9-1-1928

Systems of farming for the hill sections of Mississippi

Lewis E. Long

R. S. Kifer

Bulletin No. 257 September, 1928

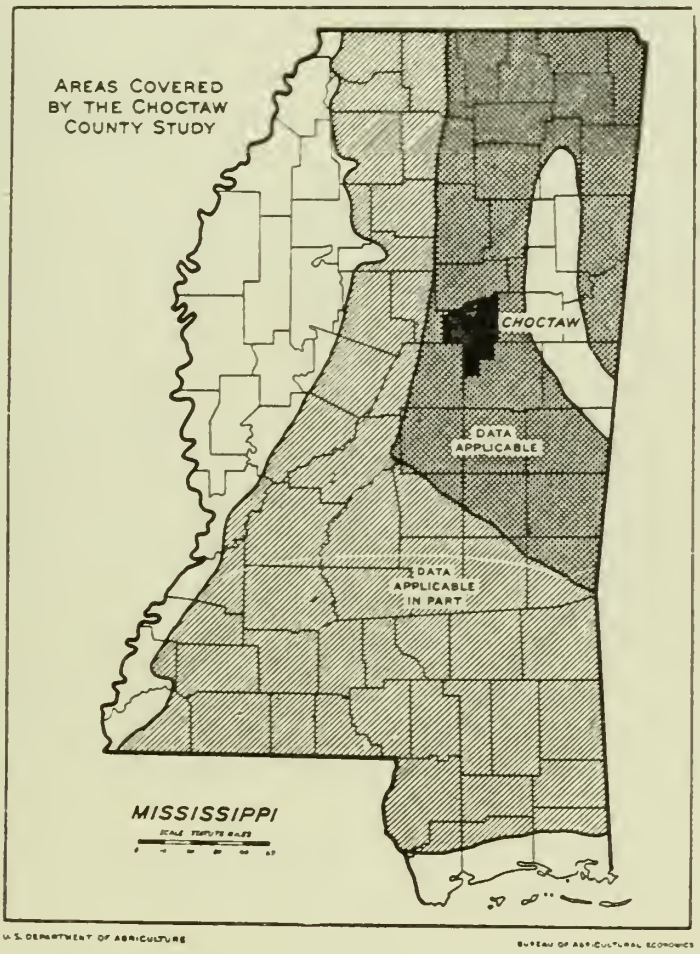
Systems of Farming for the Hill Sections of Mississippi

By

LEWIS E. LONG, Mississippi Agricultural Experiment Station

and

R. S. KIFER, United States Department of Agriculture Bureau of Agricultural Economics



This bulletin should be applicable in particular areas where conditions are similar to those in the area where this study was made.

United States Department of Agriculture
Bureau of Agricultural Economics
in cooperation with
Mississippi Agricultural Experiment Station
A. & M. College, Mississippi

J. R. RICKS, Director

SYSTEMS OF FARMING FOR THE HILL SECTIONS OF MISSISSIPPI
TABLE OF CONTENTS

SYSTEMS OF FARMING FOR THE HILL SECTIONS OF MISSISSIPPI

The purpose of this bulletin is to point out some factors which affect farmers' earnings in the hill section of Mississippi, and to suggest some systems of farming which should be profitable in this and similar sections. The information contained should help in developing the more important crop and livestock enterprises and in combining these into a well balanced farming system.

To the farmer in the hill section of Mississippi the conservation of soil fertility and the economic use of fertilizers are important questions. The too common practise of continually cropping the fields with cotton or corn destroys the humus content and reduces the fertility of the soil. The quantity of fertilizer necessary to obtain good yields will depend somewhat on the cropping system followed. A choice of crops which will yield a profitable return to the farmer and yet serve to maintain the plant food in the soil is essential to a good long time farming program. To this end feed crops and livestock are needed and, wherever profitable, should be included in the farm organization.

The Nature of the Study and the Bases for Conclusions

The field work for this study consisted of obtaining farm business records by the survey method in Choctaw County, Mississippi, for the years 1920 to 1923 inclusive, and of obtaining detailed farm business records in the same section during 1924, 1925 and 1926. Data from the United States Agricultural Census, from the Division of Crop and Livestock Estimates of the Bureau of Agricultural Economics, from reports of the United States Weather Bureau, from reports of the Mississippi State Tax Commission, and from the Mississippi Agricultural Experiment Station were also used.

In the first part of the bulletin the physical characteristics of the section and the effect on crop and livestock adaptation are discussed briefly. A brief explanation is given of recent agricultural developments in response to changes in economic or natural conditions.

Secondly, the quantities of labor and materials used in producing crops and livestock on farms in the section are shown. These requirements are then considered in connection with the historical and experimental data and normal relations between the quantity of product and the cost factors used in production are obtained. From these normal relations and prices which seem likely for a period of years just ahead combinations of crops and livestock which should be profitable are suggested. Forms are provided and methods are explained by which systems of farming may be worked out on particular farms.

In this study, survey records were obtained from 15 farmers in 1920, 12 in 1921, 16 in 1922 and 21 in 1923 (1). These records showed the capital investment, the acreage and production of crops, the number and production of livestock, with the income and expenses for each farm. This material shows recent changes in organization, and progress on certain farms in the section. With a few exceptions, records were obtained from the same farms in consecutive years, and at the end of the period the farms were included in the detailed cost account work.

(1) These records were secured under the direction of J. N. Lipscomb. The data were not published separately.

Twenty-four farmers kept detailed cost records in 1924, 19 in 1925, and 19 in 1926. Records were kept on 17 farms for the three year period. These records show the investment in the business, the cash expenses and receipts, the man labor and horse work expended on crops and livestock, the material used on, and the production of crops and livestock, and the value of products which the farm contributed to the family living (1).

Crop seasons were unusually favorable for most crops during the three years of the detailed study. Normal yields have, therefore, been modified in light of yields for a longer period.

Fertilizer experiments in the community and livestock breeding and feeding trials at the Experiment Station indicate that the common practices in the county can be improved. The Experiment Station data consists of fertilizer tests conducted in the immediate community and elsewhere in the area; tests of cotton varieties; production of other crops and experiments with methods of breeding and feeding livestock. The results of these experiments are the basis for some of the fertilizer requirements and livestock rations suggested. References to published reports are given under the different headings.

DESCRIPTION OF THE AREA

The farm records were obtained in Choctaw County, Mississippi, located in what is known as the Short Leaf Pine Section, about 50 miles northeast of the geographical center of the state.

The topography of the county is marked by rolling uplands and level stream bottoms. The mean elevation is about 450 feet. Drainage is good, but the cultivated hill sides wash badly unless properly terraced.

The soils of Choctaw County have been grouped into 9 series and 16 types (2) with rusten very fine sandy loam and Pheba silt loam most important. Pheba silt loam predominated on the farms from which records were obtained, with Rusten, Collins, Orangeburg and Susquehanna series represented in small areas. In general, the soils in the section are lacking in phosphorus, and many soils are lacking in potassium (3). The nitrogen content of the soil depends largely on the cropping system followed in the past, but in most fields this element must be supplied through application of fertilizer. Practically all of these soils are deficient in lime. Heavy applications of commercial fertilizer are necessary to produce good crop yields in most of the area.

Rainfall is more than ample particularly during the winter and spring months. The average annual rainfall is 52 inches distributed as follows: winter 15 inches, spring 15 inches, summer 14 inches, and fall 8 inches. The high precipitation, together with the rolling topography, fine top soil and heavy subsoil results in severe washing of cultivated hillsides. The lighter rainfall during the fall months is favorable to successful harvesting of crops.

Because of the rolling nature of the land much water is lost in run off, while the lack of decayed vegetation impairs the moisture retaining pro-

(1) This material is reported in Mississippi Experiment Station Bulletins Nos. 228, 237 and 243. Progress reports for 1924, 1925 and 1926 respectively.

(2) Soil Survey of Choctaw County, Miss. Government Printing Office, 1923.

(3) The soils of Mississippi—Mississippi Station Technical Bulletin No. 7.

erty of the soil. Even with the high rainfall, crops sometimes suffer from ack of moisture during brief periods of drouth.

The winters of Choctaw County are short and mild while the summers re long, but not excessively hot. The mean temperature for the winter nonths is 46.6° F. Freezing may occur at night, but the temperature during he day is usually above freezing. Snow is rare.

During the summer months, June, July, and August the mean tempera- ure is 79.0° F., and is favorable to the growth of corn and cotton. The ummer nights are, however, comfortably cool. The growing season is ufficiently long that there is no danger of crop loss from early or late rosts. The average date of the last spring frost is March 28, and the verage date of the first fall frost is October 31. The average frost free pe- iod is 217 days (1).

The Adaptation of Crops

In the natural state, the soils of Choctaw County are low in fertility nd erode badly where terracing is not practiced, but with a liberal use f fertilizer and the construction of terraces, the growing of a variety f crops is possible.

Cotton succeeds best on the higher fields where the thinner lands are onducive to less vegetative growth and early maturity. Usually, such ields are farther removed from timber and bushy areas in which the oll weevil survives the winter.

Corn and other row crops for forage are more successful on the lower and oorer drained lands. Although the practice has been to fertilize corn only ghtly or not at all, it has been found that liberal use of fertilizer even n bottom lands yields good returns on the investment.

Oats are usually grown as a nurse crop for lespedeza seeding. Without he use of fertilizer and with the usual practice of sowing broadcast and lowing under, the yield is ordinarily very low. By the use of fertilizer and etter preparation of the seed bed, oat production could be profitably xpanded. Oats could also be used advantageously as a winter cover crop o prevent washing and for winter pasture.

Lespedeza is ordinarily successful as a hay crop on the bottom fields.)n the upland fields it fails as a hay crop unless the season is unusually et. However, lespedeza supplies one of the principal plants in upland astures. When once well seeded, lespedeza reseeds itself for several suc- essive years.

Cow peas may be grown, with few exceptions, on any field of the ounty, production being limited by soil fertility and drainage. Soy beans ave succeeded in numerous instances, but the varieties best adapted to he county have not yet been determined. Vetches and clovers have never ecome established in the county due, perhaps, to a deficiency of lime in he soil.

Truck crops, including sweet potatoes, sugar cane, water melons, can- aloupes, tomatoes, and garden crops produce well in low sandy areas.

Natural pastures are very poor. Many of them consist of more or less

(1) Weather data from the records of the U. S. Weather Bureau Station at ouisville, Winston County, Mississippi, are taken to represent conditions in Choctaw ounty.

open woods, swamps, and old abandoned fields. Broom sedge is the predominating natural grass. Great pasture improvement is possible by stopping erosion where necessary and encouraging the growth of such plants as bermuda grass, carpet grass and lespedeza.

The county was originally covered with pine and hardwood forests, which have been largely cut away. The only remaining timber is old field pine and some of the less valuable deciduous timber. The soil and climate are very favorable to the growth of pine timber, and where the land can not be put to a more profitable use, such timber should be protected and encouraged.

Adaptation of Livestock

The lack of good pastures is perhaps responsible for the small numbers of livestock in the county. Few beef cattle are kept and dairy cattle are kept primarily to supply the family needs for dairy products. The county is free of ticks and with the establishment of more market outlets for dairy products and the possibilities for pasture improvement, dairying should become more important as a farm enterprise.

Pork production is limited by the scarcity of grain. Practically all corn produced is needed to feed work stock, so that, with a few exceptions, only enough hogs are kept to supply family needs. Some hogs have been shipped from the county when prices were especially favorable. Some expansion could be made in the production of hogs by an increased use of pastures and grazing crops.

Few sheep are kept in the county at the present time. When sheep were kept, the income was derived from wool sales and an occasional mutton sale. This income was insufficient to cover expense of fencing and losses by disease and dogs; so the enterprise was abandoned. Some profit might be made with small flocks of sheep where spring lambs were produced for market.

Chickens, up until the last few years, were kept mainly for family use. In recent years, sales of poultry and eggs have been increasing and much improvement has been made in farm flocks. The county is well adapted to poultry production, and this enterprise, as a part of the farm plan, pays well where ordinarily good poultry management is practiced.

AGRICULTURAL DEVELOPMENT IN CHOCTAW COUNTY

The first settlers in Choctaw county came principally from the Carolinas and Georgia, and the present white population is of almost pure native stock descended from these early settlers. The county was organized in 1833 and attained its present form in 1874. During the reconstruction period following the civil war, much of the agricultural land was abandoned, but at the time of the census in 1880, the county was developing rapidly. Population increased steadily until the invasion of the boll weevil in 1909. Since 1910, the population particularly the farm population, has been decreasing. The total population in the county increased from 9,000 in 1880 to 14,400 in 1910, but in 1920 the population was only 12,500. The reduction was caused by the movement from the farms.

Table 1 shows the farm population, number of farms, and land in farms

as reported by the United States Census since 1880. The number of farms and land in farms increased with population until about 1910. During the period from 1910 to 1925 there has been a decided decrease in population and land used for farming. This movement has been general throughout the Southern States and is only slightly greater for this area than for the state as a whole. The decrease in farm land was less rapid than the reduction in population and the tendency is for the average size of farms to increase slightly. The total amount of improved and cultivated land in the county decreased as did the average acres of improved and crop land per farm. For the most part the abandoned crop land was allowed to grow up to brush and trees.

TABLE 1—FARM POPULATION AND LAND IN FARMS 1880-1925 (a) CHOCTAW COUNTY, MISSISSIPPI

Year.	Population	Number of Farms	Land in Farms (Acres)	
			Total	Improved
1925	9,424	1,957	203,510	66,626(b)
1920	10,942	2,188	228,010	75,416
1910	13,589	2,583	237,768	98,422
1900	12,554	2,189	217,591	70,290
1890	10,580	1,544	199,527	59,996
1880		1,358	169,918	41,288

(a) Data from United States Census.

(b) Includes crop land and plowable pasture, but not land in buildings.

TABLE 2—ACRES OF CROPS 1879-1924 CHOCTAW CO., MISS. (a)

Year	Cotton	Corn	Oats	Cane and Sorgum	Hay and Forage	Sweet Poatoes
1924	10,586	23,050	1,032	313	2,904	275
1919	11,682	28,724	1,883	1,054	6,114	522
1909	22,932	26,045	2,500	484	3,193	560
1899	19,798	27,132	2,927	616	661	305
1889	18,576	20,412	4,200	464	712	472
1879	13,497	18,139	3,931			430

(a) Data from United States Census.

As shown in table 2 the acreage of cotton in 1924 and 1919 was only about 50% of the acreage in 1909. A smaller acreage of corn was grown in 1924 than in previous years, but in general the acreage of corn has decreased less than other crops. There has been no appreciable increase in crops planted to replace the cotton acreage abandoned. Figure 1 shows the acres and production of the important crops according to reports of the census since 1879. Although the census reports an increase in acreage of hay and forage crops in 1919 yet the acreage in 1924 was no higher than in 1909. Even in recent years the acreage planted to cotton varies considerably, the tendency being to increase the acreage following a profitable crop year. Figure 2 shows the changes in estimated cotton acreages for the years 1919 to 1926. Since 1919 the cotton acreage has normally been about 12,000 acres, but

dropped to one-half that in 1921 after the price decline of 1920 and increase somewhat in 1926.

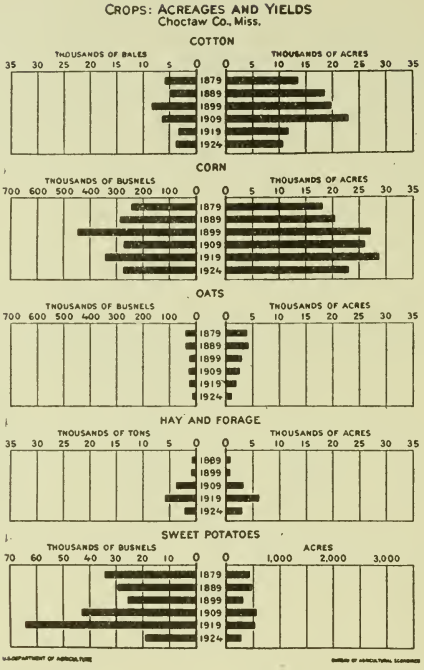


Figure 1—Census figures show that cotton and oats acreage have tended downwa since 1909. The acreages of corn and forage crops were greater in 1919, but less 1924 than in 1909.

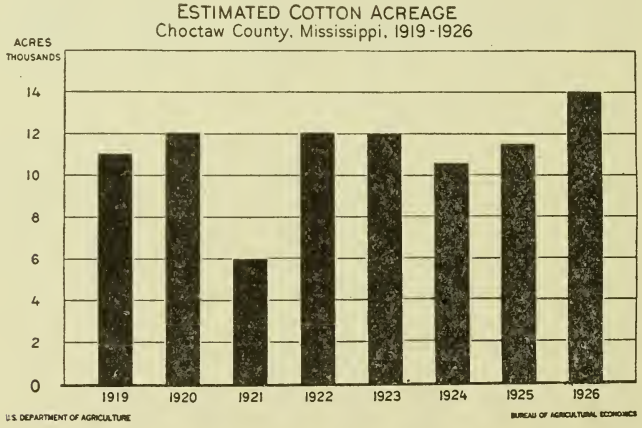


Figure 2—During recent years the acreage of cotton in Choctaw County has approximately 12,000 acres. With an abundance of land available, this acreage c be materially increased, should prices justify expansion without decreasing acr of other crops.

Table 3 shows the estimated average yield per acre of the important crops in Choctaw and in the 7 nearby counties having similar soil conditions. Cotton yields were above normal during the period from 1924 to 1926; however, yields of other crops were more nearly the average. The yields of most crops could be increased considerably by the use of more fertilizer and better cultural practices.

TABLE 3—ACRE YIELD OF CROPS, CHOCTAW CO., MISS., 1920-1926 (a)

Year.	Cotton Pounds	Corn Bushel	Oats Bushel	White Potatoes Bushel	Sweet Potatoes Bushel	Tame Hay Tons	Lespedeza Tons	Syrup Gallons	Soy Beans Bushel
1926	232	20	20	58	112	1.1	1.0	106	10
1925	197	16	20	66	105	.9	1.1	91	16
1924	174	12	18	90	46	.8	.....	62	8
1923	76	15	16	64	98	1.3	1.2	98	.....
1922	162	17	18	116	122	1.2	1.4	87	.....
1921	80	14	25	75	70	.9	.....	78	.....
1920	90	.....	.....	.....	.....	.....	.....	.....	.....
Average	144	16	18	78	92	1.0	1.2	87	11
(b) Av. of 8 counties	141	15	20	82	90	1.1	1.3	84	11

(a) Data from Division of Crop and Livestock Estimates.

(b) Average for Choctaw, Attala, Montgomery, Leake, Webster, Oktibbeha, Winston, and Neshoba Counties.

Since 1880 the changes in the number of livestock kept on the farms has coincided closely with changes in crop acres. The tendency to decrease the acres in cash crops has not been compensated for by any increase in the extent of the livestock enterprises. Table 4 gives the numbers of livestock on farms for the census years 1880 to 1925. The number of workstock on farms increased from 1880 until 1910, but has decreased somewhat since that time. The numbers of cattle and hogs are less at the present time than in 1890 and 1900.

TABLE 4—LIVESTOCK ON FARMS, CHOCTAW COUNTY 1880-1925 (a)

Year	Horses	Mules	Cattle	Swine	Chickens
1925	1,197	2,792	7,885	2,966	55,220
1920	1,917	2,579	9,819	8,025	61,476
1910	2,374	2,203	7,732	6,731	49,187
1900	2,228	1,945	10,673	15,049	42,424
1890	1,771	1,222	10,562	14,245	80,072
1880	1,058	1,135	7,802	11,969	37,569

(a) Data from United States Census.

It is probable that the decrease in farm population has allowed the less productive land to go out of cultivation. The period since 1920 indicates that the reduction in crop acres is not likely to continue, and that in periods of favorable prices, the acreage of crops can be increased readily. The increased acreage of cotton in 1926 following 2 years of favorable yields and prices illustrates this possibility.

TABLE 5—LIVESTOCK ON FARMS, CHOCTAW COUNTY, MISS. (a)

Year	Horses and Mules (b)	Cattle	Hogs
1925	3,825	6,616	2,776
1924	3,874	7,520	3,393
1923	3,885	6,794	3,520
1922	4,105	7,106	3,316
1921	4,368	6,432	4,179
1920	4,532	8,427	6,139
1919 (c)			
1918	3,818	6,876	5,640
1917	4,010	5,923	4,884
1916	4,362	5,863	1,524

(a) Annual Reports of Mississippi State Tax Commission.

(b) Includes Colts, Stalions, and Jacks.

(c) Not reported.

Numbers of livestock in Choctaw county as reported by the State Tax Commission shown in table 5 indicate a continuation of the trend shown by the reports of the census. In general, the numbers of work stock, cattle and hogs have been decreasing since 1920. The movement of population from the farms has not resulted in more extensive systems of farming, nor in the use of larger units of machinery to replace the labor lost to the farms.

Description of Farms Studied

The average size of the farms on which detailed records were obtained was 124.9 acres as compared to the county average of 104.1 acres reported by the census for 1925. These farms were not only larger than the county average, but also had a higher proportion of the land in crops. On the route farms the percent of land in crops was 37.4 as compared to 24.5 for all farms in the county.

About one-half of the cotton and some of the corn grown on the route farms was cultivated by share croppers. Nearly all of the share crops were on farms larger than the average and on a typical farm of 100 acres the crops are more often cultivated by the operator or by wage labor. Detailed cost records were obtained only for the fields operated by the owner and on these fields the yield was somewhat higher than that reported for the county. The acre yield of cotton on fields for which records were available from 1920 to 1926 averaged 166 pounds of lint as compared to an estimated average of 144 pounds for the county. Cotton yields were much higher for the three years from 1924 to 1926 than for the preceding years. Favorable weather conditions, smaller boll weevil damage, and perhaps a more effective use of fertilizers may be responsible for this yield.

The corn crop averaged 17 acres per farm, of which 6 acres were grown by share croppers. Corn yields were also higher on the route farms, averaging 19 bushels per acre as compared to a county average of 16 bushels. Lespedeza, oats, pea or sorghum hay, and miscellaneous truck crops each averaged about 1 acre per farm. The yields of oats and hay were practically the same for the route farms as for the county. Table 6 gives the average crop yields on farms for which records were obtained from 1920 to 1926.

A wide variation in crop yields is shown on separate farms for the same year. For instance in 1926 with an average of 232 pounds of lint

cotton per acre, yields on individual farms ranged from 130 to 550 pounds per acre (1). Much of this variation in yields is due to the kind and quantity of fertilizer used. The farm with the lowest yield applied only 160

TABLE 6—CROP YIELDS PER ACRE ON ROUTE FARMS, CHOCTAW COUNTY, MISS. 1920-1926

Year	Cotton Pounds	Corn Bu.	Oats Bu.	Hay Tons	Syrup Gallons	Sweet Potatoes Bushels
1926	232	20	16	1.38	121	.....
1925	214	17	12	.9	83	.....
1924	172	18	21	.9	.....	.....
1923	135	20	14	1.5	123	187
1922	163	19	16	2.0	95	181
1921	133	18	22	1.0	89	110
1920	113	16	14	1.4	114	144

pounds of fertilizer per acre while the farm with the highest yield applied 200 pounds of mixed fertilizer in addition to 5 tons of barn-yard manure. Figure 3 shows the apparent relation between the yield of cotton on the route farms in 1926 and the fertilizer applied per acre. An average application of about 250 pounds of fertilizer would have produced about 250 pounds of lint, but with few exceptions the higher yields were obtained through the use of larger quantities of fertilizer.

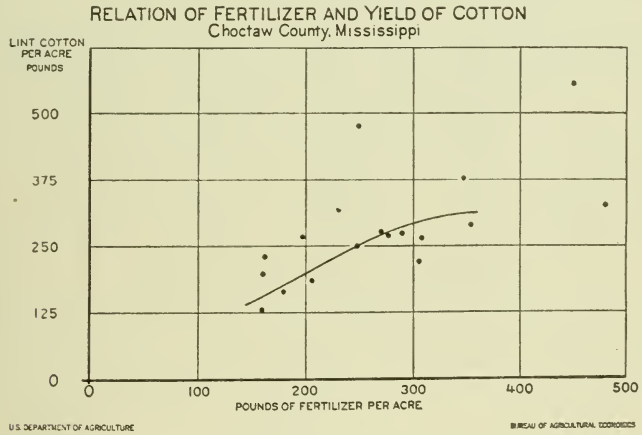


Figure 3—In 1926 the rate of fertilizer application per acre had a direct relation to the yield of lint. An application of 500 or 600 pounds per acre of an 8-6-4 mixture is most generally profitable as indicated by experimental tests covering three years in Choctaw County.

Since cotton is generally grown on higher lands where the natural fertility of the soil is low, the benefit from using fertilizer is evident. Corn, being better adapted to the lower, more fertile land, fertilizer is not so generally required.

The number of work stock on farms in 1926 ranged from 2 to 8 animals per farm. In 1924 and during a part of 1925 a number of farmers were producing dairy products for market, but for the remainder of the period,

(1) Mississippi Experiment Station Bulletin No. 243, Progress Report of Cost Production Route in Choctaw County, Mississippi, 1926.

with the exception of a single dairy farm, milk and butter was produced only for home consumption. In 1926 the number of cows ranged from 1 to 4 head on the general farms. An average of 44 chickens per farm and hogs to produce 666 pounds of dressed pork were kept.

Farm Returns in Choctaw County 1920 to 1926

Farm returns in the area from 1920 to 1926 are shown in table 7. The years during which detailed records were kept were years of fairly good yields and prices for cotton, and farm returns were higher than those shown by surveys in the same area for the four preceding years. The increase in farm expenses indicates that farmers were increasing their operations during the prosperous period. In 1926 the farm income on 19 farms averaged $743.00 and represented the return to the farmer for his own labor and his invested capital. After allowing $282.50, the average value of the operators' labor at 15 cents per hour, the farms returned a profit of 10.9% on the capital investment. The total value of products, including cash sales, increase in inventory, and the value of products used in the home, averaged $1,540. Cash and non-cash expenses, including depreciation and value of family labor other than that of the operator, were $743.00 per farm. Farm returns in 1925 and 1924 were somewhat higher than in 1926, due principally to higher prices received. The yields during these years were less than in 1926.

TABLE 7—FARM RETURNS, CHOCTAW COUNTY, MISS.

Year	Number of Farms	Investment Dollars	Value of Products Dollars	Total Charge Dollars	Farm Income Dollars
1926	19	4,229	1,540	797	743
1925	19	4,187	1,748	923	825
1924	24	4,020	1,375	477	898
1923	21	3,674	910	412	498
1922	16	3,687	757	398	359
1921	12	3,669	479	259	220
1920	15	3,729	224	479	—255

Production of Crops and Livestock

The results shown by the analysis of the detailed cost records have been considered in connection with results of crop and livestock experiments and from these a statement of the quantity of materials and the amount of labor which should normally be used in the production of each important farm product is given. The relations shown, while calling for a higher production for the quantity of cost factors used, than is usually obtained in this section, are such that many farmers following recommended practices will be able to equal them under normal conditions. In favorable years or under especially favorable conditions, production on many farms will exceed crop yields and livestock production shown.

Materials and Labor Used for Crop Production

Of the elements of production the farmer has a certain degree of control over those dealing with the variety of crop grown, methods of cultivation, and the quantity and kind of fertilizer used. The labor required to care for the crops is dependent on the nature of the soil, the topography, the preceding crop, and the size of machinery used as well as on the individuality of the operator, and to some extent on seasonal climatic conditions. Some fields require more labor than do others.

Yields and requirements of labor and material will differ from year to year. The average of a given year may not represent the normal expected over a period of years. The amount of material used may affect the yield and for this reason the normal requirements used may differ somewhat from the averages shown by the records of farms in the area.

Cotton

Table 8 shows the average amount of fertilizer, man labor, the horse work used and average yields obtained on 13 farms during the period of the study. Cotton yields were much higher in this area for 1924, 1925, and 1926 than they were during the period from 1920 to 1923, and were higher than is normally expected. During these favorable years, yields of one-half bale of lint cotton per acre were not unusual, and a few farmers averaged more than one-half bale for the three-year period.

TABLE 8—MATERIALS AND LABOR USED PER ACRE IN COTTON PRODUCTION, CHOCTAW COUNTY, MISS.

	Farms No.	Acres	Seed Bus.	Manure, Tons	Commercial Fertilizer			Man Labor Hrs.	Horse Work Hrs.	Ginning Costs, Dols.	Acre Yield Lbs.
					Phosphate Lbs.	Nitrate Lbs.	Mixed Lbs.				
Three year average on separate farms, 1924, 1925, 1926	1	3.0		5.5	169	71	67	246	78	4.13	412.7
	8	7.3		.7	152	4	72	95	46	2.70	269.7
	14	3.7		.5	95	55	60	112	43	2.67	267.3
	4	7.7		1.1	145	50	55	83	31	2.52	252.0
	16	11.6			209	79		132	43	2.42	242.3
	15	9.9		.4	200	98	56	123	43	2.35	235.3
	10	6.6		.1	106	47	23	73	34	2.30	230.7
	9	13.9		.3	172	32	81	87	37	2.25	225.3
	3	8.5		.3	178	25	80	67	31	2.17	216.7
	5	9.2		.3	149	48	15	65	30	1.90	190.0
	17	16.9		.8	96	18	69	99	40	1.90	189.7
	12	18.0		.2	167	42	70	135	45	1.89	189.0
	2	23.2			46	14	168	130	28	1.87	186.7
Three year average of all farms			1.15	.3	137	47	52	105	38	2.03	206
Suggested requirements and expected yield			1.25		261	196	44(a)	92	38	2.50	250

(a) Sulphate of potash.

Analysis of recommended fertilizer mixture is 8-6-4. The 501 pounds is equivalent to about 600 pounds of commercially mixed 8-6-4 fertilizer.

On these farms an average of 105 man hours of labor were used in producing an acre of cotton. Forty-two per cent of this labor was for picking and 26 per cent was for hoeing and chopping, all hand labor. Fifteen per cent of the labor was used in preparing the seed bed, applying fertilizer and planting. Cultivation made up another 15 per cent and hauling made up 2 per cent of all man labor used. Of these operations the labor of picking depends somewhat on the yield, while the amount of labor required for the preparation of the land varies with the type of soil, topography, and condition of the fields. The cultivation is, for the most part, performed with one horse implements and the man labor for cultivation could be reduced approximately one-half through the use of two-horse cultivators. While the saving in labor through cultivating cotton with two-horse cultivators would not reduce the total amount of man labor on this crop materially, it

would release some man labor to care for other crops at a time when corn and truck crops require attention.

With an average application of 236 pounds of commercial fertilizer per acre the three-year average yield on all farms was 206 pounds of lint cotton per acre. Some fields received light applications of manure. Average yields per farm ranged from 187 to 413 pounds per acre. The fertilizer used on these farms consisted principally of acid phosphate and nitrate of soda, although some mixed fertilizers containing potash were used. Figure 3 shows the importance of fertilizer in obtaining high yields of cotton on these farms in 1926.

TABLE 9—EFFECT OF FERTILIZER ON COTTON YIELDS
(Commercial Fertilizer)

Year—	Phosphate Pounds	Nitrate Pounds	Sulphate of Potash, Lbs.	Total Pounds	Approximate Analysis	Ginning Cost Dollars	Acre Yield (1)		Increased Yield, Lbs.
							Fertilized Plot, Lbs.	Check Plot, Lbs.	
(2) 1924	300	200	.....	500	9.6-6-0	2.20	221.2	78.5	142.7
(3) 1925	300	225	50	575	8-6-4	5.17	517.2	287.0	230.2
(4) 1926	300	225	50	575	8-6-4	4.71	471.0	197.7	273.3

(1) Estimated lint as one-third of seed cotton.

(2) Mississippi Station Bul. 226—Cotton Experiments, 1924.

(3) Mississippi Station Bul. 230—Cotton Experiments, 1925.

(4) Mississippi Station Bul. 241—Cotton Experiments, 1926.

Results from tests in the county conducted by the Experiment Station show that applications of fertilizer heavier than the average will prove profitable, and that the inclusion of potash is desirable in a fertilizer for cotton. Table 9 shows the yields of cotton from well fertilized plots for each year of the study and the increase in yield over that obtained from unfertilized plots. In each year the yield was increased substantially and a basis is established for suggesting a heavy application of well-balanced fertilizer.

In view of the increased production resulting from the judicious use of fertilizer and considering that the years 1924, 1925 and 1926 were particularly favorable to cotton, a yield of 250 pounds of lint cotton would seem likely to be obtained from the production requirements suggested in Table 8. This yield was exceeded on a number of farms in 1925 and 1926 even with lighter applications of fertilizer. In less favorable years the yield would be less and 250 pounds should represent the crop over a period of years when 500 pounds of balanced fertilizer are applied. Cost of ginning is estimated at $5.00 per 500 pound bale. On those farms which are more fertile than the average, a larger yield could be expected. The more fertile farms or those farms with manure available for distribution would probably require less commercial fertilizer.

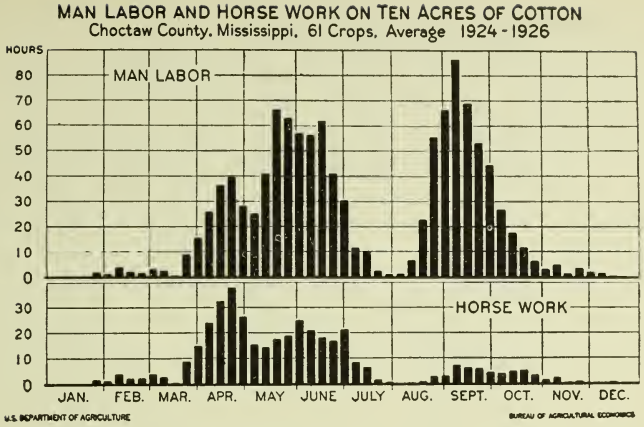


Figure 4.—Cotton calls for a great amount of hand labor in May and June and again in September. Farm enterprises which require a small amount of labor during these months are desirable.

Figure 4 shows the seasonal distribution of man labor and horse work on ten acres of cotton. This distribution is derived from the average amount of labor used each week on cotton on Choctaw County farms for the three years of the study. The peak of cotton labor comes during hoeing and chopping in May and June and again during the picking season in August and September. With the implements and practices common to the area, 10 acres of cotton is about as much as one man will ordinarily care for during the season when cotton demands most labor.

Corn

It is the common practice in this section to plant corn on the lower, more fertile land and to use little or no fertilizer. Yields on these farms for the three years of the study averaged 18.1 bushels per acre, the three year average on separate farms ranging from 12.0 to 37.5 bushels per acre. Corn does not compete with cotton as a money crop, but corn to meet the needs for feed is usually grown.

The amounts of man labor, horse work and materials used in the production of corn and the yields obtained on these farms are shown in Table 10. The averages for the three year period are shown for each item. Practically all farmers used some fertilizer, usually acid phosphate or nitrate of soda on some of their fields at some time, but few used sufficient fertilizer to obtain best results on all corn land. The average application per acre for the 3 years is 66 pounds. Although corn does not respond as readily to heavy applications as does cotton the results obtained indicate that more fertilizer could have been used profitably on many fields.

Fields are usually small and one-horse implements are used for cultivation after planting. Since the work of cultivating corn made up about 28 per cent of the total man labor on the crop the use of 2-horse machinery

TABLE 10—MATERIALS AND LABOR USED PER ACRE IN PRODUCING CORN, CHOCTAW COUNTY, MISS.

	Farm No.	Acres	Seed, Lbs.	Manure Tons	Com. Fertilizer			Man Labor Hrs.	Horse Work Hrs.	Acre Yield Bushels
					Phosphate Lbs.	Nitrate Lbs.	Mixed Lbs.			
Three-year average on separate farms, 1924, 1925 and 1926.	1	8.0		.....	149	.....	.....	62	58	37.5
	7	5.6		.2	206	49	.....	86	92	31.1
	15	9.2		.3	99	17	.....	50	38	23.0
	8	15.0		.....	16	.....	5	38	28	22.3
	17	11.1		.....	26	.....	6	59	40	21.9
	16	11.0		.....	85	7	.....	61	41	21.0
	13	11.7		.....	23	5	17	45	47	20.7
	6	18.8		.....	36	.....	6	52	45	19.6
	3	10.9		.....	14	47	.....	32	26	17.3
	5	9.6		.....	66	22	.....	30	27	17.0
	2	9.8		.....	44	.....	50	52	30	16.9
	12	18.6		.....	.....	1	.....	54	39	16.2
	11	8.7		.1	27	13	.....	30	25	15.8
	14	9.3		.1	62	5	.....	52	44	14.7
	10	10.0		.....	25	.....	6	29	24	14.6
	9	14.1		.....	46	2	.....	37	27	13.3
	4	11.0		.....	18	37	3	29	20	12.0
Three-year average on all farms.	.....	11.5	10.1	.1	51	9	6	44	35	18.1
Suggested requirements and expected yield.	.....	.....	10	.....	100	150	.....	38	35	25.0

would reduce the labor per acre on corn materially. The labor thus released from the corn crop could be used on other crops or to grow a larger acreage of corn.

Heavy applications of fertilizer have not always proved profitable, but applications of fertilizer in moderate quantities rarely fails to yield satisfactory returns. Results at the Holly Springs Station indicate an increase in yield of 8 to 10 bushels per acre for an application of 100 pounds of nitrate of soda with 150 to 200 pounds of acid phosphate (1). This same application with the addition of 50 pounds of kainit is suggested as a general fertilizer

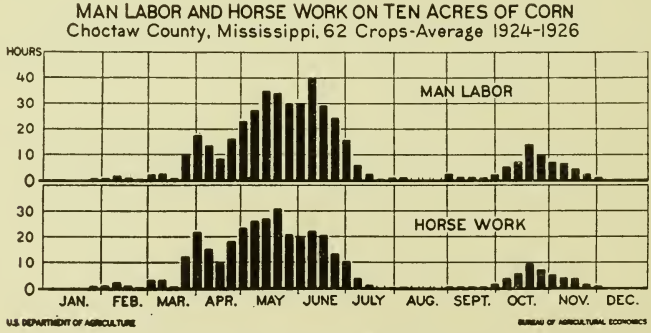


Fig. 5—Corn calls for the greatest amount of man labor in May and June. Labor on corn conflicts with labor on cotton during these months.

(1) Mississippi Station Bulletin 239. Report of the Holly Springs Branch Experiment Station, 1926.

for corn by the Raymond station (1), while the Poplarville station has secured satisfactory results by the use of nitrogen fertilizers alone (2).

Figure 5 shows the seasonal distribution of man labor on corn in Choctaw County. Any reduction in man labor during the months of May and June would help to reduce the peak of man labor at a time when both corn and cotton are requiring labor. The labor of gathering corn comes at a time when other work is not pressing.

Suggested requirements for corn production are given in Table 10. An application of 250 pounds of fertilizer per acre should give a yield of 25 bushels per acre. In view of the common practice of planting corn on the most fertile land it seems reasonable to expect the recommended application of fertilizer to produce the above yield. On the better land or on farms on which barn yard manure was available a larger yield would very likely be obtained.

Oats

Few farmers in the section grew oats, but it seems that more could do so with profit. In addition to providing excellent feed for livestock, oats is valuable as a cover crop and will provide some winter pasture in addition to the crop of grain. The common practice in the community is to cut the crop and feed it in the bundle. A larger acreage of oats on these farms would provide a substitute for other grain or would provide an additional crop for hay.

TABLE 11—LABOR AND MATERIALS USED PER ACRE IN PRODUCING OATS, CHOCTAW COUNTY, MISS., 1924

	Farms	Acres Per Farm	Seed Bu.	Fertilizer Nitrate Lbs.	Man Labor Hrs.	Horse Work Hrs.	Acre Yield Bu.
Individual Farms in 1924 (1)	17	6.0			14	10	26.7
	2	1.0			40	19	25.0
	4	1.5			18	25	25.0
	5	1.5			17	13	25.0
	24	1.8			14	29	17.1
	19	6.0			23	16	16.7
	13	2.5			21	11	16.0
	14	2.5			23	19	16.0
	9	4.0			20	32	12.5
Weighted average of all farms—1924, '25 and 1926—		3.7	1.7		15	14	16.4
Suggested requirements and expected yields—			2.0	200	15	14	30.0

(1) Taken from Progress report on Cost of Production Route in Choctaw County, Mississippi, in 1924. Mississippi Experiment Station Bulletin 228, page 9.

Table 11 shows the hours of man labor, hours of horse work and yields obtained on the farms reporting oats in 1924, together with the averages for all farms reporting oats during the period of the study. Suggested requirements for production are also given.

1. Mississippi Station Bulletin 231. Report of the Raymond Branch Experiment Station, 1925; and Mississippi Station Bulletin 240. Report of same Station 1926.
2. Mississippi Station Bulletin 225. Report of the South Mississippi Branch Experiment Station, 1922, 1923, 1924.

The general practice in seeding oats is to broadcast the seed and cover with a plow or harrow. With this method the seed is covered unevenly and a poor stand often results. More care in seeding would increase the probability of securing good stands.

An averge of 1.7 bushels of seed was used per acre. Few farmers applied fertilizer to oats yet tests of the experiment station show that fair yields can be obtained by application of sodium nitrate at the rate of 200 to 300 pounds per acre. It seems that with more care in seeding and with the application of some nitrate of soda that the yield given in Table 11, as a standard, could be easily obtained in most years.

The distribution of labor on oats is shown in figure 6. These oats were seeded in the spring, although fall seeded oats would have made as good or better yields and in addition would have provided cover for the field during winter, as well as some pasture. The labor distribution on fall seeded oats would not conflict with labor on other crops more than oats seeded in the spring. In each case the labor of seeding comes at a time when other work is not pressing. Oat harvest, however, does conflict with the cultivation of cotton.

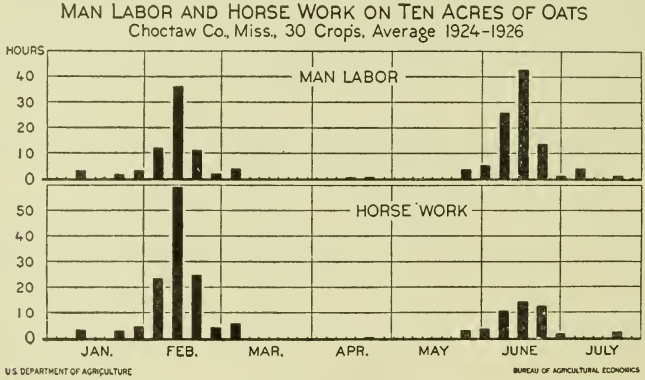


Fig. 6—Oats call for labor during February and June. The harvest labor comes at the same time as tillage labor on corn and cotton. Man labor for harvesting might be decreased by the use of modern machinery.

With no fertilizer the yield of grain for the three years was 16.4 bushels per acre. With the suggested application of fertilizer a yield of 30 bushels should normally be expected.

Lespedeza

Lespedeza is perhaps the best legume hay crop for the area, and occurs extensively in pasture mixtures. In Choctaw County it will make a growth suitable for hay on the low valley lands and on the most fertile uplands. On the thinner soils it grows and reseeds itself but does not reach a height suitable for mowing. Lespedeza seeded in fall oats in February at the rate of bushel per acre should yield a crop of hay following the oats and reseed itself to produce a crop of hay the second year. It is sometimes allowed to remain on the ground for a longer time, but is eventually replaced by persistent grasses. Two crops of hay can, however, be expected from one seeding.

TABLE 12—MAN LABOR AND HORSE WORK USED PER ACRE IN PRODUCING LESPEDEZA HAY, CHOCTAW COUNTY, MISS., 1924

	Farm No.	Acres Per Farm	Man Labor Hours	Horse Work Hours	Yield Tons
Individual Farms—					
1924—	17	1.8	17	17	1.7
	5	4.5	3	6	1.2
	6	12.0	10	18	1.0
	14	2.5	29	44	1.0
	16	1.0	28	40	1.0
	1	8 0	19	24	.9
	15	3.0	12	12	.9
	3	3.5	11	21	.8
	4	3.5	9	1	.8
	8	2.0	19	28	.8
	10	2.5	15	21	.6
	11	2.5	16	24	.6
	13	11.0	2	4	.3
Three-year average of all farms reporting— 1924, 1925 and 1926		3.9	12	18	1.1
Suggested requirements and expected yield—			12	18	1.0

Table 12 shows the man labor and horse work used on lespedeza in 1924, as reported by a number of farms in Choctaw County. The yields of hay in 1924 and 1925 were somewhat lower than usual and it seems that a higher yield than that shown by the average of the three years might normally be expected. Since many of the fields were abandoned in 1925 and 1926 some of these must have been nearly run out and heavier yields could have been obtained on new seedings in 1924. The yield in the year ranged from .3 to 1.7 tons per acre with an average of .9 tons. The labor reported in 1924 includes labor of seeding on some fields and labor for hauling on all. Much of the variation in labor used is due to these factors.

The crop of 1925 was practically all from volunteer seedings and with no seeding labor reported the average labor used is low. The crops in 1926 were all volunteer seedings but with the high average yield the labor used is higher. Labor reported here includes hauling from the field. Fertilizer is not commonly used on this crop since the lower more fertile land only is recommended for growing lespedeza hay and if the preceding oat crop was fertilized no additional fertilizer is needed. On the suggested requirements no man labor or horse work is included for seeding lespedeza since it is assumed that the crop would be seeded with oats every other year.

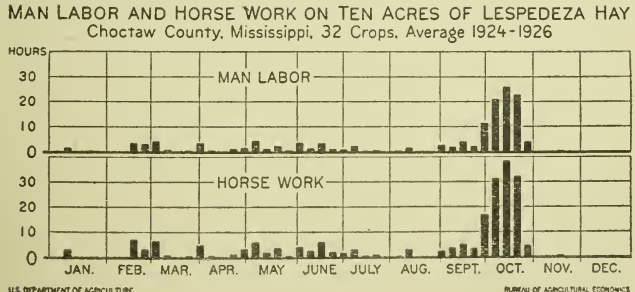


Fig. 7—Lespedeza is usually harvested late in the season and interferes very little with other crop labor.

The distribution of labor and horse work on 10 acres of lespedeza is shown in figure 7. The peak of labor on hay comes late in the fall when other work is not pressing, and labor on hay does not interfere with other crop work. On most farms there is some land suitable for growing lespedeza that is now lying out. Considering the value of the legume in the cropping system, and a need for more high grade roughage on most farms, it seems that the acreage of lespedeza could profitably be increased. On all the farms the hay was cut after the seed had ripened so that the field would be reseeded. The hay may be harvested at any time from August to October depending on seasonal conditions and the degree of seed maturity desired.

Sweet Potatoes

Some potatoes can usually be sold on the local and nearby markets at fair prices. When the low acre cost is considered in relation to the yield obtained, it should be a profitable practice to produce some potatoes other than those used on the farm. In years of low prices the surplus potatoes could be utilized as feed for livestock. The man labor and horse work on potatoes, as shown in figure 8, does not conflict seriously with other crop labor. Where plants are transplanted from vine cuttings 3 bushels of potatoes will furnish cuttings for an acre. Fertilizer is used sparingly but an application of 8-4-4 fertilizer is recommended where large yields are desired. Yields of from 100 to 200 bushels should be obtained. (1).

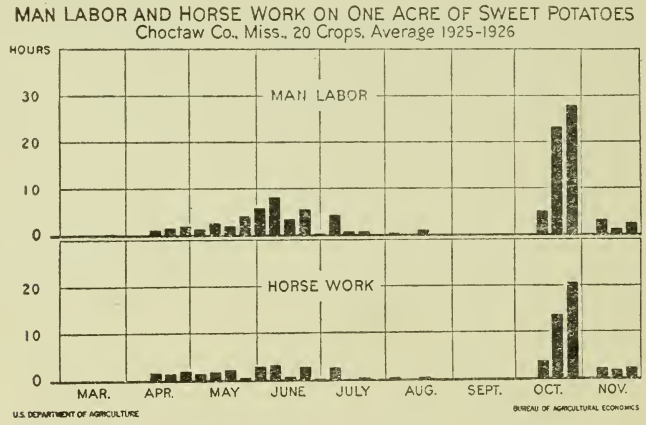


Fig. 8—Sweet Potatoes work in well with other crops, but call for some labor at the same time as corn and cotton.

Cane and Sorghum

Sugar cane and sorghum for molasses are grown on many farms primarily for home use. Where a local market for molasses is available sorghum or sugar cane will return a good profit per acre.

Sugar cane syrup is preferred by the market and usually sells for about 50 per cent higher price than sorghum molasses. The crop is usually planted on low fertile soil or is given a covering of barn yard manure. Where fertilizer is used an application of equal parts of acid phosphate and cottonseed meal is suggested. Sorghum will normally produce 80 to 100 gallons of molasses per

(1) Mississippi Joint Bul. 1. Agricultural Progress and Opportunities of South Miss.

acre. Sugar cane may yield considerably more than this in favorable seasons and the yield should normally be somewhat higher than that received from sorghum. In addition to the molasses the sorghum cane should yield about 20 bushels of seed per acre. About 117 hours of man labor and 92 hours of horse work are required to care for an acre of this crop and make it into molasses. (1).

Materials and Labor Used for Livestock Enterprises

Extensive data on the feed and labor used in the production of livestock and livestock products are not available from the farm records. On most farms the livestock enterprises are relatively unimportant and usually are supplementary to cotton growing. Work stock are maintained to care for the crops. The products from cows, hogs, and poultry are, for the most part, used in the home.

Work Stock

The horses and mules kept for work stock are generally small, ranging from 800 to 900 pounds in weight and are adapted to work in the cotton fields. Since much of the labor on cotton is hand labor and the crop acreages are small, the work stock is used less than in some other farming sections, and here the animals are allowed to run in pastures for long periods. With an extensive use of pasture and light farm work the feed allowance per head is less than in many other sections.

The quantity of feed used and the hours of work per animal as reported by the farm records is given in Table 13. For all farms the feed used per

TABLE 13—FEED AND LABOR USED PER HEAD BY WORK STOCK, CHOCTAW COUNTY, MISS.

	Farms	Average No. per Farm	FEED			Total Grain Lbs.	Roughage Tons	Pasture Days	Man Labor Hours	Time Worked Hours
			Corn Lbs.	Oats Lbs.	Mill Feed Lbs.					
Three-year average on separate farms, 1924	1	3	3,101	136	11	3,248	.7	102	67	810
1925	12	3	2,880	128	.....	3,008	.4	120	87	808
1926	8	3	2,630	.....	.....	2,630	.8	104	66	799
	14	2	2,082	306	.....	2,388	.5	127	60	798
	5	3	1,962	.....	247	2,209	1.1	121	64	772
	3	2	2,429	97	132	2,655	.3	94	66	728
	6	3	2,542	.....	.....	2,542	.7	87	34	715
	16	3	2,654	568	84	3,306	.9	81	79	672
	15	2	2,322	26	392	2,740	.7	145	52	660
	10	2	2,492	155	17	2,664	.6	113	64	649
	7	2	2,404	182	.....	2,586	.7	182	62	609
	17	3	2,623	50	.....	2,673	.8	128	66	567
	9	3	2,304	60	8	2,372	.5	51	63	497
	2	3	2,652	294	466	3,412	.2	112	62	484
	13	2	2,996	.....	32	3,028	1.4	108	46	466
	4	2	2,135	22	68	2,225	.6	118	58	442
	11	2	2,155	184	5	2,344	.7	142	72	435
Weighted average all farms, 1924, 1925 1926		2.7	2,481	115	75	2,671	.7	118	59	637
Suggested requirements for 850 pound animals		.....	1,820	780	.....	2,600	1.4	110	60	600 to 1000

(1) Miss Experiment Station Bul. 237, Progress Report on Cost of Production, Route 1925.

head during the year averaged 44 bushels of corn, 3.6 bushels of oats, 75 pounds of mill feed, and .7 tons of roughage. The distribution of average quantity of feed per head on the separate farms indicates that there is quite a wide variation in the feed used by different farmers.

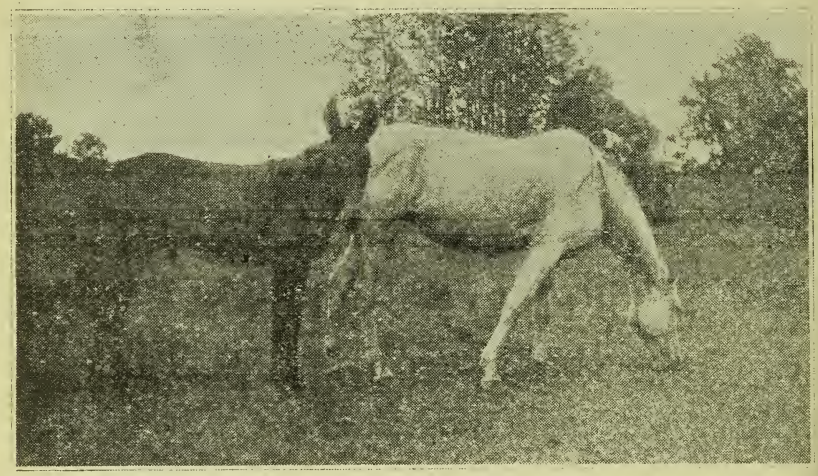


Fig. 9—Where pasture is plentiful and feed is produced on the farm, it may be more economical to raise rather than purchase mules for replacement.

The animals were worked an average of 637 hours each per year or an average of 80 days of 8 hours each. Some farmers used their work stock almost twice as much as others. The work stock were on pasture for 118 days and in addition were on pasture at night throughout the summer.

The average quantity of feed consumed would allow a daily ration of 10 pounds of grain and 5 pounds of hay for the period when not on pasture. The feed reported during 1924 is very light and is probably less than the quantity fed normally. When working, the horses were fed on corn and a small amount of lespedeza, and the ration normally given is low both in protein and dry matter.

The ration recommended by the experiment station calls for 50 bushels of corn, 40 of oats and 2¼ tons of hay for a 1000 pound horse on dry lot feeding for a year. For an 850 pound animal this would be 10 pounds of grain and 11 pounds of hay daily. Horses fed on this basis and on pasture without supplementary feed for 105 days during the year would require approximately 2600 pounds of grain and 2860 pounds of hay. The suggested requirements for an 850 pound horse as given in Table 13 would substitute some oats for a part of the corn in the ration most commonly used in the section and would increase the allowance of hay.

Milk Cows

Only one farmer on the route made dairying an important enterprise, but with a market for whole milk or butterfat available dairying presents one alternative to cotton for the farmers in this section. The quality of the cows now kept could well be improved and a producer who planned to start a herd for commercial production could profitably obtain better cows than are now

being milked. The average production per cow for the three years is only 128.5 pounds of butterfat annually. This is equivalent to 2570 pounds of 5% milk. The cows kept were small but produced milk with a high percent of butterfat. A farmer with a reasonably good herd of cows should be able to obtain a production of 4000 or more pounds of 5% milk. Good profits cannot be expected from cows that will not reach this production.

The feed consumed and the labor used per cow is given in Table 14. As nearly all the cows included in this report were kept to produce dairy products for home use only, no particular effort was made to obtain a higher production. Production could undoubtedly have been increased through heavier feeding. These cows received on the average, 876 pounds of concentrates of which 70 per cent was cottonseed or cottonseed meal. In addition, the cows received 1100 pounds of roughage and were on pasture for about 230 days.

TABLE 14—FEED AND LABOR USED PER COW FOR MILK PRODUCTION

	Farm Number	Cows Per Farm	FEED USED						Pasture Days	Man Labor Hours	Production of Butterfat, Lbs.
			Cottonseed Meal, Lbs	Cottonseed Lbs.	Corn Lbs.	Other Concentrates Lbs.	Total Concentrates, Lbs.	Roughage Tons			
Three-year average on separate farms 1924, 1925, 1926	9	2	581	.....	.....	280	861	.5	183	85	257
	1	5	308	487	310	32	1,137	.8	225	91	196
	6	13	974	.....	189	127	1,290	.5	178	73	166
	11	2	409	135	120	.....	664	.4	224	115	155
	16	5	362	195	600	119	1,296	.4	194	96	153
	3	2	323	308	.....	213	844	.8	187	83	132
	13	5	221	135	350	218	924	.8	203	63	122
	8	4	370	240	.....	38	648	.5	198	73	115
	15	3	327	309	358	109	1,103	.6	205	97	112
	10	2	211	310	.....	.....	521	.7	215	87	109
	4	3	481	221	.....	185	887	.8	194	85	107
	2	4	314	50	.....	133	497	.5	206	73	106
	17	2	160	679	91	50	980	.7	185	87	103
	14	3	319	221	88	197	825	.7	230	91	98
	5	4	203	265	424	.....	892	.5	239	80	97
	12	3	253	136	127	57	573	.3	199	100	93
	9	3	190	259	.....	27	476	.5	155	89	83
Weighted average all farms 1924, 1925, 1926			419	197	159	101	876	.6	229	79	129
Suggested requirements and expected production			300	.....	600	300(1)	1,200	1.5	215	80	200

(1) Made up of oats.

The seasonal distribution of labor on cows is shown in Figure 10.

Feed requirements in addition to pasture to produce 4000 pounds of milk per cow are given in Table 14. The allowance suggested would provide a ration of 7.8 pounds of grain and 13 pounds of hay daily for 150 days. This feed would need to be supplemented by some winter pasture to keep the cows in a full flow of milk. Under farm conditions the grain ration would probably

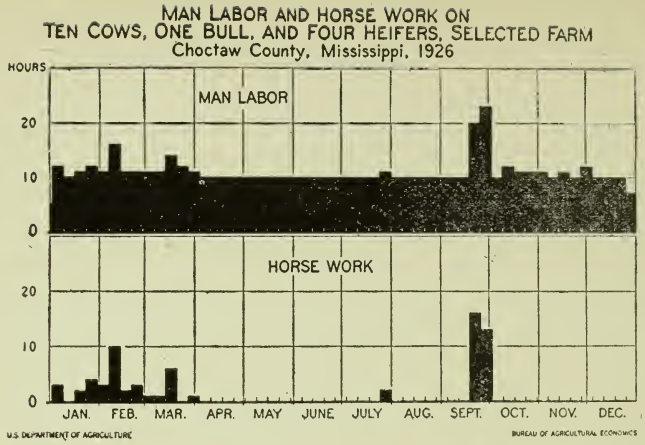


Fig. 10—Dairy cows provide an outlet for labor during the entire year. The farmer as a business man may profit by giving himself and family a steady job.

be distributed over a longer feeding period than 150 days, and cows would receive some grain while on good pasture. For the expected production it is assumed that the cows will have the ability to convert the feeds into milk.

Fig. 11—Dairy cows permit a more even distribution of the farm labor, aid in maintaining soil fertility, furnish a home market for farm grown feeds, and thus add to the farm income.

The long pasture season reduces the quantity of hay required and also displaces the succulent feed usually provided for in a dairy ration. Few farmers turning from cotton to dairy production would have a herd large enough to justify the use of a silo for the short feeding season. Cows with the capacity to produce more than 4000 pounds of milk will require heavier rations and a larger proportion of concentrate feed.

Good pastures are of prime importance to successful dairying in this sec-

tion. Natural pastures are ordinarily poor and where necessary should be improved by terracing and stopping washes. Good pasture mixtures including such plants as lespedeza, bermuda grass, and carpet grass should be introduced where these plants are not already established. (a).

Pork Production

Hogs are more often kept to produce pork for home consumption than for market. A few farmers produced pigs for sale. The average annual production per farm for the period of the study was 643 pounds of dressed pork, or the equivalent of 860 pounds of live pork. The hogs fed out are often purchased as small pigs, kept in a dry lot or close pen, and fed out on corn supplemented with skim milk, shorts, and kitchen waste. Under these conditions a surplus production of pork would usually be unprofitable. A few farmers, however, are making use of pasture in pork production and it seems that with the use of pasture crops pork production can profitably be increased on a number of farms. The use of pasture crops and the production of light rather than heavy hogs would materially reduce the grain required per unit of pork.

The feed and labor used in producing 100 pounds of live pork on farms in this study are shown in Table 15. The grain used in the production of 100 pounds live pork was 439 pounds in addition to the milk, pasture, or kitchen waste. Where breeding stock was kept the feed consumed by the breeding animals was included in the average feed per 100 pounds of pork. The total quantity of grain required could in many instances be reduced by the use of

TABLE 15—FEED AND LABOR USED IN PRODUCING 100 POUNDS OF LIVE PORK, CHOCTAW COUNTY, MISS.

	Farm Number	FEED USED			Man Labor Hours
		Corn (1) Pounds	Mill Feeds Pounds	Total Concentrates Pounds	
Three-Year average on separate farms	2	200	59	259	11
	3	336	.....	336	10
	5	364	33	397	13
	16	377	57	434	12
	4	338	100	438	14
	11	352	87	439	17
	12	460	.....	460	13
	7	331	157	488	14
	15	453	38	491	16
	8	514	17	531	10
	13	525	7	532	10
	1	553	9	562	15
	9	577	17	594	16
	14	548	63	611	17
	6	563	52	615	9
	17	579	39	618	19
	10	596	33	629	21
Weighted average all farms 1924, 1925, 1926		400	39	439	13
Suggested requirements for pork production		322	33 (2)	355	12

(1) Basis of shelled corn.
(2) Tankage in lieu of skim milk.

(a) For other suggestions on dairying see Mississippi Station Bulletin 166—"Dairying on Cut-Over Pine Land."

supplementary feeds such as tankage or fish meal, the use of pasture or the disposal of the hogs at about 200 to 225 pounds rather than feeding them to heavier weights.

Growing pigs on good pasture should receive a mixture of corn and tankage in a ratio varying from 9 parts of corn to one of supplement for young pigs to one of 18 parts corn to one of supplement for well grown pigs. For dry lot feeding the ratio of supplement to corn should be doubled. (a). Substitute feeds can be used for either corn or tankage . Where skim milk is available a ratio of 2 or 3 pounds of milk to one of corn will balance the ration effectively. Fish meal may be substituted for tankage pound for pound. Shorts makes a good feed for young pigs but it is usually more expensive than the other protein supplements. Pigs on good pasture should produce 100 pounds of gain on 350 pounds of balanced concentrate mixture. (b). Suggested requirements for producing pork are given in Table 15 and should meet the requirements on most farms in the section. The ration consists of corn and tankage and assumes that pasture will be available for the greater part of the year. The feed allowance provides an average ration of 3 pounds per day for maintenance of the sow and assumes the production of 1500 pounds of live pork from each sow. Where skim milk is available the tankage could be replaced and if sufficient milk was available the quantity of grain would be reduced somewhat.

Sheep Production

At the present time few sheep are kept in the hill sections, but a farm flock of ewes to produce lambs for the early market should be profitable on many farms. In this section sheep may be kept on pasture for the greater part of the year and will require very little concentrate feed. A ewe on good pasture would require no grain except during the breeding season and for the short feeding period during the winter. Ewes lambing in December to produce lambs for the June market should receive some feed in addition to roughage during the winter months. The amount of feed shown in table 16 would allow a ration per ewe of one-half pound of cotton seed meal and one and one-third pounds of hay for 90 days when the sheep were not on pasture, and would allow one-half pound of cotton seed meal per ewe per day for 30 days at breeding time in July.

Lambs running with ewes in good pasture will eat very little grain but to insure the lambs being ready for market a grain mixture of equal parts corn, bran, and oats is advisable. Market lambs would consume about sixty

TABLE 16—FEED USED FOR SHEEP PRODUCTION (1)

Feed Per Head	For 100-lb. Ewe	For Lamb to Weigh 75 Lbs.
Cotton Seed Meal (lbs.)	60	.....
Mixed Grain (lbs.)	.....	60
Hay (lbs.)	120	.....
Pasture (days)	275	150
Production Wool (lbs.)	4	.....
Live Weight (lbs.)	.....	75

(1) Based on unpublished data of the Mississippi Experiment Station.

(a) Mississippi Extension Bulletin 38—"Swine production in Mississippi."
(b) Henry & Morrison—"Feeds and Feeding."

pounds of grain each and should weigh about 75 pounds. As the lambs grow older they will consume more corn and less of oats and bran than the equal parts mixture for creep feeding.

A flock of sheep, under good management, should return a lamb for every ewe kept. Replacements in the ewe flock should be made about every 5 years.

A sufficient number of sheep pastures should be provided to permit the flock to be shifted at least as often as alternate years. Such shifting guards against infestation with stomach worms, the chief hazard of the sheep enterprise in the area. No trouble should be experienced from dogs if the sheep range within sight of the house and are penned at night.

Poultry Production

Like the other livestock enterprises poultry production is primarily to meet the needs for home use. The average size of the farm flocks for the 3 years was 48 birds. Egg production averaged 40 eggs per hen per year. A small flock of poultry will obtain a large part of its feed by ranging over the farm, but to obtain a reasonably high egg production some extra feed and attention must be given the hens. An ample, balanced ration, with proper housing, early hatching, and rigid culling would increase egg production on most farms.

Table 17 gives the amount of feed reported for poultry on these farms for the 3 years. The grain given consisted principally of corn. A very few farmers fed mill feed and a few fed some skim milk to the chickens. Even with the low production the poultry was a paying enterprise and one that might be increased with profit. A flock of 100 hens would require very little more la-

TABLE 17—FEED AND LABOR USED PER HEN IN POULTRY PRODUCTION, CHOCTAW COUNTY, MISS.

	Farm Number	Size of Flock Numbers	FEED PER HEN			Man Labor Hours	Eggs Produced Number
			Grain Pounds	Mill Feed Pounds	Milk Gallons		
Three-Year average on separate farms 1924, 1925, 1926	15	29	28	3		2.4	57
	14	41	20	3		1.5	53
	13	76	17	4		.8	52
	9	32	21	1		1.9	50
	5	55	11	.....		1.0	50
	11	42	11	6		1.6	49
	4	38	11	4		1.8	46
	7	59	9	7		1.2	44
	10	32	24	.....		2.0	44
	6	70	25	3		1.2	42
	12	52	25	.....		1.7	41
	1	71	17	.....		1.1	40
	16	55	17	1		1.3	40
	2	38	10	.....		1.5	36
	8	57	24	1		1.1	35
	17	41	28	.....		1.7	33
	3	39	19	.....		1.5	29
Three-Year average of all farms—1924, 1925, 1926	.....	48	18	2		1.5	41
Suggested requirements and expected production	.....	100	30	15	10	1.5	90

bor than a flock of 50 hens. A flock of 100 hens culled to eliminate non-layers should produce at least 750 dozen eggs per year when given the quantities of feed suggested. Some feed would be obtained from the fields. The grain fed could consist of corn and sorghum seed, though corn is better and often lower in price. The laying mash could consist of ground corn and ground oats, though bran and shorts could profitably be added. (a) The chickens should have all the skim milk they will drink or the animal protein needed should be provided by adding meat scrap to the mash mixture. On many farms skim milk for 100 hens would not be available.

The production expected for this ration is double the average production for the area but should be easily attained by most producers, and would make the poultry enterprise a valuable part of the farm business.

Expected Prices of Marketable Products

Farm returns in any given year depend partly on prices received, and for farms on which cotton is the chief source of income, farm profits will closely follow the price of cotton unless yields are exceptionally low or high. The farmer in planning his year's operation often considers only the relative returns from different enterprises for the past year and gives little attention to the probable price at harvest time.

Prices do, however, fluctuate around a mean or normal value, and the prices of different commodities tend to have a certain definite relation. This normal price of all products may never exist under actual conditions, yet the normal price of a product should be a better guide to the expected future price than the price of the last year or the price prevailing at planting time.

Farmers should take into account the seasonal variations in prices together with price trends over longer periods. For perishable products this is especially true and it is the expected price at the time of marketing on which the producer should base his operations.

A complete analysis of prices of Mississippi products cannot be made here but approximations of expected prices based on prices of previous years, trends of prices and the long time outlook for particular commodities are given

TABLE 18—ESTIMATED PRICES, CHOCTAW COUNTY, MISS.

PRODUCTS TO BE SOLD			EXPENSE ITEMS		
Item—	Unit	Price	Item—	Unit	Price
Cotton	lb.	$ .175	Cotton Seed Meal	ton	$40.00
Cotton Seed	ton	32.00	Bran	ton	35.00
Corn	bu.	1.00	Cow Peas	bu.	2.00
Oats	bu.	.65	Soy Beans	bu.	2.50
Sweet Potatoes	bu.	1.00	Lespedeza Seed	bu.	4.00
Loose Hay	ton	15.00	FERTILIZERS—		
Lespedeza	ton	20.00	(1) Home mixed 8-6-4	ton	36.40
Hogs	lb.	.085	Nitrate of Soda	ton	59.00
Chickens	lb.	.20	Acid Phosphate 16%	ton	18.00
Eggs	doz.	.22	Sulphate Potash	ton	38.00
Milk, 4%	cwt.	2.00	Labor	day	1.50
Butter Fat	lb.	.38			
Cows	head	30.00			

(1) Home mixed 300 pounds acid phosphate; 225 pounds nitrate of soda; 50 pounds sulphate of potash.

Mississippi Experiment Station Bulletin 241—"Cotton, Fertilizers and Varieties, 1926.

(a.) Helps for Mississippi Poultry Raisers.—Mississippi Extension Bulletin No. 26.

in table 18. These prices are used in this bulletin in estimating farm returns for farms under different systems of management. It is not expected that these prices will prevail at any one time, but it is believed that they will represent relative values of products from farms in this section of Mississippi. (1).

On most farms cotton is the first consideration and corn, hogs, hay , dairy cows, and truck crops make up the alternative enterprises. The price received for cotton has an important bearing on farm income. Figure 12 shows the monthly price of cotton and cotton seed since 1921. Cotton prices were considered to be relatively high during 3 of the six years. During this period the price of cotton was high enough to bring about a great expansion in cotton acreage. For the purpose of this bulletin the price is taken slightly lower than the average for the 6-year period.

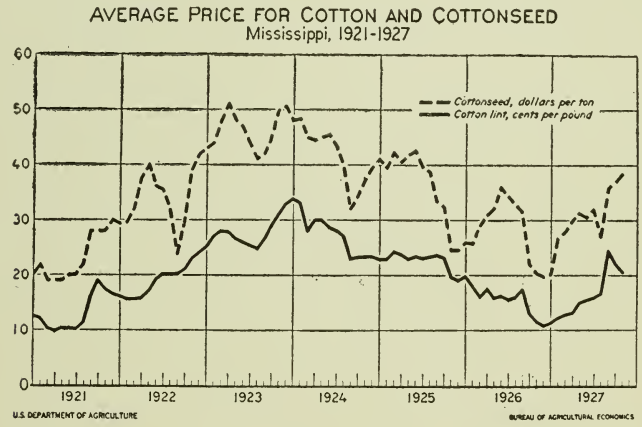


Fig. 12—The seasonal variation in cotton seed prices is more marked than the variation in prices for lint, but in general, the price trends are similar

SYSTEMS OF FARMING

Income per farm in this area is low when compared to that in many sections of the United States. Most of the farms are family operated, and the acres cultivated are insufficient to give large returns. The fact that cotton the most important cash crop, requires a large amount of hand labor limits the acreage which can be grown by the family. The topography and the nature of the soil generally make very large units of machinery impractical so that the acreage of crops can not readily be extended. The low natural fertility of the soil limits the crop yield and in many cases the return per acre is low. Increases in income per family will come about through increasing the efficiency of production, or in enlarging the farm business or both.

More efficient production than the average existing in the area is essential for providing a higher standard of living. Good crop yields should not require much more labor than low yields. Efficient livestock production can be obtained with little increase in the time required to care for the livestock.

(1) Data are drawn from: (a) U. S. D. A. Statistical Bulletin 16—"Prices of Farm Products Received by Producers, South Atlantic and South Central States."
(b) U. S. D. A. Misc. Circular 101.—"The Agricultural Outlook for 1927."
(c) Prices received by Choctaw County, Mississippi, farmers as reported on survey and records for 1920 to 1926.
(d.) Current issues of "Weather Crops and Markets Supplement."

Judicious use of fertilizer on crops and intelligent feeding of livestock should lead to higher yields per unit and a more economical production.

The size of the farm business also is a limiting factor in farm profits. Where cotton is the chief crop it often determines the size of the farm business. Other crops and livestock serve only to contribute to cotton production. The acreage of cotton which can be handled by the available labor, and the feed crops for work stock and livestock which contribute to the family living often make up the extent of the farm enterprises. On many farms such enterprises as dairy cows, hogs, poultry, or truck crops could be increased without reducing the cotton produced and would increase farm profits materially. On most farms the land area is not the limiting factor in production although the land in use is in many cases the most productive land of the farm. Much of the land now lying out could be brought into cultivation again or developed into good pastures. Where available labor is the limiting factor to increased production, additional crops are grown by a share cropper rather than with wage labor.

A combination of the farm enterprises which will increase the production of minor crops and livestock products without a corresponding decrease in the leading cash crop usually will increase the net returns. To obtain this combination would mean an increase in crops or livestock which would be cared for with no serious conflict in the demand of the cotton crop for labor. A cropping system designed to conserve soil fertility should reduce the expense for fertilizers, and where additional crops can be utilized by livestock the contribution to soil fertility would be increased and a more uniform distribution of labor obtained.

Many farmers increase their income by work off the farm during slack seasons. Profitable enterprises which would utilize this spare time would provide work on the farm during the same period and would insure an opportunity to utilize this time.

Figure 13 shows distribution of labor on a typical farm in this section.

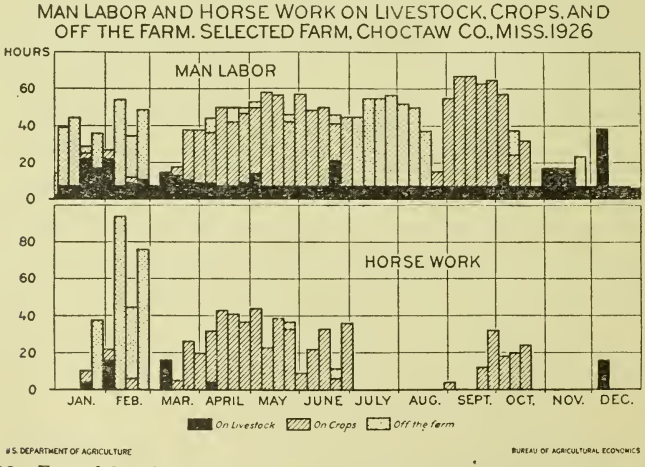


Fig. 13—Farm labor is heaviest from April to June, and from September to October 15. This typical distribution allows time for outside labor during the winter and mid-summer. A farm so organized as to provide steady employment on the farm throughout the year is usually more desirable.

An increase in yield which would produce the same quantity of cotton on a smaller acreage would release land for the growing of other crops which might be marketed or fed to livestock.

With these points in mind and in view of information brought out in a study of the records taken in the area for a period of years, with additional data from other studies and from the results of experiments, outlines for the organization of farms are suggested. These suggested systems are adapted from systems now in operation in the section. Such changes as have been made are in line with conclusions brought out by the study, and those contained in reports of experiments.

The cropping systems suggested are such as will offer a distribution of man labor, produce crops which can be readily utilized, and conserve soil fertility. They have been shown to be well adapted to the section.

In estimating farm returns it is necessary to assume a given price for products sold. The prices used are such as appear probable for the quality of products common to the area. Considering a period of years a particular effort has been made to maintain a normal relation between the prices of the different commodities so that the comparison of returns from the different organizations will show the relative profitableness of each over a long period of time.

Suggested Systems of Farming for Farm With Approximately 40 Acres of Crop Land and Additional Pasture

A farm with between 40 and 50 acres of land in crops and improved pastures is as much as one man can conveniently care for. The farm would be organized with as much cotton as one man with some additional family labor could tend and pick and such other crops and livestock as could be cared for without an undue conflict with the cotton. A system of farming for a farm with 40 acres of crop land is described in tables 19 to 23 (a).

The farm would produce cotton, corn, some hay, and in addition to the necessary work stock would keep a few cows, hogs and poultry to produce products for home consumption or for market. The system as outlined would be applicable to localities in which a market for butter fat was available and on farms having approximately equal amounts of cotton and corn land. Where both markets for cream and whole milk are available the advisability of selling to one or the other depends on the prices offered and the possibilities of utilizing the skim milk on the farm.

Where the quantities of fertilizer recommended are used the cropping system given in table 19 should normally produce 6 bales of cotton, 3 tons of cotton seed, 300 bushels of corn, 180 bushels of oats, and approximately 12 tons of hay and straw. Since the nature of the soil and arrangements of fields is such that a definite rotation is unlikely to be practiced, a winter cover crop of oats, rye, or where the crop is adapted, vetch is suggested. The winter cover crop would not only furnish some winter pasture, and a green manure crop to be plowed under in the spring, but would also tend to hold the unused fertilizer of the preceding crop. It is estimated that about one-third of the

(a) The authors are not unmindful of the oft repeated slogan, "Food and Feed First"; but since it has been shown that ample food and feed can be produced without reducing cotton acreage, and since cash is essential to high living standards, the cash crop is given precedence.

fertilizer applied to a crop remains in the soil as residue, but without a cover crop on the land much of this fertility would be leached or washed away during the winter. The winter pasture provided would reduce the amount of hay required by the stock.

TABLE 19—CROP REQUIREMENTS AND PRODUCTION FOR SUGGESTED SYSTEM WITH 40 ACRES OF CROP LAND (System 1)

Crop—	Acres	Acre Yield	Total Production	Fert. Used Tons	Man Labor, Hrs.	Horse Work Hours	USE OF CROP			Value Sold Dollars
							Feed,	Seed,	Sale,	
Cotton (lint)	12	250 lbs.	3,000 lbs.	3.	1,104	476			3,000	525
Cotton (seed)		500 lbs.	6,000 lbs.					500	5,500	88
Corn	12	25 bus.	300 bus.	1.5	456	420	283	2	15	15
Oats (grain)	6	30 bus.	180 bus.	.6	90	84	120	60		
Oats (straw)		.5 ton	3 tons				3 tons			
Lespedeza	3	1 ton	3 tons		36	54	3 tons			
Lespedeza	3*	1 ton	3 tons		36	54	3 tons			
Soy Beans	3*	1.2 ton	3.6 tons		100	100	3.6 tons			
Improved Pasture	7									

*Second crop.

A heavier yield of oats would undoubtedly be obtained from low land, but with the addition of the nitrate fertilizer good yields should be obtained on upland and the rotation of cotton and oats would be possible. After the oats are harvested a crop of lespedeza hay on low land or soybean hay on upland could be obtained with no application of fertilizer other than that not utilized by the oats. The 3 acres of lespedeza seeded with the oats should give a good hay crop following the oats and would reseed itself for a hay crop the following year. If allowed to reseed, the lespedeza would remain on the land for a longer time than one year if desirable. Lespedeza seeded on upland, when oats followed cotton, would be used for pasture.

This cropping system should normally produce a small surplus of grain over the requirements of livestock on the farm. Expected cash receipts from the sale of crops are $628.

Because the dairy industry in the country is as yet undeveloped the dairy herd is small and heavy production is not expected. A herd of 5 cows kept for milk with one heifer and one calf for replacement are suggested. Unless the stock is of exceptional quality it will rarely pay to raise any except the best heifer calves. Veals from the small dairy breeds are not readily marketable and they will not pay for milk consumed. Two mules or horses for farm work, a sow with one litter of pigs each year, and 100 head of poultry would also be kept.

The quantity of feed used and the method of distribution is given in table 20. Practically all the feed grown on the farm with the exception of the cotton seed would be fed to livestock. In addition to the farm raised feed, cotton seed meal, tankage, and mash for the poultry would be purchased. Cotton seed might be advantageously exchanged for cotton seed meal. Where winter pasture is available less hay than that allowed here would be required and with no change in the cropping system some surplus could be sold.

The production of livestock and livestock products and the use to which these are put is given in table 21. Dairy products, meat, and eggs would be

provided for home use and in addition butter fat, some pork and poultry products would be for sale. Expected cash receipts from the sale of livestock and livestock products are $613.

TABLE 20—FEED FOR LIVESTOCK, SUGGESTED SYSTEM WITH 40 ACRES OF CROP LAND (System 1)

Live Stock	Head Number	FEED						
		Corn bus.	Oats bus.	Cotton S. Meal lbs.	Bran lbs.	Tankage lbs.	Hay or Straw tons	Skim Milk lbs.
Mules	2	65	50	.....	.....	.....	3.	.....
Cows	5	54	48	1,500	.....	.....	7.5	.....
Heifers	1	4	5	150	.....	.....	1.0	.....
Calves	1	3	5	150	.....	.....	.25	3,000
Hogs	8	111	.....	.....	.....	400	.....	4,000
Poultry	100	46	12	.....	2,000	.....	.....	9,000
Total	.....	283	120	1,800	2,000	400	11.75	16,000

TABLE 21—PRODUCTION OF LIVESTOCK AND LIVESTOCK PRODUCTS (System 1)

Live Stock	Number	Unit Production	Total Production	DISPOSITION			
				Used in Home	Fed Lbs.	Sale	Sale Value
Cows	5	200 lbs Butter fat	1 cow butter fat 1,000 lbs	150 lbs.	18	1 Cow 832 lbs.	$ 30 333
Hogs	1 sow 7 pigs	.....	pork 1,500 lbs.	700 lbs	.....	800 lbs.	88
Poultry	100	7.5 dozen eggs	750 doz eggs 250 lbs. meat	150 doz. 100 lbs.	....	600 doz. 150 lbs.	132 30

Making no allowance for miscellaneous receipts such as the sale of wood or lumber or receipts from work off the farm the expected gross returns from crops and livestock are $1,241.

Current operating expenses would be higher on this farm than for many farms in the area as they are operated. The cost of fertilizer is somewhat greater, more supplementary feed is purchased, and such expenses as feed grinding, threshing, and breeding fees would be increased. The expected costs of the most important items of expense are given in table 22. The total operating cost of farm including taxes should be about $663.

TABLE 22—SALES AND OPERATING EXPENSES FOR SYSTEM WITH 40 ACRES OF CROP LAND (System 1)

Sales—

Crops (from table 19) $628
Livestock (from table 21) 613

Total Sales $1241

Crop Expenses—

Fertilizer

Cotton 3 tons at $36.40 ..... $109
Corn 1.5 tons 65

Oats .6 tons	36
Seed—1/3 cotton seed, 5 bu. @ 2.*	10
Lespedeza 3 bu. @ 4	12
Soy beans 3 bu. @ 2.50	8
Threshing 100 bu	18
Ginning costs	30
Purchased Feed—	
Cotton seed meal 1800 lbs. @ 2	36
Tankage 400 lbs. @ 4	16
Bran 2000 lbs. @ 35	35
Oyster shell 200 lbs. @ 1.00	2
Miscellaneous Expenses—	
Grinding 3.5 tons @ 3.00	11
Breeding fees	15
Other farm expenses	50
Taxes—	210
Total Expense	$ 663
Net Return	$ 578

*Assumed that cotton seed will be renewed every third year.

The difference between cash receipts and expenses with this system under usual conditions would be about $578, and would represent the normal return to the operator. To this income should be added the value of products furnished

TABLE 23—EXPECTED RETURNS FROM FARMS WITH APPROXIMATELY 40 ACRES IMPROVED LAND, WITH DIFFERENT SYSTEMS OF FARMING

	SYSTEM No. 1 Suggested System With Cotton and Dairy Products		SYSTEM No. 2 As Operated in 1926 Cotton and Corn		SYSTEM No. 3 Suggested System With Cotton and Sheep	
Size of farm (acres)	80		71		80	
Crop land (acres)	35		35		33	
Improved pasture (acres)	10		.....		10	
Woods pasture and farmstead (acres)	35		36		37	
Total investment. Dol.	$3,500		$3,100		$3,500	
CROPS GROWN—	**Acres**	**Production**	**Acres**	**Production**	**Acres**	**Production**
Cotton	12	3,000 lbs. lint 6,000 lbs. seed	18 (1)	3,750 lbs lint 7,000 lbs. seed	12	3,000 lbs. lint 6,000 lbs. seed
Corn	12	300 bushels	13	325 bushels	12	325 bushels
Oats	6	180 bushels	.....	.....	6	180 bushels
Hay	9 (2)	9.6 tons	2	2.4 tons	9 (2)	9.6 tons
Truck crops	2	family use	2	family use	2	family use
LIVESTOCK—	No.—		No.—		No.—	
Work Stock	2	farm work	2	farm work	2	farm work
Cows	5	1,000 lbs. fat	2	family use	2	family use
Young Cattle	2	1 cow	.....	.....	.....	.....
Hogs	8	1,500 lbs. pork	8	1,500 lbs. pork	8	1,500 lbs. pork
Poultry	100	750 doz. eggs 250 lbs. poultry	42	315 doz. eggs 105 lbs. poultry	150	925 doz. eggs 375 lbs. poultry
Sheep	.....	.....	.....	.....	37	30 lambs 148 lbs. wool
Receipts from Crops	$628.00		$848.00		$653.00	
Receipts from Livestock	613.00		112.00		675.00	
Total Receipts	1,241.00		960.00		1,328.00	
Cash Expenses	663.00		524.00		704.00	
Net Return	578.00		436.00		624.00	

(1) 6 Acres by share cropper.
(2) 6 Acres are second crop.

the home which would be equivalent in value to about $450, during the year. The returns from this system are compared with estimated returns from alternative systems in table 23.

The crop and livestock organization with system "2" in table 23 is that of one of the most successful small farms on the Choctaw County route in 1926. Cotton and corn were the important crops grown and with the exception of a small quantity of pork no livestock or livestock products were sold. This farm had a total area of 70 acres, of which 40 acres were suitable for cultivation and 35 acres were in crops in 1926. The crops consisted of 18 acres of cotton, 13 of corn, 2 acres of pea hay and 2 acres of miscellaneous truck crops for family use. The operator cared for all crops except 6 acres of cotton which was grown by a share cropper. The farmer operator provided one-half the cash expenses for this crop and obtained one-half of the product. With the production per unit used in estimating returns with system 1 the cotton acreage on farm 2 would give the operator 7.5 bales of cotton lint and 7000 pounds of seed for sale. The corn crop would give a surplus of approximately 80 bushels over the requirements for feed (1). No dairy products were sold from the farm and since no particular effort was made to obtain a high production per cow the feed given is less than for the herd with system 1. The pork and poultry enterprises would produce a small surplus over the products which would be used by the family.

The quantity of feed given each class of livestock differs somewhat from that for the suggested system. For instance the records show that the cows on this farm received more cotton seed meal, and cotton seed hulls but less grain and hay than the suggested ration. The pork produced, equivalent to about 1600 pounds of live hogs, required about the same quantity of feed as the suggested ration but used more corn and no protein supplements.

Adjusting production on this farm by applying suggested requirements and production to the acres of crops and number of livestock kept and applying the prices assumed in estimating returns with system 1 makes a direct comparison of the two systems of farming possible.

Farm income is principally derived from the sale of cotton and cotton seed. Crop receipts including the sale of surplus corn equaled $848, while receipts from the livestock enterprises, poultry and hogs, would make $112 more. From this income of $960 the cash expenses for fertilizer, purchased feed, taxes, services, and miscellaneous expenses amounting to approximately $524 should be deducted. The resulting farm income is $436 as compared to $578 for the suggested system 1. The value of products used by the family is assumed to be the same with each system.

System "2" may be criticized for including so small an acreage of legumes in the cropping system, and making no provision for a winter cover crop. The livestock in system "1" together with the use of cover crops should aid in maintaining fertility and humus in the soil and consequently reduce the risk of low crop yields. System "2" is dependent on the yield of corn for feed whereas a small acreage of oats would reduce the risk of a short feed crop during unfavorable years. The income of system "2" is dependent on good

(1) The production of crops, quantity of fertilizer used, feed consumed by livestock, and production of livestock products were worked through as in tables 19 to 22 for farm 1, but to avoid repeating the form of these tables only the final estimates are given in table 23.

cotton yields and good cotton prices, and while the income may be larger for especially favorable years, the operator must expect some years of low yields or low prices when his farm income will be very much reduced.

System "3" might be profitably put into practice in sections where a market for dairy products is not available but where pork or lambs could be readily sold. The system as outlined has 12 acres of cotton and 12 acres of corn, 6 acres of oats and 9 of hay. The cropping system is similar to that of system "1" and equal production per acre has been assumed.

The livestock consists of horses or mules for farm work, cows for dairy products to be used in the home, poultry, hogs, and a small flock of sheep. Although very few sheep are kept in the area at the present time, wool production was once a common enterprise on many farms of the area, and in view of present prices for wool and lambs, and the outlook for prices, this enterprise might be reintroduced on some farms. A small flock of sheep would utilize a part of the roughage and pasture, and would give some returns from the wool clip and from the sale of Spring lambs. Spring lambs from this area should be suitable for market weighing about 70 to 80 pounds by early summer. The flock of sheep would require some attention during lambing season, and on most farms in the area the sheep enterprise would require a certain amount of fencing.

Estimated returns from this system are given in table 23 under number "3". With sales of 6 ewes, 24 lambs, and 148 pounds of wool from a flock of 37 sheep and the sale of surplus poultry and pork products the returns from the sale of livestock would be $675. This with crop sales of $653 would give a gross income of $1,328, from the farm. Expenses for fertilizer, feed, taxes, services, etc., are estimated at $704. The farm income with no deduction for extra labor would be $624, as compared to $578, for the farm first suggested. Allowance for products used in the home has been made and the value of these products should be equal on the different systems described.

Suggested Systems of Farming for Farms with Approximately 70 Acres of Improved Land with Additional Woodland and Pasture

A farm with 60 or more acres in cultivation in this section is larger than a one man unit. With the proportion of crop acres in corn and cotton typical of the area the farm could be operated by one man and additional family labor equivalent to the labor of one man. Typically the farm would be operated by one man, and crops in excess of those which could be cultivated by one man would be let out to croppers. The proportion of wage to share crops would depend quite largely on the amount of unpaid labor available on the farm. Some farms larger than this are operated as a family unit.

Formerly many farmers in the south did not have the advantage of a good market for dairy or other livestock products. The development of the dairy products industries has placed a market for whole milk within hauling or shipping distance of many farmers and nearly all farmers can find a ready market for cream. System 4, outlined in table 24 gives the organization of a farm with 70 acres of crop land on which dairying is combined with cotton.

A system of this type would require some labor other than that of the operator and would use an additional man for the greater part of the year. The estimated income is based on crop yields and livestock production sug-

gested as standard and good practice in crop and livestock production is assumed.

TABLE 24—EXPECTED RETURNS FROM SYSTEMS WITH APPROXIMATELY 70 ACRES IMPROVED LAND, WITH DIFFERENT SYSTEMS OF FARMING

	SYSTEM No. 4 Suggested System Cotton and Dairy Products		SYSTEM No. 5 As Operated in 1926—Cotton and Corn		SYSTEM No. 6 Suggested System Cotton and Sheep	
Size of farm (acres)	120		120		120	
Crop land (acres)	50		51		50	
Improved pasture	20		15		20	
Wood, stump land and farmstead	50		54		50	
Total investment	$5,500		$5,670		$5,500	
CROPS GROWN—	**Acres**	**Production**	**Acres**	**Production**	**Acres**	**Production**
Cotton	15	3,750 lbs. lint 7,500 lbs. seed	29 (1)	4,625 lbs. lnt. 9,750 lbs. seed	15	3,750 lbs. lint 7,500 lbs. seed
Corn	15	375 bushels	16 (2)	325 bu.	15	375 bu. grain
Oats	10	300 bushels 5 T. straw			10	300 bu. grain 5 T. straw
Lespedeza	10	10 T. hay	3	3 T. hay	10	10 T. hay
Soy Beans	8	9.6 T. hay	1	1.2 T. hay	8	9.6 T. hay
Truck Crops	2	home use	2	home use	2	home use
LIVESTOCK—	No.—		No.—		No.—	
Work Stock	3	farm work	3	farm work	3	farm work
Cows	10	2,000 lbs. B.F.	2	family use	2	family use
Young Cattle	4	2 cows				
Hogs	8	1,500 lbs. pork	2	327 lbs. pork	8	1,500 lbs. pork
Poultry	100	750 doz. eggs 250 lbs. poultry	81	607 doz. eggs 202 lbs. poultry	200	1,500 doz. eggs 500 lbs. poultry
Sheep					74	60 lambs 296 lbs. wool
Receipts from crops		$ 768.00		$1,021.00		$ 888.00
Receipts from livestock		1,008.00		121.00		978.00
Total receipts		1,776.00		1,142.00		1,866.00
Cash expenses		912.00		707.00		1,012.00
Net returns		864.00		435.00		854.00

(1) Nineteen acres grown by share cropper.

(2) Six acres grown by share cropper.

Fig. 14—Six hundred pounds per acre of fertilizer analyzing 8-6-4 is responsible for the difference in the appearance of the cotton on the right and the left of the picture. The difference in yield was 1,070 pounds of seed cotton and the difference in value after paying for the fertiiizer was $43.22.

Fifteen acres of cotton receiving 500 pounds of 8-6-4 fertilizer should produce 250 pounds of lint and 500 pounds of seed per acre giving a total production of 7½ bales of lint and 3 3/4 tons of cotton seed. Fifteen acres of corn receiving 250 pounds of fertilizer per acre could be expected to yield 25 bushels per acre. Ten acres of oats cut for grain fertilized with 200 pounds of nitrate of soda should return 300 bushels of grain and 5 tons of straw. A winter cover crop of oats for cotton and corn land to provide winter pasture and prevent wasting of fertilizer residue is suggested. Lespedeza seeded with oats on good land should yield a crop of hay following the oats. The lespedeza sowed on thin upland would be utilized for pasture. Soy beans on upland following oats would also produce a crop of hay and leave the land for a cultivated crop the following year. In addition to the hay following the oats, 5 acres of reseeded lespedeza will be required for hay. By using lespedeza pasture on upland the cotton land may be alternated with legumes.

Under this cropping system an annual production of 3750 pounds of lint, 7500 pounds of cotton seed, 375 bushels of corn, 300 bushels of oats, 19 tons of hay and 5 tons of straw should be made normally. Of this production only the cotton lint and seed would be marketed. The feed crops would be utilized by livestock on the farm.

The livestock would consist of 3 mules for farm work, 10 head of milk cows, 4 head of young cattle, 100 head of poultry, and pigs to produce approximately 1500 pounds of pork. In addition to the feed grown on the farm the livestock would require 2 tons of cotton seed meal and 1000 pounds of poultry mash. This supplement would balance the feed available on the farm.

Ten cows producing 4000 pounds of 5% milk each would produce 1890 pounds of butter fat in addition to the milk used in the home and fed to calves. Where cream is sold the skim milk would provide sufficient protein feed for the poultry and hogs. Unless the cows were of exceptional quality it would not be profitable to keep young stock except those required for replacement of the dairy herd. Presumably 2 calves kept each year would allow the sale of 2 cows or heifers. With the normal production of butter fat, pork, and poultry, receipts from the sale of livestock and livestock products would amount to $1008 annually. This, with the $768 from the sale of cotton and seed would give an expected cash income of $1776.

Current expenses for fertilizers, feed, seeds, breeding fees, feed grinding, and taxes would be approximately $912 leaving a net cash income to the farm and labor of $864. To obtain the net production of the farm the value of products furnished the home estimated at $450 should be added.

Hired labor equivalent to one man for 6 months at $30 per month would reduce the return to the operator by $180.

Share cropping is more common than hired labor on crops, and with a farm of this type one man could care for the livestock and feed crops with perhaps some extra labor during haying. With the 15 acres of cotton grown on a share basis the operator would receive ½ of the crop and would bear ½ of the cash expense. With no change in practice the normal net return to the operator would be $548, where the cotton was grown by a cropper.

System "5" in table 24 shows the system of farming followed on one of the most successful 120 acre farms on which records were kept in 1926. On this farm no effort was made to produce a surplus of livestock or livestock

products. Dairy products and pork were produced for home use only. Two-thirds of the cotton and one-third of the corn was grown on a share basis. Ten acres of corn, 10 of cotton, 3 of lespedeza and 1 of pea hay were grown by the operator, while 19 acres of cotton and 6 of corn were grown by share croppers. The farm had 3 head of work stock, 2 cows, hogs to produce 327 pounds of dressed pork, and 81 chickens.

This system in 1926 gave a farm return of $914, including the value of products furnished the home and $480 received from labor off the farm.

With the expected crop yields the farm would produce 4625 pounds of cotton and 9000 pounds of cotton seed for the operator's share and 107 bushels more corn than would be required for livestock. Returns from crop sales at normal prices would be $1021. A small surplus of eggs and poultry would add $121 to the cash receipts. Normal current expenses for the operator's share of fertilizer on corn and cotton, cost of seed, purchased feed, taxes, and miscellaneous expenses would total $707. The expected net income would be $435 not including farm products used in the home or receipts from outside labor.

The expected farm return from this system plus the receipts from outside labor is approximately the same as that of system 4. In arriving at crop production the amount of fertilizer used and crop yields were considered the same for both systems, yet over a period of years yields would be more certain with system 4. The greater use of legumes, cover crops, and rotating pasture in system 4 would tend to improve the soil and good crop yields would be more easily attained. The risk of low yields would be reduced, and where the system was practiced for a period of years, should result in higher average yields than those assumed or would allow a reduction in cost of fertilizer.

Where the farm income is derived from only one source, profits are dependent on the price and yield of the single product, and returns will fluctuate widely from year to year. In this case returns in years of good prices and yields would be high, while other years of low yields or low prices small profits

Figure 15—Cotton, feed and livestock may form the basis for a safe and profitable farming system. The field here is used as a feed lot during the winter, thus saving manure with little effort.

could be made. The income with system "4" would be more constant since dairy production and prices may be good and compensate for low returns from cotton in poor cotton years. Some years the return would be less since it is unlikely that exceptional profits could be made on two commodities the same year. Receipts from outside labor with system "5" made up a large share of the income, and these receipts depend on the opportunity for the operator to find profitable employment during slack seasons. This opportunity may not be open to all farmers and enterprises which will allow remunerative labor on the farm are more desirable.

Other enterprises than dairying may be worked into the farming system with good results. In some sections a market for dairy products may not be available and other crops or livestock adapted to the particular farm may be developed. System "6" outlined in table 24 shows the estimated returns from a farm of 70 improved acres on which sheep would be kept. With the same cropping system and production outlined in system "4" 60 ewes and the lambs would not use all of the feed grown, and a small surplus of hay could ordinarily be sold. Receipts from livestock and livestock products would under usual conditions be somewhat less, but with lower expenses the farm income would be approximately the same as in "4". Since sheep require less labor than dairy cows, the flock of poultry might be increased.

With sheep the farm return would depend to some extent on the ability of the operator to care for the flock, and while the flock would make good use of roughage and pasture, the sheep must be carefully tended. In sections where sheep are not commonly grown, dogs may cause some losses. One disadvantage of sheep raising is that on most farms the establishing of a farm flock would require an immediate outlay of cash for adequate fencing.

Systems of Farming on Larger Farms

On farms larger than one-man units much of the land is cultivated by share croppers. The land actually operated by the owner is usually equivalent to a small farm, and is organized as such. The organization of the larger farms depends so much on the individuality of the owner and the croppers that typical systems can not readily be described. For the most part the larger farms grow cotton and corn, and it would be difficult to work in other enterprises on land except that operated by the owner.

TABLE 25—CROP PRODUCTION ON FARM WITH 120 IMPROVED ACRES

Crop	Acres	Acre Yield	Total Production	Fertilizer Tons	Disposition of Crops			
					Feed	Seed	Sale	Sale Value
Lint	25	250 lbs.	6,250 lbs.	6.25			6,250 lbs.	$1,094
Seed		500 lbs.	12,500 lbs.			1000 lbs.	5.75 T.	184
Corn	25	25 bu.	625 bu	3.125	591 bu.	4 bu.	30 bu.	30
Grain	15	30 bu.	450 bu.	1.5	344 bu.	106 bu.		
Straw		0.5 T.	7.5 tons		7.5 tons			
Lespedeza (1)	20	1 T.	20 tons		20 tons			
Soy Beans (2)	15	1.2 T.	18 tons		18 tons			

(1) 10 acres of lespedeza second crop following oats.
(2) 5 acres of soy bean hay second crop following oats.

A combination of cotton and dairy products for a farm of 120 cultivated acres is described in tables 25 to 28. This system is essentially an expansion of the types discussed as systems 1 and 4. However, because of its larger size the tables showing the distribution of crops and livestock are given.

Table 25 shows the crop requirements and production and the use made of the crops. Twenty-five acres of cotton using 6¼ tons of 8-6-4 fertilizer should produce 12½ bales of cotton lint and 5¾ tons of seed for sale. As wage cotton the returns from this crop should be $1,278, however, the crop would probably be grown on a share basis. Twenty-five acres of corn and 15 acres of oats for grain would just about meet the needs of livestock for grain crops. The small surplus of grain is negligible. Ten acres of lespedeza following oats and 10 acres of second-year lespedeza should produce 20 tons of legume hay. This with 5 acres of soy bean hay following oats, 10 acres of early soy bean hay and the oat straw, would meet the expected requirements for roughage. Oats to seed a winter cover crop on all cultivated land is provided, and this crop available for winter pasture would reduce the requirement for hay.

The distribution of the feed to livestock is given in table 26. These quantities are based on the suggested requirements for livestock production. Since a market for whole milk is assumed, the milk fed to calves should be kept as low as possible. Prepared calf meal fed to calves with a small quantity of whole milk will keep the cost of rearing calves at a low figure, however, calves must be of good stock before it will be profitable to raise them on milk and feed. Some milk must be fed, and with milk testing 5 per cent fat, an allowance of 600 pounds per calf means a cost of about $15 per calf for milk alone. Calves from cows producing no more than 200 pounds of butter fat annually had best be disposed of at birth. With no skim milk for feed, tankage for hogs and meat scrap for poultry should be provided.

TABLE 26—FEED FOR LIVESTOCK—FARM WITH 120 IMPROVED ACRES

Kind of Livestock—	Number	Corn, Bu.	Oats, Bu.	Cottonseed Meal, Lbs.	Mill Feed, Lbs.	Tankage, Lbs.	Milk Lbs.	Hay and Straw, Tons
Mules	4	185						6.
Cows	20	214	188	6,000				30.
Heifers	5	18	47	1,500				5.
Calves	5	18	47	1,500	1,000		3,000	1.
Bull	1	9		500				2.
Hogs	8	111				500		
Poultry	100	36	62		1,000			
Total		591	344	9,500	2,000	500	3,000	44.

The expected production of livestock and products and the use to which these are put are shown in table 27. Milk testing 5 per cent is valued at $2.50 per hundred pounds. This price is based on a normal price of $2.00 for 4 per cent milk and 5c per hundred weight of milk for each additional .1 per cent of fat. The amount of products used in the home should be sufficient for one family. Expected receipts from livestock enterprises are $2,268.

TABLE 27—PRODUCTION AND USE OF LIVESTOCK AND LIVESTOCK PRODUCTS—FARM WITH 120 IMPROVED ACRES

	No.	Unit Production	Total Production	Disposition of Product			Value of Sales
				Used in Home	Fed, lbs.	Sold	
Cows	20	4,000 lbs. milk	80,000 lbs.	1,500 lbs	3,000	75,500 lbs.	$1,888.00
Young Cattle	10		5 cows or heifers			5 head	150.00
			1,500 lbs. live wt.	700 lbs.		800 lbs.	68.00
Pork	8						
Poultry	100	7.5 doz eggs	750 doz.	150 doz.		600 doz.	132.00
		2.5 lbs. meat	250 lbs.	100 lbs.		150 lbs.	30.00
Total livestock sales							$2,268.00

A brief financial summary of the farm business is given in table 28. Total cash receipts under usual conditions should equal $3,576. Expenses including all fertilizer, feed and seed purchased, taxes and miscellaneous expenses are estimated at $1,888. To operate the farm as described would probably require the labor of one man for the greater part of the year and the labor of a second man during the cropping season in addition to the labor of the operator. Allowing $800 for hired labor would give a farm income of $888 to the operator for his own labor and the use of his land. This income figure does not include products furnished the family which would be approximately $450.

TABLE 28—FINANCIAL SUMMARY ON 120-ACRE DAIRY FARM

Investment		$10,000
Receipts—		
Crops	$ 1,308	
Livestock	2,268	
Miscellaneous		
Total		$ 3,576
Expenses—		
Fertilizer	$ 453	
Feed	413	
Seed	90	
Threshing, ginning, grinding	182	
Miscellaneous	150	
Taxes	600	
Total		$ 1,888
Difference		1,688
Hired labor		800

Probable Effects of Variations in the System of Farming

Direct expenses of fertilizer and labor could be reduced by letting the cotton ground to a cropper tenant. This adjustment would decrease the returns from cotton 50 per cent, but would also reduce the expense for fertilizer on cotton by 50 per cent, and would eliminate much of the hired labor during the summer. Labor on cotton at 100 man hours per acre and charged at 15c per hour would be a total cost of $375. One-half of the cost of fertilizer on cotton would be $114. With the same yields and prices used in estimating the farm income in table 27 the expense would be reduced $489, and the receipts $639. The operator would, however, be relieved of part of the management of the crop and would be carrying only one-half of the risk.

With 20 cows and 10 head of young cattle the operator might find it advisable to build a silo and substitute silage for a part of the roughage in the cattle ration or to supplement pasture and reduce the acreage required. Five acres of corn land planted to Texas seeded ribbon cane should produce 60 tons of silage. This silage would replace approximately half of the hay in the cattle ration and would reduce the hay requirements by about 20 tons. With silage the amount of cotton seed meal in the ration should be increased in order to balance the ration, and with 5 acres less of corn some additional grain might be purchased.

The sorghum for silage might replace the soy beans following oats, and would thus more nearly balance the feed production with feed requirements. In this area approximately 10 tons of hay more than is needed would be produced.

Where no market for whole milk is available cream would be sold and the skim milk remaining on the farm utilized by poultry and hogs. The skim milk would then replace the tankage and meat scraps purchased and to some extent would reduce the amount of corn required for pork production. In order to utilize the skim milk, pork production could be doubled, which would in turn increase the amount of corn required for hogs, and might call for an increased acreage of corn. With butter fat at 38c per pound, 5 per cent milk would be worth $1.90 per cwt. as compared to $2.50 taken as the expected price for whole milk. For hog feeding 100 pounds of skim milk is figured roughly as equal in value to ½ bushel of corn. With corn at $1.00 per bushel the skim milk would be valued at approximately 50c per 100 pounds. Each 100 pounds of 5 per cent milk from which 25 per cent cream is sold would return 80 pounds of skim milk for feeding which would have a value of about 40c for hog feed. The total value of the milk and cream would be approximately $2.30 per cwt. The cost of hauling would be less for cream than for whole milk. The relative merits of selling cream or whole milk where markets for both are available may be determined by using actual prices and conditions.

The Choice of Enterprises

The systems of farming previously described were set up to show the relation of several enterprises in the farm business and to point the way to improved organization on Mississippi farms. Farm management has here been treated in a very general way and the results are strictly applicable only when the conditions assumed do exist. The farmer who is looking toward increased profit through better adjustment of his resources and more economical effort should consider the problems on his individual farm in the light of probable prices, yield or production and requirements and adaptability of different enterprises to his farm. The manager will do well to direct his effort to producing those things for which he and his farm are best suited. Not all farms are equally adapted to corn or cotton, and the crop which is best adapted to the particular farm will ordinarily be most profitable, assuming that a market is available.

A farm with an abundance of land on which corn and hay can be readily grown will produce dairy and pork products more profitably than a farm with higher thinner land on which cotton can be produced more economically than other crops. Some light soils may return more profit from such crops as sweet potatoes, or peanuts than from ordinary field crops. Other farmers will find

that a local market will make sorghum or cane, and syrup making one of their most profitable enterprises. A farm near a market for whole milk will probably keep more cows and produce less of some other product than an equally good farm which has no market for milk available.

Bulletins 228, 237 and 243 show that production costs vary widely on farms in a given locality. Enterprises which were profitable on some farms were unprofitable on others, and in selecting his enterprises the farmer should consider the relative profitableness on his own farm. Table 29 shows the yields of cotton, corn, oats and lespedeza, which would give equal returns per acre at a given price and a given production cost. The cost of production is the average for the farms on which detailed records were kept in 1924, 1925 and 1926.

TABLE 29—YIELDS PER ACRE OF CORN, OATS AND LESPEDEZA HAY AT GIVEN PRICES EQUAL IN NET VALUE PER ACRE TO DIFFERENT YIELDS OF COTTON LINT AT 20c PER POUND

Crop	Prices Per Unit	Unit	YIELDS OF EQUAL NET VALUE PER ACRE						
Cotton	$ .20	Pound	100	125	150	175	200	225	250
Corn	1.00	Bushel	9.8	14.8	19.8	24.8	29.8	34.8	39.8
Oats	.65	Bushel	5.2	12.9	20.6	28.3	36.0	43.7	51.4
Lespedeza	20.00	Ton	.12	.37	.62	.87	1.12	1.37	1.87

Note: Land use cost was not considered in the costs used in making the above comparisons.

If the cost of production on a particular farm was equal to the average cost for the area and prices were those given in the table a farmer would find cotton more profitable than corn on a field which would produce 150 pounds of lint cotton unless 20 bushels or more of corn could be produced. Or cotton on the same field would be slightly more profitable than 20 bushels of oats or .6 tons of hay.

This table illustrates the importance of producing the crop best adapted to a particular farm or field. But considerations other than immeditae cash return should enter into the choice of enterprises and the system of farming should be planned to return most profits over a long period of time.

Relative prices for products will also determine in a measure the most profitable system or the most profitable crop. When cotton is high in price the farm with a large proportion of cotton benefits more than one with a small acreage and conversely suffers more when the price of cotton is low. A change may be made, however, in adjusting acreage to prevailing prices and growing more cotton when cotton is likely to be high in price, and more of other crops when the price of cotton is expected to decline.

Violent changes in organization are costly when such shifts involve increased equipment or the disuse of equipment on hand. Changes can not be made readily from dairying to cotton or from cotton to hogs or sheep. Some shifts can be made, however, in a more limited way, and an organization which is based on normal yields and prices should prove most profitable in the long run. Adjustments to prices can best be made by curtailing production on the least profitable enterprises in times of unfavorable prices and expanding production on those enterprises for which it is thought that the market will be favorable.

An illustration of this would be changes made in the dairy and cotton

farm last described. If conditions were such that a price of 30c per pound could be expected in the fall, the acreage of corn, or pasture, could be reduced and the acreage of cotton increased as much. The reduction in feed crops would necessitate cutting down dairy production by eliminating a few of the least productive cows. With cotton prices very low and dairy products relatively high some of the land least desirable for cotton could be put in feed crops and cows which would normally be turned off could profitably be kept on for a longer period.

Each farm is an individual unit, and the most profitable combination of enterprises will differ on dissimilar farms. It is by knowing the possibilities of production of each of his fields, and knowng the approximate amount of elements of cost which must be applied to each to obtain a given production that an operator can choose his cropping system to obtain the highest profit from his land. To obtain the best use of his labor, crops and livestock enterprises which distribute his productive labor throughout the year are necessary. The choice of livestock enterprises rests in part on the quality and nature of feed available, ready markets and prospective prices.

Planning the Individual Farm

Forms which will enable the farm operator to more easily plan his business are provided on pages 47 to 50. Knowing the productivity of his fields and livestock, and probable returns from them, the plan for the operation of the farm may be formulated and probable results from different methods determined. These forms are the same as those used for tables 19, 20, 21, 22 and 23, and these tables may be used to illustrate just how the farm data are to be filled in.

Where the suggested requirements used in the bulletin do not apply to the particular farm, other figures may be used. The references cited will be of assistance to the operator in arriving at usual requirements for his farm. Other bulletins or books relating to crops and livestock may be used, or the county agent may aid in getting data applicable to particular conditions. For instance, a farmer who has cows capable of producing 250 pounds of butter fat per year will allow more feed than that included in the requirements given here, or if a field will produce a good yield of corn without fertilizer it may not be advisable to use fertilizer and the elements of cost will be reduced.

A farm map will help in keeping acreages of each field, previous crops and condition of the fields in mind.

If man labor and horse work are to be hired it may be advisable to enter the amount in the column headed "labor" of form "A." These same columns may be used to compare total labor on different crops.

A form such as table 30 may be used as a guide for estimating feed requirements for livestock. The figures given in this table show the amount of feed per head used in estimating feed requirements on the suggested systems. These quantities will differ somewhat on individual farms and a certain amount of substitution may be made. The amount and quality of the available pasture will affect the amount of feed given.

The problem of estimating a probable price is difficult. However, bulletins and reports showing the prices that have prevailed in past years, trade publications, reports on market conditions, such as outlook reports from the

Experiment Station, Extension Service and Department of Agriculture, will give the producer a basis for arriving at expected prices.

Alternative systems of farming may be worked through on forms similar to those which follow, and the results from the different systems compared. It is careful planning that eliminates waste in production and permits farmers to make the best of existing conditions.

TABLE 30—EXPECTED FEED REQUIREMENTS PER YEAR PER UNIT OF LIVESTOCK

FEED—	Horses, 850 lbs.	Cows (1)	Heifers	Calves	100 lb. gain Feeder Pigs (2)	Per Sow (1)	100 Head Poultry (1)	Ewes	Lambs
Shelled Corn, lbs.	1,820				350	1,000	1,000		
Gr. Corn, lbs.		600	200	200			1,000		40
Oats, lbs.	780					200	1,000		
Gr. Oats, lbs.		300	150	150			1,000		10
C. S. Meal, lbs.		300	150	150				60	
Hay, lbs.	2,860	3,000	2,000	500				120	
Straw, lbs.									
Bran, lbs.							1,000		10
Tankage, lbs.					25	100			
Milk, lbs.				350					
Skim Milk, lbs.				3,000			9,000		
Production		200 lbs. B. F.				7 pigs	750 doz. eggs 250 lbs. poultry		

(1) With production as shown.
(2) Allowance for dry lot feeding.

Forms similar to A, B, C, D, and E are described, and a method of using them outlined in more detail in Farmers Bulletin 1564 of the U. S. Department of Agriculture.

FORM "A"—FOR ESTIMATING CROP PRODUCTION (See Table 19)

Crops	Acres Number	Yield Per Acre Amount	Total Production Amount	Fertilizer Used Tons (a)	Man Labor Hours (b)	Horse Work Hours	USE OF CROP			Value of Sales Dollars (c)
							Feed Amt.	Seed Amount	Sales Amount	

(a) Cost of fertilizer to be calculated and carried to Form "D"
(b) Cost of hired labor goes to Form "D"
(c) Total of sales goes to Form "E"

FORM "B"—FOR PROPORTIONING FEED FOR LIVESTOCK

(See Table 20)

In this Column List the Kind of Livestock	No. of Head	IN THESE COLUMNS LIST THE AMOUNT OF FEED FOR EACH KIND OF LIVESTOCK										
		Corn Bu.	Oats Bu.	Bran Lbs.	C.S. Meal Lbs.	Shorts Lbs.	Corn Chops Lbs.	Tankage Lbs.	Hay Tons	Straw Tons	Hulls Tons	Silage Tons
Mules												
Young Stock												
Cows												
Young Cattle												
Bulls												
Sheep												
Sows												
Pigs												
Chickens												
Totals Amts.												
Total Value												

Difference between totals here and items on Form "A" must be bought.
Carry value of purchased feed to Form "D"

FORM "C"—FOR ASSEMBLYING PRODUCTION AND ESTIMATING INCOME FOR LIVESTOCK—(See Table 21)

KIND—	List Number Kept	List Expected Production Per Head	List Total Production	List Amt. or Number Used Here			Expected Price	Value of Sales	Value used in Home
				Used in Home	Amount Fed	Amount For Sale			
Cows									
Young Cattle									
Hogs									
Poultry									
Sheep									

Carry total sales and value of products used in home to Form "E"

FORM "D"—FOR ASSEMBLYING EXPENSES—(See Table 22)

CROP EXPENSES—	Units	Cost Per Unit	Total Value
Ferilizer—Cotton			
Corn			
Oats			
Other			
Seed—Cotton			
Corn			
Oats			
Grass			
Soy Bean			
S. Potatoes			
Other Crops			
Threshing			
Ginning			
Purchased Feed			
Miscellaneous Expenses—			
Breeding Fees			
Blacksmith			
Repairs			
Machinery			
Buildings			
Labor			
Insurance			
Taxes			
TOTAL			

FORM "E"—FOR ESTIMATED FINANCIAL STATEMENT

Cash Receipts From:

Crops—From Form "A" .....

Livestock—From Form "C" .....

Livestock—Pro.—From Form "C" .....

Miscellaneous, for labor off the farm, sales of wood, ties, etc. .....

Total .....

Less Cash Expenses—From Form "D" .....

Net Cash Return .....

Add value of products used in home—From Form "C" .....

Total net returns from proposed plan .....