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INCREASING INCOMES
Through Farm Adjustments
IN THE
GRENADA-LORING
Soil Association Area
OF
Southern West Tennessee

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and
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United States Department of Agriculture

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SUMMARY

The relatively low average farm income in type-of-farming area 3 is obtained almost exclusively from production of cotton. Other sources of income are needed also to permit more profitable use of farmers' resources and to raise long-time net incomes.

This report presents and evaluates alternatives to the present systems of farming.

In developing alternative systems of farming, it was assumed that the present acreage of the representative farms would not change. The total volume of production, however, would be increased by reorganizing the farm and adopting improved production practices. Both of these measures would require more capital.

Largely because of its value as a cash crop, and the relatively low risk involved in its production, cotton would be kept in each alternative system. However, the acreage would be reduced in varying amounts, depending chiefly on the amount of labor available, when combined with livestock and other enterprises. But, with higher yields per acre and the present labor supply, the quantity of cotton produced either would remain as at present or would increase slightly. With the assumed reduction in the long-time labor supply, total production of cotton would decline below the present level.

Alternative systems were developed under two assumptions relative to the labor supply: (1) That it would remain as at present in the short run, and (2) that it would be reduced approximately 30 to 40 percent in the long run.

In adjusting the farm organization with improved practices, alternative systems are developed around cotton and either grade B dairying (alternative I) or the cow-calf type of beef production (alternative II). Hogs are combined with dairying, and either hogs or hens, or both, would supplement production of beef.

In each farming system the present acreage of cotton would be reduced about 20 to 25 percent to approximately the 1955 acreage allotment under the assumption that the present labor supply would be available. On the large upland farm, however, the reduction would amount to about 50 percent, under one assumption.

Compared with the present system, these alternatives would permit more complete use of the land resources by (1) incorporating idle land into the cropping system and (2) increasing production per acre through the use of more efficient production practices.

Soils would be better protected from erosion. Smaller acreages would be in cultivated crops; rotations of cultivated crops and sod crops on upland would be established. Idle land would be brought into these rotations or into the permanent pasture program; and improved grass-clover pastures would be established.

These changes would permit fuller employment of the labor force on these representative farms. The range would be about 200 to 260 days as compared with the present 165 to 190 days of labor per man.

In making these improvements, the cash outlays needed to make the shifts where tractor power is substituted for workstock would be 80 to 120 percent of the present average investment.

On the representative small upland farm, which would not shift to tractor power, additional capital equivalent to about 50 to 75 percent of the present investment would be needed.

Labor earnings from alternative systems for all groups of farms would increase. On upland farms family earnings would rise from roughly \$800 to \$1,200 to around \$2,500. On bottom land farms, earnings would rise from a range of \$1,500 to \$2,000 to a range of \$3,500 to \$4,500.

Labor returns per man-equivalent to the operators of small upland and medium-sized upland farms would not differ significantly. The large upland farm with only 15 acres of cotton (alternatives I and II) would return a third to a half more net returns per man to the operator than would the smaller farms. For the cotton-dairy-hog alternative I the operator would receive about \$2,200 per man and for the cotton-beef-poultry-hog alternative II, about \$2,100 per man.

With 25 instead of 15 acres of cotton, labor earnings on the large upland farm would increase by \$250 when combined with dairying (alternative I) and \$185 when combined with beef (alternative II).

With no changes in the present farming systems except to increase yields per acre by adopting improved practices on present acreages of corn and cotton, labor earnings would increase at 1949 prices. For example, on the typical small upland farm with lint cotton at 29 cents a pound, earnings would rise about 70 percent. At 22 cents a pound, earnings from improved practices would drop to 25 percent above present earnings.

If the labor force were reduced 35 to 40 percent, only the large farm would have cropper labor. This farm would employ one full-time man on a cropper-wage basis.

With this reduction in labor it is assumed that fewer acreages of cotton would be grown than is assumed for alternatives that would retain the present labor supply. Reductions from present acreages would range from about 60 percent on the representative small farms to 80 percent on the large upland farms. In production of cotton per man, reductions would range from zero to 20 percent on all except the medium-sized bottom land farm and the large upland farm. For these latter farms production per man would be reduced about one-half.

With reductions in cotton, production of livestock and feed crops would be emphasized. With reduced labor, alternative III on the large farm would have 20 percent more beef cows than alternative II, which is similar as to type of organization but retains the present labor force.

Generally, for both croppers and farm operators, the total labor force would be more fully utilized with the reduced labor supply and the shift to more livestock. With the present labor force, the alternative systems would use cropper labor a maximum of 200 days per man. This compares with about 250 days per man when the labor force is reduced as in alternative III on the large upland farm.

The problem of capital would be intensified if the total labor force were reduced. Alternative systems with present labor forces would require an additional cash outlay about equal to the present average investment. For the alternative with reduced labor (alternative III), the additional requirement would range from one and a half to twice the present investment.

Alternative III in all farm size groups would require an average investment per man ranging from \$12,000 to \$16,500. This compares with \$6,500 to \$9,300 per man for alternatives with the present labor forces and \$4,400 to \$4,900 per man for the present cotton system.

The representative large farm would need the highest investment. This farm would reduce its labor force 43 percent, but its crop and pasture land would be increased to 73 acres per man.

Net returns to labor per man would be higher for alternatives with a reduced labor supply. They would range from \$1,735 on the representative small farm to \$1,825 on the large farm. For alternatives with the present labor force, the range would be from \$1,424 on the large upland farm to \$1,625 on the small upland farm.

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Net returns per man on bottom land farms of a given size would be larger than net returns on upland farms of comparable size, chiefly because of higher yields per acre and a more intensive cropping system.

How tenants would fare if the labor were reduced may be illustrated by alternative system III (beef-hog-poultry-cotton) on the representative large farm. With the tenant and his family making up the two-man labor force, their labor earnings would be \$3,260 compared with present earnings of about \$2,000. Only

72 additional days of labor but about \$8,200 of new capital would be needed in the system.

Although in the long run these alternative systems of farming would be more profitable to both labor and capital, certain obstacles are recognized. Chief among these are the relatively large amounts of new capital needed to set up improved systems. Others include: (1) the need to learn new skills and develop higher levels of management, (2) increased risk, and (3) a high percentage of tenancy.

INCREASING INCOMES THROUGH FARM ADJUSTMENTS IN THE GRENADA-LORING SOIL ASSOCIATION AREA OF SOUTHERN WEST TENNESSEE

Thomas J. Whatley and Samuel W. Atkins¹

INTRODUCTION

Type-of-farm area 3, of which the Grenada-Loring Soil Association is a part, is the main cotton-producing area in Tennessee. During the past century a large percentage of Tennessee's one-half to three-quarter million acres of cotton has been grown there. In general, farms have been organized around cotton. A few acres of corn and lespedeza hay are grown chiefly for feeding work-stock. Other livestock are kept mainly to supply home needs. Because of this farm organization labor has been underemployed; land has been used inefficiently; and farm incomes have been relatively low.

The per capita agricultural income of Tennessee as a whole has lagged behind that of most of the United States. For example, in 1910 the average income per farm person in Tennessee was \$154, compared with \$270 in the country as whole. From 1910 to 1950 farm income per person increased about 1.0 percent per year in Tennessee, compared with 2.6 percent per year in the United States. This condition existed chiefly because many people with small capital resources have tried to make a living from farming.² For example, the total value of land, machinery, and livestock per farm person in 1910 averaged \$466 in Tennessee, compared with \$1,241 for the United States as a whole. Between 1910 and 1945 the real value of per capita resources in agriculture increased only two-thirds as fast in Tennessee as in the United States. In terms of 1910-14 dollars, per capita resources in Tennessee agriculture in 1945 averaged \$684, compared with \$1,560 per capita in all American agriculture.

Farm people in the area studied are in about the same position as those in Tennessee as a whole with respect to per capita farm incomes and per capita farm resources. Although this area is a little higher than Tennessee in per capita income, its per capita value of real estate, machinery and livestock is lower, as indicated by the situation in type-of-farming area 3 (fig. 1). Relatively little capital is needed for cotton, the major enterprise in this area.

¹ Associate Agricultural Economist, Agricultural Experiment Station, University of Tennessee; and Agricultural Economist, Production Economics Research Branch, Agricultural Research Service, U. S. Department of Agriculture, respectively.

² Type-of-farming area 3 in 1950 had 0.7 percent of the farm people in the United States but only 0.33 percent of the farm income and 0.28 percent of the value of real estate, machinery, and livestock.

TABLE 1.—*Cash Farm Income and Value (in actual dollars) of Farm Property per Rural-farm Person in Type-of-farming Area 3, with Comparisons, 1949 and 1945, Respectively*¹

Item	Type-of-farming area 3	Tennessee	United States
	Dollars	Dollars	Dollars
Cash farm income per rural-farm person, 1949	370	329	968
Value of real estate, machinery, and livestock per rural-farm person, 1945	934	1,054	2,382

¹ Data on the value of machinery in 1950 are not available.

Source: Census of Agriculture, 1945 and 1950, U. S. Bureau of the Census.

The 1940's provided an excellent opportunity to make adjustments in the agricultural economy of the South. Because of job opportunities in industries many underemployed farm workers moved into more productive work in urban areas. A continuation of this trend, however, would create problems in the short run. Labor would leave agriculture faster than suitable adjustments could be made to the reduced labor supply. In the long run, however, this process should create greater opportunities in agriculture through expanded markets for farm products and more efficient production.

Substitution of capital for labor leaving farms should result in a considerably higher per capita income, provided improved production techniques are adopted by those who remain in agriculture. The introduction of new capital combined with new production techniques may take the form of an increase in farm size, in livestock numbers, in mechanization, or a combination of these with an improved level of production practices. Unless a reduction in the supply of labor is accompanied by a change in the use of other resources, however, the total agricultural output may be reduced for the specific area or state.

Location of the Area

The Grenada-Loring Soil Association Area studied is located in the southwestern part of West Tennessee (Fig. 1). It occupies approximately three-fourths of the upland cotton area designated as type-of-farming area 3, which is the northern extension of a similar area in Mississippi, sometimes referred to as the Brown Loam Area.

Purpose and Use of the Study

This study was intended to evaluate alternative systems to the present specialized cotton system of farming that will better utilize land, labor, and other capital resources in maximizing farm incomes and satisfactions over a period of years.

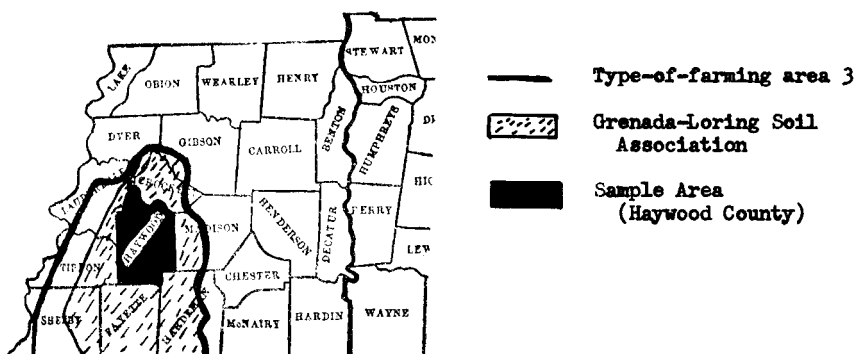


Figure 1.—Location of type-of-farming area 3 and the Grenada-Loring Soil Association area in Tennessee

Specific objectives were as follows:

1. To describe the present agriculture of the area in terms of land use, systems of farming, and size of farm; crop, pasture, and livestock practices and their relation to the physical resources.
2. To estimate the cost and returns from present and alternative systems of farming.
3. To point out and evaluate the limitations of and obstacles to the attainment of desirable adjustments in farming and suggest ways of alleviating them.

This report should serve as a guide to State and Federal agencies in helping farmers adjust their present farm plans to achieve more profitable long-run systems of farming. It also should aid in area program planning by providing a basis for estimating the effects of proposed adjustments on production and production requirements in the area.

Method of Study

The first step in the procedure was to describe the present pattern of the agriculture into which alternative systems of farming must fit. This was done by (1) studying information from secondary sources such as the Census of Agriculture and soil maps relating to the whole area, and (2) making a field survey of farms in a typical county in the Grenada-Loring soil area studied. Hay-

wood was selected as the typical county. In terms of types of farms, it is representative of about 90 percent of the farms in the area, or the predominately cotton farms, and soil resource maps for all farms were available.³

The farms surveyed were located in a sample of eight 2-mile-square block that were selected at random. Information was obtained on all farms in the sample blocks, provided the homesteads of the farm operators were located within these sample blocks. For details of the sampling procedure see appendix I.

The field survey covered 141 farms. Information was obtained on major land uses, crop and livestock organizations, and farm resources. On about a fourth of these farms, data were obtained on present production practices for the major farm crops and the cost of workstock and tractor power. An attempt was made to learn what practices were used for small grain, improved pasture, dairy cattle, beef cattle, and hogs; but, because few farmers produced these enterprises, the number of schedules obtained were inadequate for analysis. To supplement the data on dairying, 40 farms that produced milk for processing in Weakley County in the Northern Brown Loam were surveyed. In this area, where soil resources are similar to the Southern Brown Loam, dairying has replaced much of the cotton as a source of income in the last 2 to 3 decades.

As soil resources and size of farm are important in determining farmers' possibilities in making successful adjustments in farming systems, the sample farms were classified according to these factors. On the basis of soil resources, they were divided into two groups according to the ratio of upland to bottom land in terms of acreage. The characteristics of the soils were obtained from area maps prepared by the Soil Conservation Service, on which individual farm boundaries supplied by the local office of the Agricultural Adjustment Administration were super-imposed.⁴ As to size, these farms were classified according to the number of acres of cleared land into small, medium-sized, and large farms.

For this classification the large multiple-unit farms (500 acres or more) were excluded as units. Consequently, most of the farm units included in this study were operated by full owners, part owners, and tenants on the single or relatively small multiple-unit farms.

The analyses of the sample farms for both the present situation and the evaluation of alternative adjustments were based on this classification. Six farms were selected to represent the farms in each of the 3 size classifications in the 2 soil groups.

For each representative farm, alternatives to specialized cotton farming were planned and the comparative costs and returns were estimated. The budget method was used.

³ Dairying and production of small fruits and vegetables are important only in localized areas in type-of-farming area 3.

⁴ Regional Office, Soil Conservation Service, Spartanburg, S. C., and Production and Marketing Administration, Brownsville, Tenn., respectively.

For this analysis it is assumed that the size of the representative farms would not change if an alternative system were put into effect. The effects of changing the size of farms may be studied by comparing systems on farms of different sizes. As for labor, it is assumed that the size of the labor force would not change for certain alternative systems in the short run. For other alternatives, it is assumed that the labor force would be reduced in the long run.

CHARACTERISTICS OF TYPE-OF-FARMING AREA 3

Physical Factors

Topography and soils — Type-of-farming area 3 makes up approximately a tenth of the farm land in the State. It slopes south and west from about 600 feet elevation in the east to 250 feet at Memphis in the southwest and 400 feet in the northwest. Drainage is by the Obion, Forked Deer, Loosahatchie and Wolf Rivers, and their tributaries. Many of the river bottoms are low and marshy, and are covered with forests. The streams are sluggish, having cut their beds almost to the level of the outlets into the Mississippi River. After heavy rains, they overflow.⁵

The area is covered with a loessial silt soil, a wind-deposited material that is relatively deep at the Mississippi bluffs and gradually thins to the east. Under the loess are layers of gravelly, sandy, and clayey coastal plains materials. Despite the comparatively level to gently rolling topography, this region is heavily scarred by erosion.

The loess soils in the area are made up mainly of upland and bottom land soils. The upland soils consist primarily of Memphis, Loring, Grenada, Calloway, and Henry series. Drainage is good on Memphis soil. It becomes progressively poorer on each of the other soils. A slight hardpan is evident in the Loring soil, and a definite hardpan usually appears from 18 to 24 inches' depth in Grenada soil. In Calloway and Henry soils the hardpan is closer to the surface. This pan development interferes with the movement of moisture and air through the soil. It also forms a barrier to root penetration. Therefore, it is an important factor in crop adaptation.

Collins and Falaya, the most important bottom land soils, are among the most productive in the area if adequately drained. Drainage is best on Collins; it becomes more of a hazard on Falaya soil.

Climate

The average length of the growing season ranges from 200 days in the eastern part of the area to 216 days in the west.⁶ This is adequate for growing and maturing a wide variety of field crops.

⁵ Luebke, B. H., Atkins, S. W., Allred, C. E., and Roth, W. J., *Types of Farming in Tennessee*, Tenn. Agr. Expt. Sta. Bul. 169, Reprinted December 1947.

⁶ U. S. Dept. of Commerce, Weather Bureau, *Climatological Data, Annual Summaries, 1921-50*.

The average annual precipitation was 51.6 inches during the period of 1921-50. The heaviest precipitation occurred in the months of December through March. It averaged between 5 and 6 inches a month. In the spring planting season, the normal rainfall declined to about 4.5 inches. The decrease continued into the

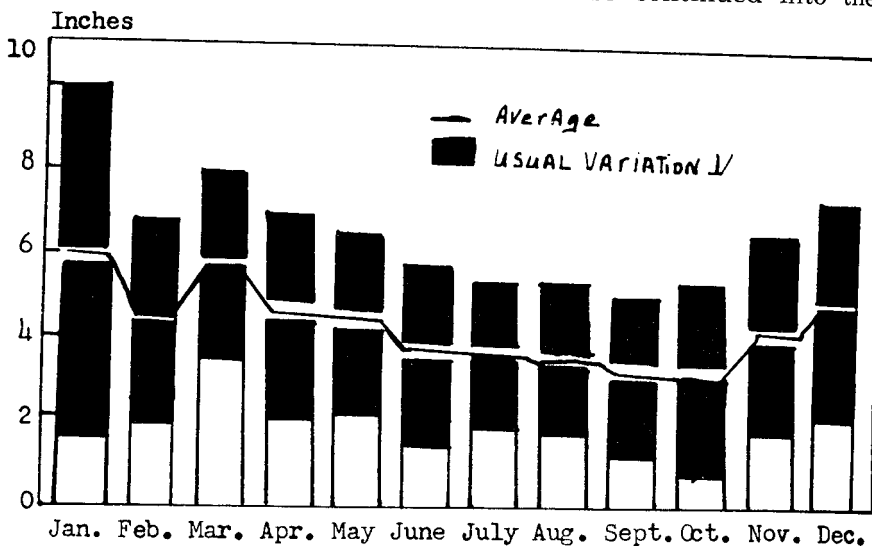


Figure 2.—Average Expected Monthly Precipitation, Type-of-farming Area 3, 1921-50.

¹ This represents plus or minus one standard deviation from the average precipitation, and is based on the assumption of a normal monthly distribution and a precipitation pattern similar to that of 1921-50.

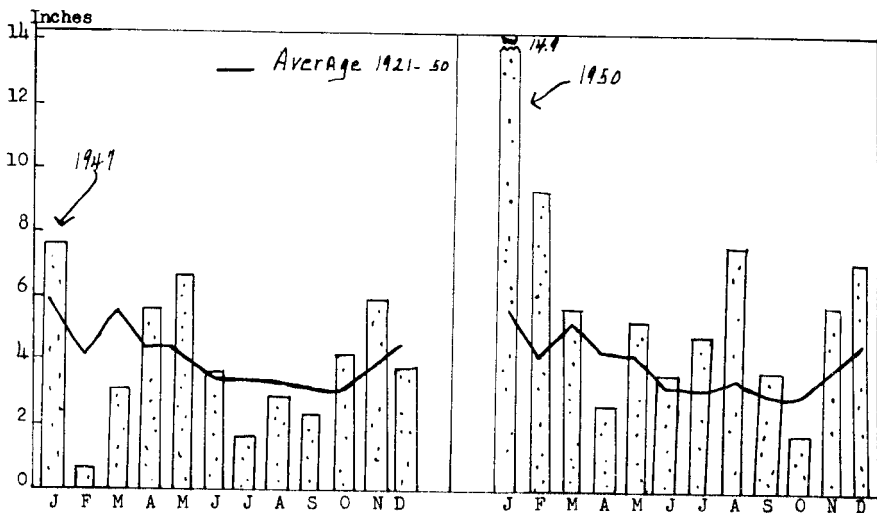


Figure 3.—Monthly Precipitation, Type-of-farming Area 3, Average 1921-50, and 1947 and 1950.

summer, with the low point (a little more than 3 inches) reached in early fall — the harvesting season for most crops in the area (Fig. 2). For specific years monthly and annual precipitation vary widely. This is illustrated by conditions that occurred in 1947 and 1950 (Fig. 3).

Social and Economic Factors

The type of farming developed in this area during the early settlement days resulted in many of the social and economic conditions that exist today. As in many other sections of the South, early agriculture was planned around cotton and slaves. As cotton was an intensive labor-requiring crop, well adapted to slave labor, a high percentage of the land was planted to cotton. This resulted in a relatively high man-land ratio in agriculture.

After the war between the States much of the Negro population remained in agriculture as tenants or sharecroppers. Until the 1930's very few changes were made in the combination of enterprises grown or the level of production techniques applied by these tenants and sharecroppers. Their operations were usually supervised by plantation owners who provided the fertilizer, seed, and other credit needs to produce the crops. As cotton was a well-known cash crop, the plantation owners or their designated furnishing merchants insisted upon a specific acreage of cotton each year before credit would be furnished the tenants and sharecroppers. Small landowners also depended largely upon local merchants for credit. They pledged their cotton crop as security for this assistance.

Because of risks and uncertainties associated with the production and price of cotton merchants and landlords often found it necessary to charge high interest rates on credit furnished sharecroppers and tenants. As a result of this system, the welfare of the entire area was closely associated with changes in the production and prices of cotton. When production and prices were high, farmers were relatively prosperous. In periods of low production and low prices farmers suffered severely. However, in many instances, a succession of poor crop years or low prices would wipe out all profits obtained in more prosperous years.

This system of farming planned around a one-cash crop, resulted in a slow rate of capital accumulation in the area. Farmers were handicapped by lack of credit and by lack of technical "know how" in making needed adjustments in agriculture. This unbalanced agriculture resulted in poor housing, inadequate educational facilities, and other social and economic ills.

Population

About 163,000 people were living on farms in type-of-farming area 3 in 1950. This represented about a fourth of the total population in the area⁷ (table 2). As in Tennessee and the Nation as

⁷ If Shelby County, in which Memphis is located, is excluded from the population data, the farm population in the remaining counties makes up 55 percent of the total population in 1950.

a whole, the percentage of farm people in the total population in this area has declined in recent decades. Since 1930 the percentage decreased from 37 to 23. Most of the reduction occurred after 1940 (fig. 4).

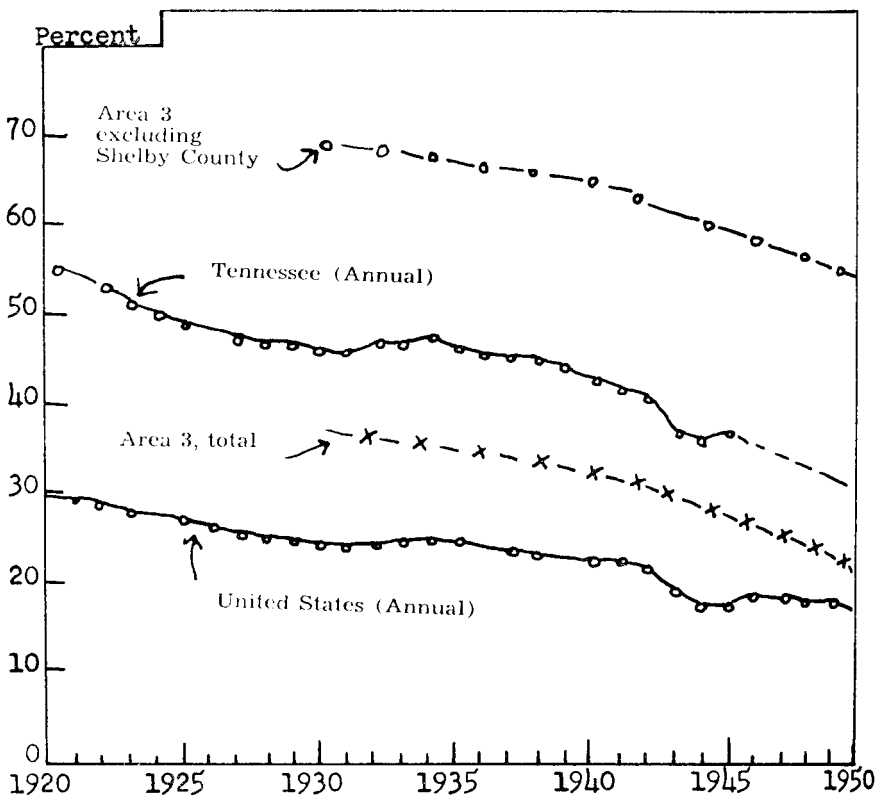


Figure 4.—Farm Population as a Percentage of Total Population, Type-of-farming Area 3, with Comparisons, by Census Periods, 1920-1950.

Sources: U.S.D.A., Agricultural Statistics, 1942 and 1949
 U.S.D.A., B.A.E., Farm Population Estimates, and
 U.S. Censuses of Agriculture and Population (County basis)

This decline in the relative importance of the farm population was the result of two sets of forces. One enlarged the nonfarm population by a little more than 40 percent. The other reduced farm population by 18 percent.⁸ These shifts in population oc-

⁸ Change in definition of farm population in 1950 had no significant effect on comparability of 1950 data with previous periods. (1950 U. S. Census of Population, Tennessee, General Characteristics, page V.)

curred from 1940 to 1950 when Memphis had its phenomenal growth in population, and farm people were attracted to urban centers by wartime jobs."

TABLE 2.—*Trends in population, Type-of-farming Area 3, with Comparisons, by Census Periods, 1930-50.*

Item	Unit	Area 3			Tennessee		
		1930	1940	1950	1930	1940	1950
Total population	Percent	534	599	725	2,617	2,916	3,292
Farm population		197	199	163	1,213	1,272	1,016
Percentage farm is of total population	Number	37	33	23	46	44	31
Decrease in farm population, 1940-50	Acres	xx	xx	18	xx	xx	20
Farm population per 100 acres farmland	1,000	9.5	8.5	6.4	6.7	6.9	5.5
Farmland per farm person	Percent	10.5	11.8	15.5	15.0	14.5	18.2

Source: U. S. Censuses of Population (County basis)

Tenure of farm operators

A high percentage of the farms in this area are operated by tenants. If croppers are classified as operators, almost two-thirds of the farmers rented all the land they operated. If croppers are classified not as farm operators but as laborers who get a share of the production for their work, the proportion of tenancy drops to about half (table 3).

TABLE 3.—*Distribution of Farm Operators by Tenure Groups Type-of-farming Area 3, 1950 and 1930*

Tenure group	1950			1930		
	Number	Percentage		Number	Percentage	
		Excluding Croppers	Including Croppers		Excluding Croppers	Including Croppers
Full owners	10,258	38	28	9,070	35	21
Part owners	3,493	13	9	1,830	7	4
Sharecroppers	10,622	xx	28	17,639	xx	41
Other tenants ¹	12,984	49	35	14,909	58	34
TOTAL	37,357	100	100	43,448	100	100

Census of Agriculture, 1930 and 1950 (County basis)

¹ Made up largely of share tenants.

This high percentage of tenancy is traceable largely to the cotton system of farming and to the fact that after the War Between the States many of the negroes remained on the plantations as share tenants or croppers. Cotton is adapted to a tenant system.

" The population of the urbanized metropolitan area of Memphis was 406,034 in 1950.

It requires relatively little supervision over the tenant by the landlord; the crop can easily be divided between tenants and landlords; and it provides relatively safe collateral for production loans. Furthermore, the value of the landlord's shares of the cotton crop normally are high in relation to the amount of capital invested and in relation to the acreage of land. In recent years the trend in numbers of both sharecroppers and other tenants (principally share tenants) has been downward. They accounted for a large part of the off-farm migration during the 1930's and 1940's. On the other hand, farm owners, both those who owned all and those who owned only part of the land they operated, increased in number during this period.

Land uses

Compared with the State as a whole, area 3 has a relatively high proportion of cropland. About half of the total area is cropland. A little more than 40 percent is harvested cropland and about 10 percent is idle cropland (table 4).

TABLE 4.—*Land Uses in Type-of-farming Area 3 and Tennessee, 1949*

Land Use	Area 3	Tennessee
	Percent	Percent
Cropland harvested	41.6	30.1
Cropland idle	9.6	8.0
Plowable pasture	14.5	15.4
Woodland pasture	7.6	10.3
Other pasture	4.6	8.9
Woodland not pastured	14.1	21.4
All other land in farms	8.0	5.9
Total percent	100.0	100.0
Total in thousands of acres	2,599	18,534

U. S. Census of Agriculture (County basis)

Of the cropland harvested, cotton occupied almost a half million acres, or 46 percent in 1949. Corn, with 30 percent, ranked second in number of acres, and hay crops were third with only 13 percent. These three crops accounted for almost 88 percent of the acreage in harvested crops. The acreage in soybeans expanded in recent years to about 54,000 acres in 1949, or 5 percent of the total harvested acres (table 5).

The acreage of cotton declined approximately a third from 1929 to the late thirties and midforties. After World War II the acreage rose rapidly. By 1949 the acreage of cotton was only about 15 percent below the 1929 level. The acres diverted from cotton have been planted chiefly to hay crops and soybeans for beans.

TABLE 5.—*Total Acreage of Specified Crops and Average Acreage Per Farm, Type-of-farming Area 3, by Census Periods, 1929-49*

Crop	1929	1934	1939	1944	1949
1,000 acres					
Corn	358	433	366	390	324
Cotton	576	388	376	375	497
All hay	93	120	182	141	136
Soybeans for beans	no data	no data	3	20	54
Other crops	67	145	123	99	71
Cropland harvested	1,094	1,086	1,050	1,025	1,082
Acres per farm					
Corn	8.2	9.7	9.4	10.3	8.7
Cotton	13.2	8.6	9.6	9.9	13.3
All hay	2.1	2.7	4.7	3.7	3.6
Soybeans for beans	xx	xx	.1	.5	1.4
Other crops	1.6	3.2	3.1	2.6	1.9
Cropland harvested	25.1	24.2	26.9	27.0	28.9

U. S. Census of Agriculture (County basis)

Livestock

Despite the fact that numbers of many kinds of livestock doubled between 1930 and 1950, livestock still remained relatively unimportant on the average farm in the area (table 6). Cattle numbers increased approximately 75 percent during this period. This was about equal to the 73-percent increase throughout the state. However, even with a 75-percent increase, cattle numbers averaged less than 5 head per farm. The number of hogs and pigs in the area increased about 50 percent between 1930 and 1950. This compared with a 30-percent increase in the state. The average number of hogs and pigs in the area increased from about 3 to 5 per farm during this period. Poultry numbers were limited primarily to family flocks of 20 to 30 birds per farm.

TABLE 6.—*Total Number of Livestock and Average Number Per Farm, Type-of-farming Area 3, by Census Periods, 1930-1950*

Kind of Livestock	1930 ¹	1935 ¹	1940 ²	1945	1950
1,000 head					
Workstock	84	79	75	79	76
All cattle	103	168	140	189	179
Cows milked	3	3	61	59	60
Hogs and pigs	116	151	135	154	174
Sheep	13	9	7	8	7
Chickens	3	3	770	1,133	823
Number per farm					
Workstock	1.9	1.7	1.9	2.0	2.0
All cattle	2.4	3.8	3.6	5.0	4.8
Cows milked	3	3	1.6	1.5	1.6
Hogs and pigs	2.6	3.4	3.4	4.0	4.6
Sheep	0.3	0.2	0.2	0.2	0.2
Chickens	3	3	20.0	30.0	22.0

U. S. Census of Agriculture (County basis)

¹ Includes only workstock and cattle over 3 months of age.² Includes only workstock and cattle over 3 months of age, hogs, pigs, and chickens over 4 months of age and sheep over 6 months of age.³ No data available.

The decline in numbers of workstock was much slower in this area than in the state as a whole. Workstock decreased 10 percent in the area between 1930 and 1950, compared with a 25 percent decrease throughout Tennessee.

Types of farms

That cotton predominates in the farm economy is further indicated by the high percentage of cotton farms—farms on which 50 percent or more of cash income from farm products was obtained from cotton. Taking only commercial farms—generally those selling farm products valued at \$1,200 or more—almost 9 in 10 were cotton farms in 1949. On other commercial farms, cotton was usually an important supplementary enterprise grown in combination with some kind of livestock and feed crops. Such farms are usually classified as general and livestock farms.

In the area approximately 80 percent of the farms as classified by the Bureau of the Census are commercial farms. Non-commercial farms are chiefly part-time¹⁰ and residential farms.¹¹

Size of farms and farm incomes.

Measured in acres farms generally are small.^{11a} Almost two-thirds contained less than 50 acres in 1950. Included in this group were most of the sharecropper farms, which averaged only 27 acres per farm (tables 7 and 8). Other tenant farms averaged about 60 acres, full owners almost 100 acres, and part owners close to 140 acres.

TABLE 7.—*Percentage of Farms in Various Sizes, Type-of-farming Area 3 and Tennessee Compared, 1950*

Acres	Area 3	Tennessee
	Percent	Percent
Under 10	8.6	10.4
10 - 49	53.6	39.1
50 - 99	20.4	24.9
100 - 179	10.7	16.2
180 - 219	1.8	3.2
220 - 259	1.2	1.8
260 - 499	2.5	3.4
500 & over	1.2	1.0

U. S. Census of Agriculture (County basis)

TABLE 8.—*Average Size of Farms by Tenure Groups, Type of Farming Area 3, Census Periods, 1930-50*

Tenure group	1930	1935	1940	1945	1950
	Acres	Acres	Acres	Acres	Acres
All farms	48	55	62	66	69
Full owners	81	87	89	88	96
Part owners	72	93	126	125	137
Tenants	52	57	65	76	61
Sharecroppers	27	30	26	29	27

Censuses of Agriculture, 1930-1950 (County basis)

¹⁰ Farms with cash sales of farm products of \$250 to \$1,199 and operator working 100 days or more off the farm or nonfarm income of the operator or his family exceeded the cash sales of farm products.

¹¹ Generally, farms used for residential purposes only.

^{11a} The sizes of farms as reported in this section are based on Bureau of the Census' definition of a farm in which sharecropper units are considered as farms.

Of the tenure groups since 1930, part owners have had the largest increase in average size of farms and sharecroppers the smallest. In fact, the average size of cropper farms has not changed significantly during the last 20 years (table 8). Part-owner farms have almost doubled in average size. In 1950, on the average, they were the largest farms in the area. Most of this increase occurred between 1940 and 1950. With tractors and tractor-drawn equipment available, many small owner-operators rented additional land, thereby increasing the size of their farming operations.

Gross cash incomes from the sale of farm products generally are low. Of the commercial farms, almost three-fourths reported cash incomes of less than \$2,500, according to the 1950 Census. One-third sold products valued at less than \$1,200. Less than 10 percent of all farms had incomes of \$5,000 or more.

Markets

This area (type-of-farming area 3) with a total population of 725,000 provides an important outlet for food and fiber entering both local and national markets. Memphis, the largest city in Tennessee, provides a central market for many farm commodities such as cotton, livestock, livestock products, and truck crops. Memphis can be reached by rail or truck from any county in the area in not more than 2 or 3 hours. Throughout the area local markets are available for cotton—markets that have been developed over several generations. Milk routes for the assembly of grade B milk for processing have been established in many communities in the area. Markets for grade A milk are provided by Memphis and smaller towns and cities.

There is a market for a considerably greater quantity of poultry and eggs than are now produced in the area. In 1950 an estimated 20 million pounds of poultry meat was shipped into Tennessee. This amounted to approximately 6 pounds per capita.¹² Between September 1, 1949, and August 31, 1950, an estimated 1,361,000 cases of eggs were shipped into the state. This represented 31 percent of all the eggs consumed in Tennessee.¹³

In 1948, livestock auctions were located in Dyer, Fayette, and Haywood counties. In Madison County, a packing company has provided a direct market for many livestock produced in the surrounding territory. In addition to these markets, Memphis has provided a major outlet for all kinds of livestock.

FARM RESOURCES AND ORGANIZATION ON FARMS SURVEYED IN HAYWOOD COUNTY

For purposes of this study, a farm is a unit of land on which the operator does the planning, furnishes the supervision, owns the power and equipment, and provides the labor force. The latter may

¹² The Agricultural Situation, U. S. Dept. of Agriculture, Bureau of Agricultural Economics, vol. 36, No. 3, March 1952.

¹³ Raskopf, B. D., Egg Marketing Wholesale and Retail in Tennessee, The Tenn. Agr. Expt. Sta., Rural Research Ser. Monogr. 267, July 1953.

consist of either wage hands, sharecroppers, the operator and unpaid labor of the operator's family, or a combination of two or more of these. Thus, a sharecropper unit is part of a farm, as defined in this study, and not a separate unit as classified by the Bureau of the Census.¹⁴ Consequently, the number of farms in the area surveyed for this study was smaller than the number reported in the Census of Agriculture.¹⁵ The land in a farm as defined in this study may be owned by the operator, partly owned and partly rented, or rented.

Number and Size of Farms

The 141 farms surveyed ranged in size from approximately 7 to about 500 acres of cleared land. These were classified into four size groups based on the acreage of cleared land per farm as follows: Very small, under 20 acres; small farms, 20 to 59 acres; medium-sized farms, 60 to 99 acres; and large farms, 100 acres

No. of
Farms

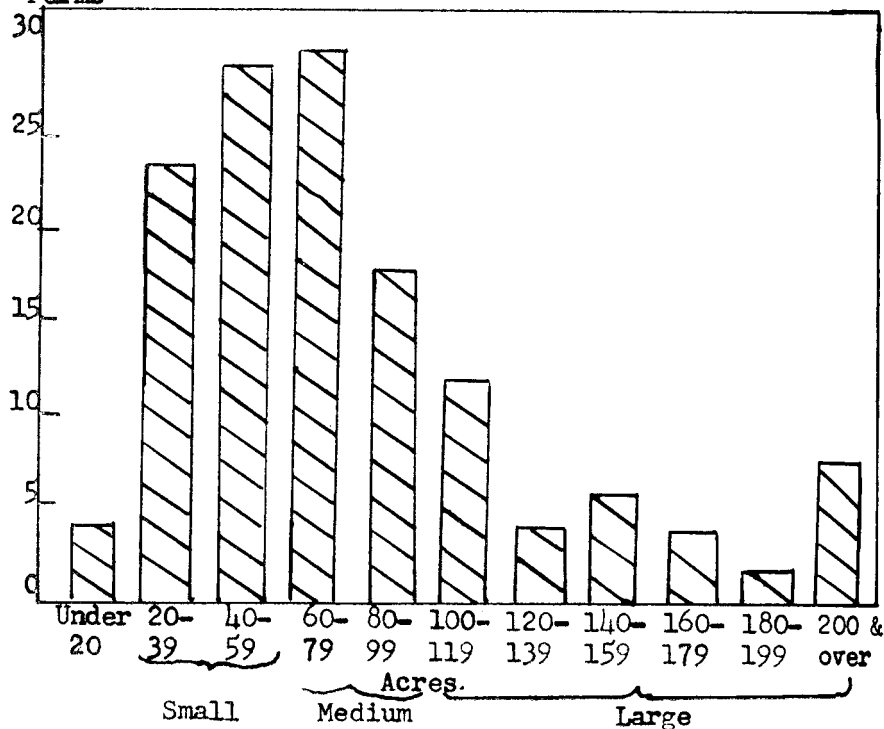


Figure 5.—Distribution of Farms According to Acres of Open Land, 141 Farms, Haywood County, Tennessee

¹⁴ 1950 U. S. Census of Agriculture, V. 1-pt. 20, Tennessee, page xii.

¹⁵ By Census definition 189 instead of 141 farms were classified according to the method used in this study.

and more (fig. 5). Of the 137 farms containing 20 or more acres, 39 percent were small; 35 percent, medium-sized; and 26 percent, large. Only these three groups are included in the analysis of farm adjustments on representative farms.

Total crop acreage is an important measure of the present size of business on these farms as the farm economy is now based largely on crops. However, under a more balanced agriculture total acreage of cleared land should be a better indication of potential size, as pasture would play a much larger role than at present. As the topography is relatively favorable in a large part of the area, a considerable expansion in farm size would be possible by using all open land and using it more efficiently.

Soil Resources

For the 141 farms surveyed, the acreages in each soil boundary were measured from soil maps as indicated in a preceding section of this report (page 11). From these data were obtained the number of acres in each soil series group as well as the acreage in each land use capability class.

The relative importance of the soil series and the capability classes on these farms is as follows:¹⁶

Soil Series	Percentage of acres	Capability Classes	Percentage of acres
Upland soils:		Upland soils:	
Memphis, Loring	42	Class III	38
Grenada	27	Class II	17
Bottom land soils:		Class IV	12
Falaya	17	Class VI, VII	5
Collins	10	Bottom land soils:	
Miscellaneous soils	4	Class IIIA	18
		Class IIA	10
Total percentage	100	Total percentage	100

Farms classified by soil resources

A major soil situation that is related to adjustments in present systems of farming in this area has to do with the relative acreages of bottom land and upland. For this reason the farms surveyed were grouped according to the percentage of cleared land that was in each of these major soil groups. For this purpose the following classes were combined, II and III, IIA and IIIA, and VI and VII.

The largest group of farms had predominately soil capability classes II and III—almost two-thirds of the farms surveyed were in these classes (table 9). This means that 40 percent or more of the cleared land was upland (Memphis, Loring, or Grenada), which could be cropped in a 2 or 3-year rotation with appropriate levels of conservation practices. They are referred to hereafter in this study of "Upland" farms.

¹⁶ See appendices II and III for description of land classes and soil groups.

The second most important group is made up of predominately capability classes IIA and IIIA—the bottom land soils. They make up a fifth of all farms and are referred to hereafter as “Bottom Land” farms.

The capability classes II and III consisted primarily of three soil series: Memphis, Loring, and Grenada. All are upland soils and produce relatively large yields per acre if properly managed. Collins and Falaya soils make up most of the bottom land soils IIA and IIIA. See appendix III, page 87 for the characteristics of these soils.

Soils in capability classes IV, VI, and VII consist chiefly of Memphis, Loring, and Grenada soils. Largely because of relatively steep slopes, erosion problems are more serious than they are on the class II and III soils. Consequently, a larger proportion of these steeper lands should be in long rotation, permanent pastures, or trees.

Twelve farms, having no predominant land classes, are grouped as “Mixed” classes. Another dozen farms, predominately strongly rolling to steep, were in capability classes IV, VI, or VII.

TABLE 9.—*Farms Classified According to Predominant Land Use Capability, Classes and Size of Farm, Haywood County, Tennessee*

Farm group based on capability classes ¹	Percentage of farms by size			All farms
	Small	Medium	Large	
All farms, number	53	48	36	137
	Percent	Percent	Percent	Percent
Class II & III (Upland)	65	70	47	62
Class IIA & IIIA (Bottom land)	25	14	19	20
Class IV	2	4	14	6
Class VI & VII	4	2	6	3
Mixed classes	4	10	14	9
Total	100	100	100	100

¹ At least 40 percent of the open land was in these combined capability classes with the exception of the mixed class. In the mixed class none of the combined capability classes accounted for 40 percent of the open land.

For the study of farming adjustments, the two chief groups were selected—“Upland” farms and “Bottom Land” farms.

On Upland farms, Memphis-Loring soils increased in relative importance with increase in average size of farm, while the proportion of Grenada soil decreased as the average size increased (table 10). The former group of soils are usually recognized by soil scientists as slightly more productive and adapted to a wider range of crops than Grenada soil. Therefore, it would seem that the larger farms tend to have better land, on the average. The combined acreage of the two groups of soils represented approximately 75 percent of all open land on upland farms. These upland farms averaged about 20 percent Collins and Falaya soils.

TABLE 10.—*Relative Importance of Soil Groups on 112 Upland and Bottom Land Farms, by Size of Farm, Haywood County, Tennessee*

Size of farm	Percentage of acres in each soil group						
	Upland soils				Bottom land soils		
	Group 30 (Memphis- Loring)	Group 40 (Grenada)	Group 31 (Lex- ington)	Group 41 (Callo- way)	Group 42 (Collins)	Group 43 (Falaya)	All Farms
Upland farms							
Small	43	33	—	2	8	14	100
Medium	47	27	1	3	11	11	100
Large	54	21	1	—	11	13	100
Total	49	26	1	2	10	12	100
Bottom land farms							
Small	20	15	5	4	15	41	100
Medium	27	12	3	11	—	47	100
Large	32	12	8	—	29	19	100
Total	27	13	6	4	18	32	100
Grand total 112 farms	44	23	2	2	12	17	100
Grand total area	42	27	2	2	10	17	100

About 50 percent of the land on bottom land farms consisted of Collins and Falaya soils. The upland soils (Groups 30, 40, 31, and 41) accounted for the remaining soils on these farms. The latter groups of soils were often located on rolling land.

About 65 percent of the acreage on upland farms was in land use capability classes II and III, with around 20 percent in classes IIA and IIIA bottom land (table 11). Approximately 10 percent of the total acreage represented rolling to slightly hilly land, which is usually not adapted to cultivated crops (classes IV and VI).

TABLE 11.—*Relative Importance of Land Use Capability Classes on 112 Upland and Bottom Land Farms, by Size of Farms, Haywood County, Tennessee*

Size of farm	Percentage of acres in each capability class							
	II	III	IV	VI	VII	IIA	IIA	All farms
Upland farms								
Small	18	49	9	1	—	7	15	100
Medium	21	47	10	—	—	11	11	100
Large	23	44	8	1	—	11	13	100
Average	21	46	9	1	—	10	13	100
Bottom land farms								
Small	4	18	15	1	2	8	52	100
Medium	—	22	11	7	—	3	57	100
Large	13	14	16	2	6	29	19	100
Average	7	18	14	3	3	16	38	100
Grand total 112 farms	18	40	10	1	1	12	18	100
Grand total area	17	38	12	4	1	10	18	100

¹ Less than 1 percent.

The small and medium-sized bottom land farms had 60 percent of the open land in capability classes IIA and IIIA, 22 percent in classes II and III, and 18 percent in the relatively rough land. On the large bottom land farms only 48 percent of the land is in capability classes IIA and IIIA; 27 percent is in classes II and III.

Usually the bottom land on the small and medium-sized farms was found along small streams, while bottom land on large farms occurred along the larger streams. The quantity of rough land in capability classes IV, VI, and VII was much higher on bottom land than on upland farms. This was especially true on the large bottom land farms, which usually had sharp breaks in topography between bottom land and upland.

Using land capability classes as a basis for determining the intensity of cropping, about half of the upland farms could be planted to row crops each year (table 12). While two-thirds of the land on bottom land farms could be cultivated as intensively, the difference in the proportion of land adapted to row crops affects the systems of farming on these two groups of farms.

TABLE 12.—*Maximum Acreage Adapted to Row Crops Per 100 Acres of Open Land on Upland and Bottom Land Farms, Haywood County, Tennessee*

Size of farm	Upland Acres	Bottom land Acres
Small	48	67
Medium	48	68
Large	51	61

Power and Equipment

Workstock is a major source of power on farms in this area, although the number of tractors has increased since World War II. In Haywood County, according to the Census of Agriculture, the number of tractors on farms increased almost three times from 1945 to 1950 (from 291 to 845). The survey of sample farms in this county also showed a rapid increase in farms with tractors from 15 percent of farms in 1947 to 44 percent in 1950.

Concurrent with the increase in number of tractors, the number of workstock declined. On the small farms surveyed, the number of head per farm declined from an average of between 2 and 3 to 2; and on medium-sized farms, the number declined from 4 to 3 head. On the large farms where most of the tractors were found, the number of workstock per farm did not change materially.

The usual horse-drawn machinery found on small and medium-sized farms consisted of a disk harrow, 2 turning plows, a section harrow, middlebuster, planter, 2 cultivators, and a wagon. In addition, a mower and a rake were usually found on large farms.

Farm Buildings

Barns are small—the usual barn averages about 20 feet square without sheds. The few large farms with commercial cattle enter-

prises have barns that average 50 feet long and 60 feet wide with sheds on both sides.

Usually, dwellings, too, are small. The usual number of rooms per dwelling used by operator families are 3 on small farms, 4 on medium-sized farms, and 5 on large farms. For cropper families a dwelling of 3 rooms is usual on farms in each size group.

Labor Supply

The farms surveyed had, on the average, an equivalent of almost 18 months, or 1.5 man-equivalents, of operator and family labor. On small and medium-sized farms, this is the principal source of labor. In contrast, cropper labor, on the average, is the major source of labor supply on large farms (table 13).

A small amount of labor is hired, principally for seasonal jobs such as chopping and picking cotton.

The size of the labor force on a given farm in this area is determined more by the acreage of cotton than any other factor. This is indicated by the fact that in 1947 about 60 percent of the variability in the acreage of cotton was associated with a change in the amount of labor available.

TABLE 13.—*Composition of the Labor Force Available for Farm Work, 141 Farms, Haywood County, Tennessee¹*

Farm groups	Farms	Operator and family labor			Cropper labor	Grand total	
		Operator	Family	Total		Per farm	Per 100 acres ²
	Number	Number of man-equivalent months per farm					
Small upland	35	10	6	16	3	19	47
Medium-sized upland	33	10	7	17	10	27	36
Large upland	17	10	9	19	27	46	31
All upland farms	85	10	7	17	11	28	40
Small bottom land	13	12	4	16	4	20	48
Medium bottom land	7	12	14	26	3	29	43
Large bottom land	7	10	7	17	25	42	29
All bottom land farms	27	11	7	18	9	27	42
Class IV: ³	8	9	5	14	9	23	35
Class VI & VII: ³	5	9	7	16	8	24	22
Mixed: ³	12	10	6	16	6	22	25
Under 20 acres open land	4	1	4	5	3	8	67
All farms	141	9	7	16	10	26	39

¹ A man-equivalent month of labor equals the amount of work which an average able-bodied man can perform in one month. Man-equivalent months : 12 equals the number of man equivalents of labor.

² Crop and pasture land.

³ See page 23 in regard to method of classifying these farms.

Traditionally the labor supply in this area has been large in relation to the acreage of land. This is especially true on small

farms, where operator and family labor supply is as large as on large farms. On small Upland and small Bottom land farms each full-time worker (man-equivalent) had, on the average, 25 acres of crop and pasture land. This acreage per man-equivalent increased to an average of about 30 acres on medium-sized farms, and to about 40 on large farms. The few extremely small farms, which were operated largely by elderly men, had an average of about 18 acres per full-time worker. They averaged actually only 12 acres per farm on which there was an equivalent of 8 months of labor, or two-thirds of a full-time man.¹⁷

Tenure of Operators

Tenants, as defined in this study, made up 56 percent of all farm operators on the 141 farms surveyed. Another 12 percent of the operators rented part of the land which they operated. Thus, approximately a third owned all of their land (table 14).

TABLE 14.—*Percentage of Farm Operators in Specified Tenure Groups, 141 Farms, Haywood County, Tennessee*

Item	All farms	Size of farm		
		Small	Medium	Large
	Number	Number	Number	Number
All farms	141	65	46	30
Farms with sharecroppers	48	8	20	20
	Percent	Percent	Percent	Percent
Full owner	32	29	26	47
Part owner	12	6	15	20
Tenants	56	65	59	33
All farms	100	100	100	100

The proportion of tenancy was lowest on large farms—about a third. This compared with two-thirds on small farms and only slightly less than two-thirds for medium-sized farms.

Some owners increase the size of their farms by renting additional land. On medium-sized and large farms about 2 in 5 owners rented additional land.

The tenant farms may be grouped according to the size of the ownership unit of which they are parts. Two-thirds of the tenants are on large ownership tracts, ranging in size from 500 to 4,500 acres. On four of the largest tracts, hired managers had overall supervision of the tenants. The owners did not live on the farms. On others some general supervision was provided by owners who lived on the farms and operated a substantial acreage with family and cropper labor.

The other third of the tenants are mainly on ownership units of 100 to 300 acres. A typical farm tract in this group has 2 to 3 tenants. The owners live on and operate parts of these tracts.

¹⁷ In computing the estimated number of man-equivalents of labor available for farm work, adjustments were made for the age and sex of those who were available for farm work. The ratings of the individuals in the labor forces were based on judgments of the farm operators. The average ratings for males 16 years old and over are shown in appendix table 1, page 88.

Major Land Uses

On the average on the 141 farms surveyed, about half of the farm land was used to produce harvested crops and a fifth for pasture. Except for a few acres of idle cropland and cropland failures, the rest was in woodland and miscellaneous uses.

An analysis of land uses by size of farms shows little, if any, significant difference between size groups in the percentage used for harvested crops (table 15). A breakdown of the size groups into cotton farms and cotton-livestock farms shows no significant variation from the average, except possibly on the few cotton-beef-hog farms which had an average of only 39 percent of the farm in harvested crops.

TABLE 15.—*Major Land Uses on Upland and Bottom Land Farms, by Size of Farm, Haywood County, Tennessee*

Land use	Percentage of total acres		
	Small	Medium	Large
	Percent	Percent	Percent
85 Upland farms			
Cropland:			
Harvested	50.9	54.8	52.1
Failure	1.1	0.4	0.7
Idle	3.1	10.3	11.3
Pasture:			
Rotation pasture	6.2	13.2	6.5
Permanent pasture	10.9	9.2	12.7
Woodland	14.7	6.7	9.4
Other land	13.1	5.4	7.3
Total farm	100.0	100.0	100.0
27 Bottom land farms			
Cropland:			
Harvested	61.0	48.3	48.3
Failure	3.0	0.5	1.0
Idle	3.8	8.3	2.6
Pasture:			
Rotation	8.1	8.5	12.2
Permanent	4.2	19.0	11.4
Woodland	9.0	8.7	21.5
Other land	10.9	6.7	3.0
Total farm	100.0	100.0	100.0

Generally the proportion of land used for pasture on the various farm size groups ranged from about 10 to 25 percent. But on the cotton-livestock farms, the proportion of land in pasture averaged about a third compared with a fifth on the average farm (tables 15 and 16).

TABLE 16.—*Major Land Uses on 19 Cotton-Livestock Farms, Haywood County, Tennessee*

Land use	Medium-sized farm				Large farms	
	Cotton-dairy (9 farms)		Cotton-beef- general (6 farms)		Cotton-beef-hogs (4 farms)	
	Acres	Percent	Acres	Percent	Acres	Percent
Crops harvested	41	50	43	47	119	39
Cropland failure						
Idle cropland	2	2	2	2	35	12
Rotation pasture	19	23	25	28	10	3
Permanent pasture	8	10	4	4	96	32
Woodland and other land	12	15	17	19	42	14
Total farm	82	100	91	100	302	100

Crops

Cotton, the major cash crop, also occupies the largest acreage of land, or an average of about 40 percent of the cropland harvested. The proportion varies from a low of about 20 percent on the few large cotton-beef-hog farms to more than 50 percent on medium-sized cotton farms (tables 17 and 18). The medium-sized

TABLE 17.—*Cropland Use on 85 Upland and 27 Bottom Land Farms Grouped According to Size, Haywood County, Tennessee*

Crop	Percentage of acres		
	Small	Medium	Large
	Percent	Percent	Percent
85 Upland farms			
Corn	32.7	30.5	30.9
Cotton	48.0	43.4	36.7
Fay: Lespedeza	12.8	10.9	13.1
Other	1.1	4.8	8.3
Seed crops	0.4	3.1	2.6
Other crops	1.8	5.0	12.1 ¹
Garden	3.2	2.3	2.8
Total	100.0	100.0	106.5 ¹
All row crops	82.6	78.9	73.2
27 Bottom Land farms			
Corn	35.2	33.2	34.0
Cotton	39.9	52.2	36.2
Hay: Lespedeza	11.3	5.2	9.2
Other	2.8	4.7	.8
Seed crops	5.3	0	15.4
Other crops	2.4	.5	7.0 ²
Garden	3.1	4.2	3.0
Total	100.0	100.0	105.6 ²
All row crops	77.5	85.9	71.6

¹ Includes 6.5 percent double-cropped acres.

² Includes 5.6 percent double-cropped acres.

cotton-dairy farms or cotton-beef farms have less cotton than cotton farms of similar size, but they have more hay.

In terms of land use, corn is the second most important crop. It occupies about 30 percent of the cropland harvested. Variations from this average for the various farm groups were not important, except possibly on cotton-beef farms on which as high as 42 percent of the cropland was in corn. But with low yields of 20 to 25 bushels per acre, most farms have only enough corn to feed their workstock and livestock kept for family use. Exceptions are the few medium-sized and large farms which have supplementary commercial livestock enterprises.

The hay crops, which generally occupied 10 to 15 percent of the cropland harvested, consisted chiefly of annual lespedeza. Soybeans and sericea lespedeza made up most of the other hay crops. Only on cotton-livestock farms was there a significantly larger than average hay acreage, or approximately 25 percent of the cropland.

Seed crops, which consist chiefly of Kobe and Korean lespedeza, sericea lespedeza, and soybeans, were produced principally on large farms where competition with cotton for use of land and labor was less.

Of minor importance were truck crops and cover crops. Only small acreages of these crops were grown on a few farms.

TABLE 18.—*Use of Cropland on 19 Cotton-Livestock Farms, Haywood County, Tennessee*

Crops	Medium-sized cotton-dairy		Medium-sized cotton-beef		Large cotton-beef-hog	
	Percent	Acrea	Percent	Acrea	Percent	Acrea
Corn	31	13	42	18	36	43
Cotton	37	15	35	15	19	23
Hay	27	11	21	9	28	33
Other crops	5	2	2	1	17	20
All crops	100	41	100	43	100	119

Lespedeza was the predominant crop used for rotation pasture. A common practice in this area is to seed lespedeza in a cotton or corn field and let the field "rest" a few years before planting the land to a row crop again. Usually hay is harvested for a year or two, then lespedeza is used for grazing in the next few years.

Land that had been in continuous pasture for 7 or more years was considered permanent pasture. In most instances, permanent pastures were unimproved; they contained only the native grasses and legumes.

Livestock

Livestock is important on most farms in the area only as a source of power and to provide products for use by farm families (table 19). On only 19 of 141 farms, or 1 in 7 farms, was the live-

stock products produced for sale of any importance. On 9 medium-sized farms, incomes from cotton were supplemented with milk produced by small herds of cows and sold to processing plants as grade B milk (table 20).

Six medium-sized farms supplemented incomes from cotton with small beef herds averaging 8 cows. They also had larger than the average number of hogs fed out.

On 4 large cotton farms, beef cattle was an important enterprise; herds averaged almost 28 cows per farm. They fed out an average of 16 hogs per farm.

Livestock kept primarily to produce products for home use generally consisted of 1 or 2 cows kept for milk, 2 or 3 hogs, and 25 to 50 hens. Many of the farmers kept a brood sow, and sold a few pigs to their neighbors.

PRESENT AND IMPROVED PRODUCTION PRACTICES AND RATES OF PRODUCTION OF CROPS AND LIVESTOCK

The success of an individual farmer is influenced greatly by his ability to select the proper bundle of production practices to be used in crop and livestock production. This bundle of practices for crop production consists of selecting good varieties, planning proper land selection, following proper rotations, adopting good cultural practices, using adequate fertilization, and controlling insects and diseases. On livestock, this bundle of practices includes such items as maintaining good breeding stock, feeding a balanced ration, and controlling diseases and parasites. Failure to include one of these practices in the bundle may mean the difference between profit and loss on a particular enterprise.

Even though all these production practices are important in determining the profitability of an enterprise, establishing the most profitable level for a given practice such as fertilization is difficult. An application of 400 pounds of fertilizer per acre on cotton, for example, may be the most economical rate for a farmer with a given combination of resources; another farmer with a different group of resources may use 600 pounds of fertilizer eco-

TABLE 19.—*Average Number of Livestock Per Farm on Upland and Bottom Land Farms, by Size of Farms, Haywood County, Tennessee*

Livestock	85 Upland Farms			27 Bottom Land Farms		
	Small	Medium	Large	Small	Medium	Large
	Number	Number	Number	Number	Number	Number
Workstock	3	4	5	3	4	3
Cows kept for milk	1	3	3	2	3	2
Cows kept for beef	1	2	3	—	—	10
Other cattle	1	2	4	2	3	9
Brood sows	—	1	1	1	1	2
Hogs fed out	3	6	7	4	4	10
Hens	25	33	115	30	44	57

TABLE 20.—*Livestock on Other Than Cotton Farms, 19 Farms, Haywood County, Tennessee*

Livestock	Average number per farm		
	Medium-sized cotton-dairy farms	Medium-sized cotton-beef farms	Large cotton-beef-hog farms
Number of farms	9	6	4
Workstock	3	4	5
Cows kept for milk	7	2	1
Cows kept for beef	—	8	28
Hogs fed out	6	6	16
Hens	45	45	17

nomically on the same crop. Even controlled experiments on crop fertilization usually are inadequate for determining the most profitable rate of application under specific conditions. Because of these limitations of present data, the level of practices recommended under improved conditions is based partly on experimental data and partly on experiences of farmers and observations of agricultural technicians.

Crops

Cotton

Because cotton is the major cash crop in this area, higher levels of production practices are used on this crop than on any other crop grown. By 1950 about 98 percent of the acreage received applications of fertilizer, averaging about 200 pounds per acre. Also farmers are using higher analysis than in previous years. For example, in 1947 a 4-8-8 mixture was the chief fertilizer used, but in 1950 farmers used almost as much 6-12-12.

Farmers generally are informed of new varieties and they plant enough seed to get a normal stand—usually about 30 pounds per acre of cottonseed.

Average yields could be increased significantly on both upland and bottom land. Growers would need to adopt to higher levels of production practices, especially higher rates of fertilization (table 21).

Corn

Unlike cotton, corn is usually not fertilized except for small applications of nitrate of soda. Only about a third of the acreage in corn received applications of mixed fertilizer in either 1947 or 1950. Open pollinated seed is usually planted. The practice of deep cultivation the last time the crop is cultivated, which is followed by many farmers, lowers yields per acre. A study of 31 fields in 1947 (a dry year) indicated that as a result of this practice yields of corn were reduced an average of 11 bushels per acre (40 percent) on bottom land and 5 bushels per acre (30 percent) on upland.

The opportunities for increasing average yields per acre are great. By adopting the bundle of practices that includes adequate fertilization, use of adapted hybrid varieties, and proper cultivation along with land selection, average yields could be doubled or tripled (table 21).

Lespedeza hay

Lespedeza, the principal hay crop on most farms, is rarely fertilized. Generally it is seeded on the least productive land—principally upland. Kobe, a late maturing variety, is the predominate variety. Usually it is seeded alone on cotton and corn land. Yields average only about 1 ton per acre.

This yield could be almost doubled by heavier rates of seeding and fertilization, along with an increase in the general level of fertility which would result from improved production practices on crops grown in rotation with lespedeza.

TABLE 21.—*Crop Production Practices and Rates of Production Per Acre, Present and Alternative Systems of Farming, Haywood County, Tennessee*

Enterprise	Production per acre	Seed used per Lb.	Fertilizer used per acre ¹					
			Establish ²			Maintain (annual)		
			N.	P ₂ O ₅	K ₂ O	N.	P ₂ O ₅	K ₂ O
			Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Present System								
Corn:								
Upland	20.7 bu.	7	8	—	—	xx	xx	xx
Bottom land	22.6 bu.	7	6	—	—	xx	xx	xx
Cotton; Lint								
Upland	325 lb.	30	8	16	16	xx	xx	xx
Bottom land	425 lb.	30	8	16	16	xx	xx	xx
		25	—	—	—	—	—	—
Alternative Systems								
Corn:								
Upland	45 bu.	10	40	40	20	xx	xx	xx
Bottom land	75 bu.	10	80	40	20	xx	xx	xx
Cotton; Lint								
Upland	500 lb.	30	50	48	48	xx	xx	xx
Bottom land	625 lb.	30	50	48	48	xx	xx	xx
Oats for grain ³	40 bu.	80	40	20	10	xx	xx	xx
Soybeans	25 bu.	40	—	24	24	xx	xx	xx
Lespedeza hay	1.8 ton	50	—	50	36	—	—	—
Sericea lespedeza hay	2 ton	15	—	80	48	—	30-45	30-45
Ladino clover- grass pasture	3 ton ⁴	5	30	120	60	30	30-45	30-45

¹ Recommendations for alternative systems are based on average conditions; the fertilizer needs for a given farm should be determined in part from soil tests.

² For alfalfa and permanent pasture, 2 tons of ground limestone per acre before seeding and periodic applications as needed; for alfalfa, 20 pounds borax annually.

³ Oats would be grazed in late winter and early spring.

⁴ Dry weight equivalent.

⁵ Ladino clover 2 pounds, orchard grass 15 pounds, or fescue 10 pounds.

Other crops and pasture.

Soybeans for beans are becoming an important cash crop in West Tennessee. In 21 counties in this region approximately 126,000 acres of soybeans were grown in 1949, or about 90 percent of the state's total acreage. Yields per acre are estimated to increase from 20 bushels at present to 25 bushels in the long run.

Sericea lespedeza, a perennial, has possibilities in this area as a hay and seed crop. The present acreage is relatively small and the level of production practices is low (usually no fertilization). However, the crop is adapted to a wide range of soil resources. It makes good growth on relatively poor and severely eroded land.

Permanent pastures other than unimproved pastures referred to on page are rare. For example, only one of the farmers surveyed for this study had seeded a ladino clover-grass pasture. Because of late seeding the stand froze out in the first winter. It is assumed in this study that with proper practices such a pasture mixture, or its equivalent, would be grown successfully—possibly ladino clover and orchard grass on upland and ladino clover-fescue on bottom land.

Many other crops are adapted to the area, and even though these crops have not been included in the proposed plans, they could be produced profitably on some farms. These crops include sweet potatoes, strawberries, okra and other truck crops. Hay crops such as red clover and alfalfa also have a definite place in the farm organization on many farms.

Livestock

Under the present farming system productive livestock are kept mainly to supply products for the farm families—such as milk, pork, eggs, and poultry. Influenced largely by the non-commercial nature of production, farmers generally follow low levels of feeding and other production practices. Making up the bulk of the concentrates is corn for hogs and chickens, and corn, hay, and unimproved pasture for cattle and workstock. Because of low production of corn many farmers buy commercial mixed feed to supplement home-grown grain. Cattle and workstock are commonly grazed on corn fields after harvest.

Under alternative systems of farming production of feed would be greatly increased as to both quantity and quality, especially as these improvements relate to pastures. Except for protein concentrates no feed would be bought other than mash for chickens in commercial sized flocks. Combined with more efficient feeding practices would be other practices such as breeding, disease control, and general flock management, which would increase production rates and make production of livestock more economical (table 22).

TABLE 22.—*Production Rates and Feed Requirements for Livestock, Alternative Systems of Farming, Haywood County, Tennessee*

Livestock	Production per head			Feed required per head				
				Commer- cial feed ²				Pas- ture
	Product	Amount	Unit	Corn	Oats	feed ²	Hay	
				Bu	Bu.	Lb.	Ton	Acre
Dairy cow	milk	50	cwt.	15	—	450	1.5	1.50
Beef cow	calf	450	lb.	—	—	—	1.0	1.75
Sow	pigs	14	head	25	—	200	—	0.20
Hog, from weaning	xx	200 ¹	lb.	14	—	60	—	.06
Hens ³	eggs	15	doz.	0.9	0.8	25	—	—
Pullets raised ³	xx	xx	xx	.25	—	16	—	—

¹ Production above weight when weaned.

² For dairy cows, cottonseed meal; tankage for hogs; 32 percent supplement for hens; starter mash and growing mash for pullets.

³ Applicable to commercial flocks.

PROBLEMS AND METHODS OF SELECTING ALTERNATIVE SYSTEMS OF FARMING

Selection and Combination of Enterprises

Farm enterprises should be combined so that all farm resources can be used efficiently and the net long-time farm income and satisfactions of farmers can be maximized. Because of the difficulties of measuring the maximization of satisfactions, it is assumed that maximization of net farm income and satisfactions are synonymous. In considering adjustment opportunities in the cotton section, land and labor are assumed to be relatively fixed, especially in the short run. Under the present system of farming these two resources are seldom fully utilized. If net farm income is to be maximized, adjustments must be made in the present combination of enterprises and production practices must be improved. Special consideration must be given to the interrelationship of the various enterprises, their adaptability to soils and climate and their relative profitableness.

To consider one of these factors without considering others may lead to erroneous conclusions. For example, lespedeza yields a relatively low return per acre when all costs are included. However, it is adapted to practically all soils of West Tennessee, although it is sensitive to dry weather. This crop can be grown in a small-grain rotation without reducing the yield of small grain.¹⁹ It can be used as a hay, seed, summer grazing, or green-manure crop. These alternatives make lespedeza a very flexible crop in any farming system.

A big problem on cotton farms is the highly seasonal requirements for labor, power, and equipment. By adding livestock enterprises better allocation can often be made of these and other

¹⁹ With high yields of small grains (50 bushels or more) first-year stands of lespedeza may be poor because of the heavy growth of small grain.

unused resources. For example, a dairy enterprise added to a cotton farm would provide use for labor, building, and land that otherwise might be unused. Even though returns to labor on dairying, especially grade B, are low when all costs are considered, the enterprise may be profitable. There are no alternative uses for some of the farmer's land, labor, and buildings.

Budget Analysis^{20a}

The budget method is used to test the relative profitableness of present and alternative system of farming on representative small, medium-sized, and large upland and bottom land farms. As a first step toward development of farm budgets, detailed data on costs and returns were compiled for some of the most important enterprises adapted to the area.

The representative farms are actual farms selected from their respective soil resource and size groups. Soil maps of these representative farms have been used in developing opportunities for adjustments. These farms represent family-sized farms, which are operated either by family labor alone or by family labor supplemented by the labor of 1 to 3 or 4 cropper families.

The price level, which is influenced by supply and demand conditions, is one of the most important variables affecting farm profits. It was assumed that an individual farmer contributes a negligible supply of farm products; therefore, his production influences farm prices very little or not at all. In accordance with this assumption, the 1949 price level was used in budgeting both present and alternative systems of farming.²⁰ The parity ratio is often used as a crude measure of the profitableness of farming in specific periods. In 1949 the parity ratio was 101.

Although all financial budgets were based on 1949 prices, budgets for the alternative systems on medium-sized upland farms were also computed at varying prices received. This was done in order to illustrate the effects on net returns of changes in price relationships.

The representative farms are discussed in order of size for upland and bottom land farms. Budgets for representative farms are based on two chief alternative farm organizations—cotton-dairy-hog and a cotton-beef-hog-poultry organizations.

For each alternative organization it is assumed that improved production practices are adopted. These practices are shown in Tables 21 and 22.

The acreage of cotton is reduced below the present level for each alternative system. In those systems in which the present supply of labor is retained, the acreage of cotton would be reduced to approximately the estimated acreages that would be planted under the 1955 acreage allotment program. However, under the

^{20a} See appendix IIA, page 85, for definitions of farm-management terms.

²⁰ See appendix tables 2, 3, and 4 for data on prices received for products sold and prices paid for items used in production.

assumption of a loss of about a third of the farm labor supply, the reduction in acreage of cotton would be greater than with the present supply of labor. (See appendix table 5).

In terms of production of cotton, however, the increase in yield per acre which was assumed for the alternative systems would compensate for the reduced acreages in the alternatives with the present labor forces. However, under the assumption of a reduced supply of labor, total production would decline also.

PRESENT AND ALTERNATIVE SYSTEMS ON SMALL UPLAND FARMS

Small farms, with from 20 to 59 acres of cleared land, make up almost 40 percent of the farms in the area. Of these, the predominately upland farms are more numerous than bottom land farms.

About 80 percent of the upland farms are operated by share tenants; the other 20 percent are operated by owners. On bottom land farms, owner operators and tenants are about equal in number.

Present System on a Representative Farm

This 50-acre farm is a typical small upland farm with gently to strongly rolling topography (B slope). It is relatively favorable for crop production provided reasonable erosion-control practices are followed. The upland soils are Grenada and Loring series, but a small strip of Falaya bottom land soil extends the length of the farm (fig. 6A). Moderate sheet erosion has occurred on all except the bottom land. In addition to sheet erosion, occasional gullies are found on the Grenada soil.

Organization and practices

The crop organization is built around cotton (12.5 acres), the principal source of cash income. The operator grows corn (8 acres) and lespedeza hay (6 acres) for feeding his livestock, which consists of milk cows, hogs, and chickens kept largely for home use, and a team of workstock (table 23). The pasture (9 acres) is little more than an exercising lot with some lespedeza and wild grass. Despite the small acreage in the farm, 10 acres of cropland are idle. Apparently this land has not been in crops or pasture for 4 or 5 years.

This cropping system prevailed in 1950, the first year after World War II in which cotton acreage controls were reinstated. With no acreage controls in 1947, this farmer planted 22 acres of cotton and 12 acres of corn. No hay was grown on the farm in that year.

In 1950 cotton was produced on 8 acres of bottom land. It averaged about 385 pounds per acre. The other cotton was grown on upland soils. It averaged about 315 pounds per acre. All cotton was fertilized at the rate of 200 pounds per acre of a 6-8-8 fertilizer.

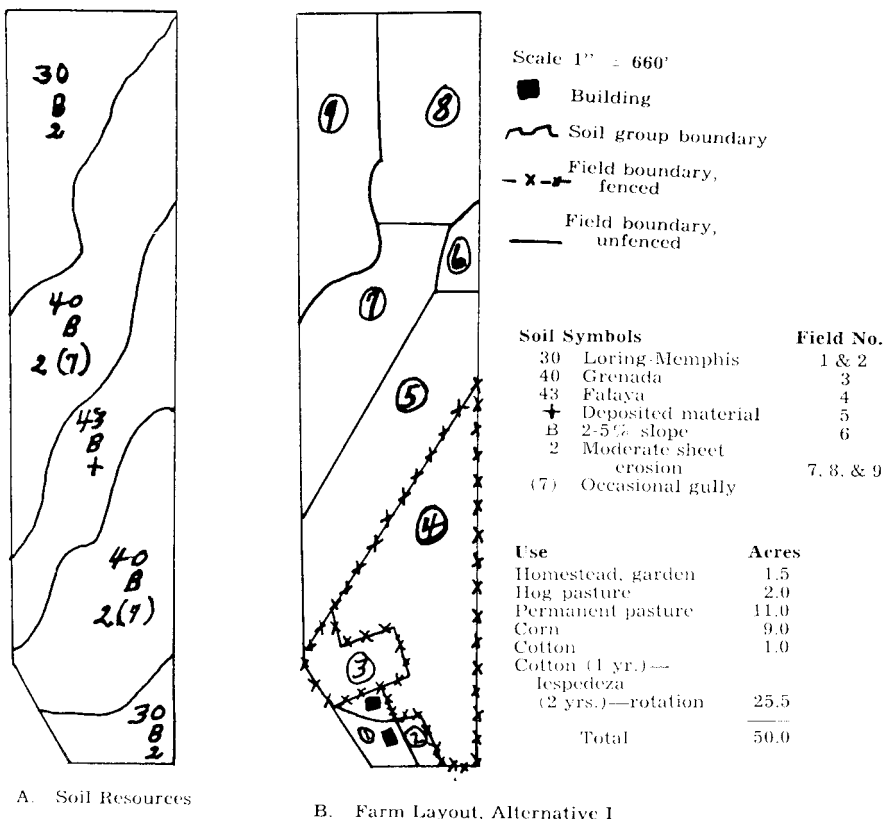


Figure 6.—Present Soil Resources and Alternative Farm Layout, Representative Small Upland Farm, Haywood County, Tennessee

The corn and lespedeza were grown on Grenada (40) soils. Of these, only corn was fertilized, and at the rate of 50 pounds per acre of nitrate of soda. Yields of corn averaged 20 bushels per acre and lespedeza 1 ton per acre. The unimproved pasture, located on the moderately well-drained Loring (30) soils, had received no lime or fertilizer. Consequently, its production was low, even though it was on the better upland soil.

The labor of the operator is supplemented with family labor equivalent to 0.3 of a full-time worker. Thus, the total labor supply equals 1.3 man-equivalents.

Costs and returns

At 1949 prices and with the farm operated by the owner, this system of farming produces a net return (labor earnings) to operator and family labor of a little more than \$1,200 (table 24). This includes both cash income from the sale of crops and livestock, and the value of products used by the operator's family. The latter is estimated to be about \$460. The costs deducted from gross income are the direct cash costs, depreciation on buildings, fences, machinery and livestock, and 5 percent interest on the average investment.

TABLE 23.—*Present and Alternative Farming Systems on a Representative Small Upland Farm, Haywood County, Tennessee*

Item	Present system	Alternative systems		
		I Cotton- dairy- hogs	II Cotton- beef- poultry	III Beef- hogs- cotton
	Acres	Acres	Acres	Acres
LAND AND CROPS				
Cotton	12.5	9.5	9.5	5.0
Corn	8.0	9.0	9.0	10.0
Lespedeza	6.0	17.0	17.0	10.0
Oats	—	—	(8.5)	(5.0)
Vetch	—	—	—	—
Other crops	0.5	—	—	—
Garden	.5	.5	.5	0.5
Total	27.5	36.0	44.5	30.5
Double cropped	—	—	8.5	5.0
Used for crops	27.5	36.0	36.0	25.5
Idle cropland	10.0	—	—	—
Unimproved pasture	9.0	—	—	—
Improved pasture	—	13.0	13.0	23.5
Woodland	1.5	—	—	—
Other land	2.0	1.0	1.0	1.0
Total land	50.0	50.0	50.0	50.0
	Number	Number	Number	Number
LIVESTOCK				
Dairy cows	2	7	—	—
Beef cows	—	—	7	12
Brood sows	—	2	—	3
Hogs raised	2	24	3	42
Hens	30	30	370	30
LABOR POWER				
Labor available	1.3	1.3	1.3	.85
(man-equivalents)				
Power used	Work- stock (2)	Work- stock (2)	Work- stock (2)	Tractor

The returns, including products used in the home, averaged 49 cents per hour for almost 2,500 hours of operator and family labor.²¹

With the farm operated on the usual share-tenant basis, assuming the system of farming described above, the tenant and his family received labor earnings of almost \$1,100. After paying taxes, repairs and depreciation, the landlord receives about \$375 as his net return on investment in land and buildings (table 24). This represents 8 percent on his investment. The tenant-operator receives 44 cents net earnings per hour of operator and family labor.

²¹ Labor requirements in this report refer to time spent on field crops, pasture, and livestock.

The investment, which amounted to \$5,800, consists largely of land and buildings. The relatively small amount of equipment needed for the present cotton system of farming is valued at about \$300. The investment in livestock, including the value of 2 head of workstock, amounts to only \$425.

Weakness of present system

In emphasizing cotton the operator recognizes that this crop is the highest income-producing enterprise for his farm and for his family. This is indicated by the high percentage of cash income that comes from cotton. It amounts to 95 percent.

By depending so largely on cotton, however, the labor force is employed chiefly in the crop season, or an average of only 190 days per year in productive work. Furthermore, no attempt is made to develop a cropping program that would use the idle land or to increase the presently low yields per acre of feed crops and pasture.

Alternative Systems on a Representative Small Upland Farm

This section deals with ways of increasing farm incomes on a representative small upland farm. Improvements include mainly changes in crop and livestock organization and in production practices that would increase yields per acre and production per head of livestock. In these ways the farmers' land, labor and capital would be used more efficiently.

Workstock are to be retained as the source of power. According to preliminary estimates net labor income would be about the same with either workstock or tractor power. Although a tractor would enable farm labor to accomplish more per hour employed and would release workstock feed for sale or to feed productive livestock, ordinarily the labor saved would have no alternative uses. On this small farm the overhead and cash operating cost of the tractor and tractor equipment would be relatively high. The labor force would remain at 1.3 man-equivalents for two alternatives but would be reduced a third in one improved system.

Alternative I, Cotton-Dairy-Hogs

Organization and practices

In this system cotton would be the chief cash crop, with grade B milk and hogs the main livestock enterprises. By reducing the acreage of cultivated crops, chiefly cotton (from 12.5 acres to 9.5 acres), using idle land for crops, and increasing per acre yields of corn, hay and pasture, enough feed would be produced for 7 dairy cows and their replacements, two brood sows, and 24 hogs, plus a farm flock of chickens (table 23).

The proposed farm layout and field uses in relation to the soil groups are shown in figure 6. Corn is to be shifted from upland

to bottom land and increased from 8 to 9 acres. At 1949 prices net returns above all expenses are estimated to be \$44 higher on an acre of bottom land corn than on an acre of upland corn, while returns from an acre of cotton on bottom land would be only \$34 higher than from an acre of upland cotton. If bottom land is scarce and adequate upland is available, under the assumptions made it would be more profitable to grow corn on bottom land and cotton on upland.

TABLE 24.—*Financial Summary of Present and Alternative Systems, Representative Small Upland Farm, Haywood County, Tennessee (1949 Price Level)*

Items	Present system	Alternative systems		
		I Cotton- dairy- hog	II Cotton- beef- poultry	III Beef- hogs- cotton
	Dollars	Dollars	Dollars	Dollars
COSTS AND RETURNS				
Cash receipts				
Crops	1,703	1,676	1,820	859
Livestock		1,307	1,125	2,741
Livestock products	88	1,146	2,281	76
Total	1,791	4,129	5,226	3,676
Family living from the farm	460	480	480	480
Total income	2,251	4,609	5,706	4,156
Cash expenses and depreciation				
Crops	173	533	746	486
Livestock	203	611	1,200	430
Other cash costs	194	361	454	400
Depreciation	174	260	248	360
Total expenses	744	1,765	2,648	1,676
Family farm earnings	1,507	2,844	3,058	2,480
Interest on investment	290	427	465	525
Family labor and management earnings	1,217	2,417	2,593	1,955
Hours of family labor	2,480	3,280	3,250	1,930
Earnings per hour of labor and management	.49	.74	.80	1.01
CAPITAL INVESTMENTS				
Real estate	4,860	5,200	5,945	5,335
Machinery and equipment	295	505	415	1,455
Livestock	425	2,120	2,065	2,915
Feed and supplies	220	710	870	805
Total	5,800	8,535	9,295	10,510

Fields 7, 8, and 9 would be placed in a 6-year rotation of 2 years cotton and 4 years lespedeza. This would provide 8 acres of

cotton. In order to provide more cash income, one acre of bottom land (field 6) also would be planted in cotton.²² Approximately 8 acres of lespedeza would be used for summer grazing and the rest would be cut for hay.

The land in fields 3 and 4 would be seeded in an orchard grass and ladino clover pasture, which is assumed to last 10 years.²³ Field 3 would be used as a hog pasture, and field 4 for dairy cows and workstock. This crop and livestock organization would be operated with the present family labor force. Much of the additional work required (principally on livestock) would be done during the noncrop season when employment under the present system is very low. Only 30 days of wage labor would be needed.

Capital requirements, however, would be increased greatly. At 1949 prices, the total additional cash outlay needed to establish this system would amount to approximately \$2,500. This includes the cost of livestock, machinery and equipment, fences, and pasture improvement. The present barns are adequate for a few additional cows and replacements. The largest outlay (\$1,145) would be for additional cows and brood sows. Pasture improvement, including fencing, would require \$935 of new capital. A little more than half this amount would be needed for a mowing machine, rake, and miscellaneous dairy equipment (table 25). Milking would be done by hand.

Costs and returns

(1) Owner operated—at 1949 prices, net labor earnings, which include farm products used in the home, would be about \$2,400, or twice the earnings obtained from the present system. It is the return to the operator on the entire farm operations for use of the labor of himself and his family.

TABLE 25.—*Cash Cost of Establishing Alternative Farming Systems, Representative Small Upland Farm, Haywood County, Tennessee (1949 Price Level)*

	I. Cotton-dairy-hogs			II. Cotton-beef-poultry			III. Beef-hogs-cotton
	Farm	Tenant	Land-lord	Farm	Tenant	Land-lord	Farm
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Real estate							
Buildings	—	—	—	1,700	—	1,700	—
Fences	510	—	510	420	—	420	525
Pasture improvement	425	212	213	425	212	213	770
Machinery	550	505	45	260	250	—	2,245
Livestock	1,145	573	572	1,520	760	760	2,000
Total	2,630	1,290	1,340	4,325	1,222	3,093	5,540

²² The comparative per acre net returns from cotton and corn are \$90 and \$78 respectively, assuming all cotton picking hired.

²³ Since this study was made, a survey of 101 beef cattle farms in the Tennessee Valley shows that to date the average life of 451 pasture fields has been 7.5 years.

For this larger net return the labor force would work more hours than at present, approximately 3,280. However, the average return per hour worked (75 cents) would also be higher.

If we assume that land values and wage rates will remain as at present, the rate of return on new capital invested in the cotton-dairy-hog alternative would average 37 percent.

(2) **Tenant operated**—if this system were operated by a share tenant, he would receive about \$1,960 in labor earnings, or 60 cents per hour of labor. This is an increase of about \$870 above present labor earnings (table 26). The tenant would invest \$1,000 in establishing this system.²⁴

TABLE 26.—*Comparative Costs and Returns, and Investment of Tenant and Landlord, Representative Small Upland Farm, Haywood County, Tennessee (1949 Price Level)*

Item	Present system		Alternative systems			
			I Cotton-dairy-hogs		II Cotton-beef-poultry	
	Tenant	Landlord	Tenant	Landlord	Tenant	Landlord
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Total income	1,610	641	2,880	1,729	3,397	2,309
Total expenses	477	267	826	939	1,181	1,466
Family farm earnings	1,133	374	2,054	790	2,216	943
Interest on investment	47	243	96	331	107	358
Family labor and management earnings	1,086	131	1,958	459	2,109	485
Hours of family labor	2,480	—	3,280	—	3,250	—
Earnings per hour of labor and management	0.44	—	0.60	—	0.65	—
Capital investments						
Real estate	—	4,857	—	5,200	—	5,947
Cattle, hogs	259	—	975	975	702	703
Other livestock	168	—	168	—	658	—
Feed & supplies	219	—	357	356	435	434
Equipment	297	—	418	86	345	71
Total	943	4,857	1,918	6,617	2,140	7,155

Alternative II. Cotton-Beef-Poultry

Organization and practices

This system would be built around a cropping program very similar to the cotton-dairy-hog alternative system. However, the livestock organization would shift to a small cow-calf herd of beef cattle (7 cows) and a 400-hen flock of chickens (table 23).²⁵ Early

²⁴ See appendix table 6, page 91 for landlord-tenant arrangements.

²⁵ Oats for grain, seeded in cotton middles after the first picking, would be incorporated into the 3-year cotton-lespedeza rotation in the cotton-dairy-hog system.

spring calves would be sold in the fall at weights of about 450 pounds each. With a 90-percent calf crop, average production per cow would be 405 pounds. Approximately 450 sexed pullets would be raised each year. This would provide 400 hens for the laying flock at the beginning of the year. It is assumed that an average of 15 dozen eggs would be produced per hen.

This system would require a larger average investment than the cotton-dairy-hog alternative—a total of \$9,295. The major items of additional cash outlay are a layer house and two brooder houses, to be constructed at a cost of \$1,700 (table 25).

Costs and returns

This system would return labor earnings of about \$2,600, or about \$200 more than the cotton-dairy-hog system. The amounts of labor required to operate these alternatives would not differ greatly. Consequently, average hourly labor earnings would be slightly higher for the cotton-beef-poultry system. The average return would be 80 cents per hour of labor (table 24).

If operated by a share tenant, this system would produce labor earnings of 65 cents per hour for the tenant operator and 11.8 percent return on the landlord's average investment (table 26).

Effect of substituting hogs for poultry

In the cotton-beef-poultry system, the homegrown feed fed to poultry would be enough to maintain 3 brood sows and fatten 42 hogs averaging 225 pounds each. By substituting hogs for the 400-hen flock, gross income would be reduced about \$1,050, but total costs would be reduced by \$1,030. This amount would include interest on a reduced investment (chiefly in poultry houses) of \$800. Thus, there would be no important changes in labor earnings for the farm.

However, labor earnings per hour of labor would be increased from 80 cents for the system with poultry to \$1.06 with hogs. Hogs require 780 hours less labor than poultry. The total labor requirements would be reduced from 3,250 hours for the cotton-beef-poultry system to 2,470 hours for the cotton-beef-hog alternative.

Alternative IA. Present Organization with Improved Practices

This variation from Alternatives I and II would mean no change in the present farming system except adoption of improved practices on cotton and corn. It is assumed that the additional corn produced, as well as the extra cotton, would be sold at 1949 prices. It is assumed also that the labor force would be adequate, except that extra labor would be needed at picking time in comparison with alternatives I and II.

Under these assumptions variable income would increase \$1,300 but variable costs would rise only \$445, leaving a net return of

\$855 above the present system, or a total of about \$2,070 in labor earnings (table 27). Thus, this net return compared favorably with alternatives I and II, particularly in view of the smaller investment required for the present organization (table 24).

If, however, the price of cotton fell to 22 cents a pound, for example, as a result of increased production or for other reasons, labor earnings would decline to about \$1,500. This amount is slightly larger than the labor earnings from the present system with 1949 prices, but it is much smaller than earnings from alternatives I and II.

TABLE 27.—*Labor Earnings from Present Organization and Improved Practices with Comparisons, Representative Small Upland Farm, Haywood County, Tennessee (1949 Prices and Present Labor Force)*

System	Corn produced	Cotton produced	Family labor earnings	
	Bushels	Bales	Dollars	Percent
Present organization:				
With present practices	165	9.4	1,217	100
With improved practices	360	15.0	2,072	171
Adjusted organization and improved practices:				
Alternative I,				
Cotton-dairy	637	9.75	2,417	199
Alternative II,				
Cotton-beef-poultry	634	9.75	2,593	213

Alternative III—Hog-Beef-Cotton (with reduced labor supply)

In recent decades the farm labor supply has declined in type-of-farming area 3. Thus this alternative system of farming is set up under the assumption that the labor supply on this representative farm will decline about 35 percent below the present level, to about 0.85 man-equivalents. This could be true, for example, on farms whose operators had full-time, off-farm jobs and helped their families carry on the farm work. Because of the need to use labor efficiently, a small tractor would replace workstock.

In this system the acreage of cotton would be reduced to 5, so that the farm labor could do the highly seasonal hoe work and picking. Cotton producing a bale per acre, would be grown in a 3-year rotation with lespedeza hay on Grenada soil.

Combined with cotton would be enterprises that require relatively little labor—hogs and beef cattle as the major sources of cash income, and corn, hay and pasture to be used for these live-stock. By growing the corn on bottom land, enough grain would be produced to fatten 42 hogs and maintain the breeding stock. With calves sold in the fall enough feed would be produced to keep a herd of 12 beef cows and replacements. More capital would be required for this system than either of the other alternatives,

chiefly because of the investment in a tractor and tractor equipment and larger investment in livestock (table 24).

On a farm basis, net labor earnings in this system (\$1,955) would be less than labor earnings from either of the other alternatives. But on an hourly basis the labor earnings (\$1.01 per hour worked) compare favorably with the other systems.

PRESENT AND ALTERNATIVE SYSTEMS ON SMALL BOTTOM LAND FARMS

Present System on a Representative Farm

This 52-acre farm contains about 30 acres of bottom land, Falaya soil series. The upland is about equally divided between Loring and Grenada soils (fig. 7). The potential production of this farm is relatively high, assuming proper drainage of bottom land and adoption of improved crop production practices on the whole farm, along with certain erosion-control practices on upland.

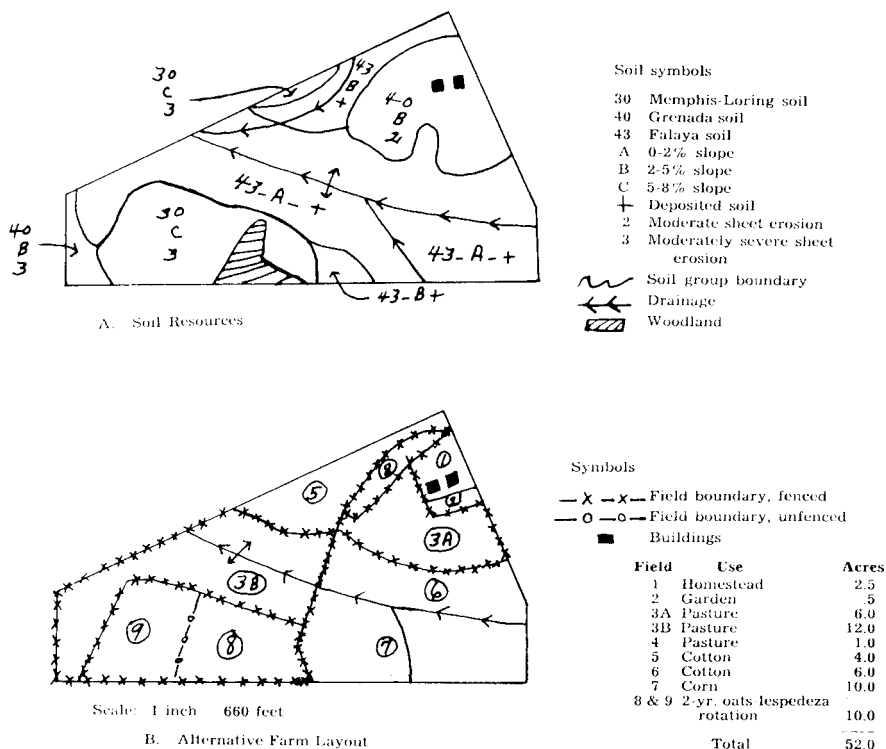


Figure 7.—Present Soil Resources and Alternative Farm Layout,
Representative Small Bottom Land Farm,
Haywood County, Tennessee

Organization and practices

Under the present system the operator produces an average of 425 pounds of cotton per acre on 12 acres and about 23 bushels of corn per acre on 10 acres. Except for small acreages in lespedeza hay and some idle land, unimproved pasture occupies the remaining land. No fertilizer is used on hay and pasture. Approximately 40 pounds of nitrate of soda is used per acre of corn; and 200 pounds of 4-8-8 fertilizer per acre of cotton.

As usual on small cotton farms, livestock on this farm are kept chiefly for products for home use and for workstock (table 28).

The average investment (about \$6,225) consists principally of real estate. The labor force, which totals 1.3 man-equivalents, is made up of operator and family labor.

Costs and returns

This system produces net labor earnings of about \$1,560 which is a third larger than the labor earnings on the representative small upland farm (tables 24 and 29). Although the labor force worked 20 more days, the average returns per hour of labor was 65 cents compared with 49 cents on the small upland farm.

Alternative Systems on a Representative Small Bottom Land Farm

The team of workstock would be replaced with a small tractor and hand milking with machine milking. Otherwise, the adjustments involved in setting up the alternative systems on the representative bottom land farm would be similar to those discussed in connection with alternatives on the representative small upland farm. The shift to tractor power is justified on this bottom land by the relatively large volume of production. The labor force, which would remain at 1.3 man-equivalents, would work about the same number of days as that on the small upland farm on which workstock is used for power and milking is done by hand.

For each alternative system the water disposal problem would be handled by grassed waterways through the bottom land area. These waterways would also be used for hay or pasture. Also, the present small woodland area would be cleared and seeded to permanent pasture.

Alternative I, Cotton-Dairy-Hogs

Organization and practices

Cotton, which is to remain an important source of cash income, would be supplemented principally with grade B milk and hogs. Because of the relatively large acreage of bottom land, all the corn and cotton, and part of the hay and pasture would be grown on this land. In comparison with the representative upland farm, this farm would produce more cotton and larger amounts of feed crops

because of the relatively large yields per acre on bottom land. The farm would carry 11 dairy cows—4 more than the small upland farm, produce corn for fattening 28 hogs, and have about 75 bushels to sell (table 28). Most of the lespedeza hay and improved pasture would be grown on the upland.

TABLE 28.—*Present and Alternative Farming Systems, Representative Small Bottom Land, Haywood County, Tennessee*

Item	Present system	Alternative systems		
		I Cotton- dairy- hogs	II Cotton- beef- poultry	III Hogs- beef- cotton-
LAND AND CROPS				
	Acres	Acres	Acres	Acres
Cotton	12.0	10.0	10.0	5.0
Corn	10.0	10.0	10.0	10.0
Lespedeza hay	5.0	10.0	10.0	8.0
Oats for grain	—	—	(5.0)	—
Garden	1.0	0.5	0.5	0.5
Total	28.0	30.5	35.5	23.5
Double cropped	—	—	(5.0)	—
Used for crops	28.0	30.5	30.5	23.5
Idle cropland	3.0	—	—	—
Unimproved pasture	17.0	—	—	—
Improved pasture	—	19.0	19.0	26.0
Woodland	1.5	—	—	—
Other land	2.5	2.5	2.5	2.5
Total land	52.0	52.0	52.0	52.0
LIVESTOCK				
	Number	Number	Number	Number
Dairy cows	2	11	—	—
Beef cows	—	—	11	12
Brood sows	1	2	1	3
Hogs raised	12	28	14	42
Hens	30	30	370	30
LABOR POWER				
Labor available				
(man-equivalents)	1.3	1.3	1.3	0.85
Power used	Workstock (2)	Tractor	Tractor	Tractor

These adjustments from the present organization would require a cash outlay of \$6,500 most of which would be used to buy machinery and equipment. A small tractor and tractor equipment, a milking machine and miscellaneous dairy equipment, and additional dairy cows would be included (table 30). Other items of importance include pasture establishment, remodeling the barn, and building and repairing fences. These extra investments would almost double the present average investment in the farm business.

Costs and returns

At 1949 prices, this alternative system would double the labor earnings of the present specialized cotton system. It would produce a net return of approximately \$3,225 (table 29, column 2). This is the return for 3,260 hours of operator and family labor, or 99 cents per hour. It assumes that the operator is the owner.

Effects of substituting soybeans for feed crops on bottom land

On the 30 acres of bottom land, corn, cotton, and soybeans for beans could be grown in a 3-year rotation. Adding 10 acres of soy-

TABLE 29.—*Financial Summary of Present and Alternative Systems, Representative Small Bottom Land Farm, Haywood County, Tennessee (1949 Price Level)*

Item	Present system	Alternative systems		
		I Cotton-dairy-hogs	II Cotton-beef-poultry	III Hogs-beef-cotton
	Dollars	Dollars	Dollars	Dollars
COSTS AND RETURNS				
Cash receipts				
Crops	1,701	2,275	2,285	1,159
Livestock	316	1,483	2,004	2,658
Livestock products	128	1,879	2,281	76
Total	2,145	5,637	6,570	3,893
Family living from the farm	460	480	480	480
Total income	2,605	6,117	7,050	4,373
Cash expenses and depreciation				
Crops	237	633	704	514
Livestock	161	803	1,338	437
Other cash costs	186	464	490	398
Depreciation	147	435	435	394
Total expenses	731	2,335	2,967	1,743
Family farm earnings	1,874	3,782	4,083	2,630
Interest on investments	311	558	583	550
Family labor and management earnings	1,563	3,224	3,500	2,080
Hours of family labor	2,400	3,260	3,360	2,020
Earnings per hour of labor and management	0.65	0.99	1.04	1.03
CAPITAL INVESTMENTS				
Real estate	4,940	5,860	6,510	5,950
Machinery and equipment	290	1,725	1,390	1,390
Livestock	745	2,805	2,935	2,915
Feed and supplies	250	770	800	770
Total	6,225	11,160	11,635	11,025

beans to row crops would replace 10 acres of forage crops. As a result, the dairy herd would be reduced from 11 to 7 cows. They would be hand-milked and the soybeans would be custom-combined.

With soybeans yielding 25 bushels per acre and cows producing 5,000 pounds of milk per head, the system with soybeans would produce about \$45 less labor income. However, 110 hours less labor and about \$800 less cash outlay would be needed to establish the system.

The decision between soybeans and cows would not depend as much on the comparative returns and labor requirements as on the availability of combines for harvesting soybeans.

For one who has limited capital and the services of a custom combine when needed, soybeans would have some advantage over additional forage crops and the larger herd.

The rate of return on new capital in the 11-cow alternative would be 24 percent, assuming that land values and wage rates remain at the present level.

TABLE 30.—*Cash Costs of Establishing Alternative Farming Systems, Representative Small Bottom Land Farm, Haywood County Tennessee (1949 Price Level)*

Item	Alternative systems		
	I	II	III
	Cotton-dairy-hogs	Cotton-beef-poultry	Hogs-beef-cotton
	Dollars	Dollars	Dollars
Drainage	85	85	85
Buildings	765	1,700	—
Fences	960	740	915
Pasture improvement	525	620	870
Machinery and equipment	2,665	2,200	2,250
Livestock	1,500	1,935	1,745
Total	6,500	7,280	5,865

Alternative II, Cotton-Beef-Poultry

In this system an 11-cow beef herd and a 370-hen flock of poultry would replace the dairy cows and hogs of the preceding system (table 28). The cropping systems would differ only in the use of oats for grain in a 2-year rotation with lespedeza hay on Memphis soil. During the 2 years, 2 crops of hay and 1 crop of oats, producing 40 bushels per acre, would be harvested.

At 1949 prices, the cotton-beef-poultry alternative would produce \$3,500 in net labor earnings, almost \$300 more than the labor earnings from the cotton-dairy-hog system. Labor needed would be the same for the two alternatives, so that net earnings per hour of labor (\$1.04) would be slightly larger for the system with beef and poultry (table 29).

The comparative labor earnings, however, do not tell the whole story. For the cotton-beef-poultry system, about \$780 more money would be needed to get started, most of which would be for building house and two brooder houses (table 30). Although interest on the additional investment was deducted from income in computing the comparative labor earnings, some farmers might find it hard to finance the extra investment. Furthermore, for some farmers the skills necessary for successful poultry production are harder to acquire than are those for successful hog production.

For farmers who can finance the larger capital requirements and who have or can acquire the necessary skills, the cotton-beef-poultry system would have a small advantage in net labor earnings in comparison with the cotton-dairy-hog alternative.

Alternative IA and IIA, Present Organization With Improved Practices on Corn and Cotton

If the operator does not change the present system except to adopt improved production practices on present acreages of corn and cotton, at 1949 prices labor earnings would compare favorably with alternative systems I and II. This assumes that the additional corn produced is sold for \$1.70 per bushel and that all cotton is sold for 29 cents a pound. (See table 31 for comparative labor earnings.)

TABLE 31.—*Labor Earnings from Present Organization and Improved Practices with Comparisons, Representative Small Bottom Land Farm, Haywood County, Tennessee (1949 Prices and Present Labor Supply)*

System	Corn produced	Cotton produced	Labor earnings	
	Bushels	Bales	Dollars	Index
Present organization				
Present practices	226	10.2	1,563	100
Improved practices	750	15	2,902	186
Adjusted Organization and				
Improved practices				
Alternative I, Cotton- dairy-hogs	750	12.5	3,224	206
Alternative II, Cotton- beef-poultry	750	12.5	3,500	224

If the price of cotton were to fall to 22 cents a pound, labor earnings would be reduced to about \$2,350. This would be about 50 percent above earnings from the present system, but significantly lower than earnings from alternatives I and II at 1949 prices.

Alternative III, Hogs-Beef-Cotton (with reduced labor supply)

In this system the labor supply would be reduced below one full-time worker to about 0.85 of a man-equivalent. If cotton were

reduced to 5 acres and hogs substituted for poultry in the preceding system, the reduced labor force could do all of the work required—about 200 10-hour days.

The land would be used more extensively than in either of the other two alternative systems. About two-thirds of the land would be in pasture and hay (table 28). But 15 acres of bottom land, which would be planted to corn and cotton, would be used intensively.

At 1949 prices, labor earnings from this system would amount to almost \$2,100 or \$1.03 per hour of labor. This return is almost equal to the return that would be obtained from the cotton-dairy-hogs system on the representative upland farm with 50 percent more labor (tables 24 and 29).

PRESENT AND ALTERNATIVE SYSTEMS ON MEDIUM-SIZED UPLAND FARMS

Medium-sized farms, which range from 60 to 100 acres in size, comprise about 35 percent of the farms in the area. There are five times as many upland as bottom land farms. About two-thirds of all medium-sized farms are operated by share tenants.

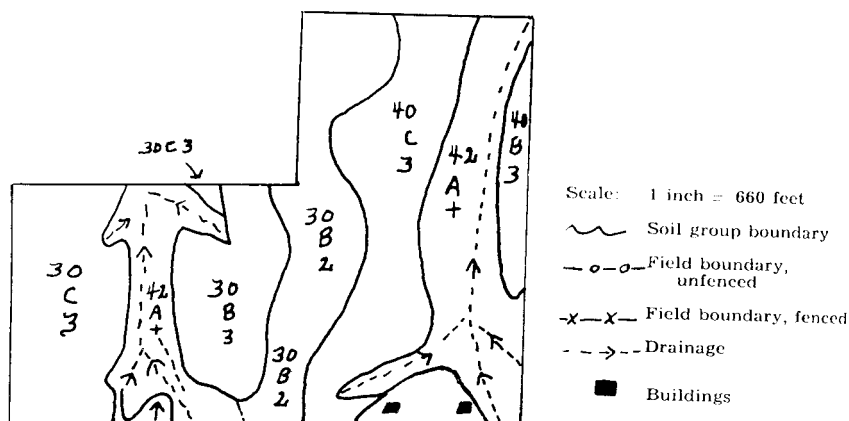
Present System on a Representative Medium-Sized Upland Farm

This 80-acre farm has relatively favorable soil and topography for crop production. Grenada, Loring, and Memphis upland soils make up three-fourths of the farm. The bottom land consists of the comparatively highly productive Collins soil (fig. 8A). Almost a fourth of the land in farms cannot be row-cropped safely, except in a long rotation (1 year in 6, for example). This is a band of Grenada soil on C slope that has lost more than 75 percent of the topsoil. Areas of this kind are best adapted to permanent hay or pasture.

Organization and practices

A little more than half the land (44 acres) is in crops, chiefly corn and cotton (table 32). The remaining acres, of which 25 are unimproved pasture and 8 are idle, produce little income. Live-stock on the farm consist of 3 head of workstock, 3 cows kept mainly for milk, a brood sow and 40 hens. Usually the operator sells a veal calf, 1 to 2 heavy calves, a few pigs, about 2 hogs, and a few dozen eggs.

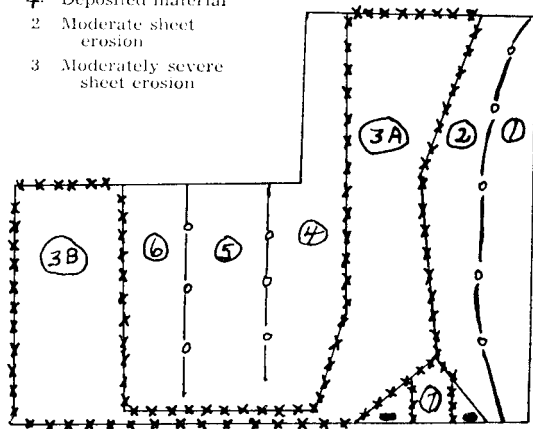
Typical of the area, most of the fertilizer is applied to cotton (200 pounds per acre of a 4-8-8 mixture). Corn receives an average of 50 pounds of nitrate of soda per acre, but no fertilizer is applied to hay or pasture. Yields of cotton average three-fourths of a bale per acre on all land. Twenty bushels per acre is the average yield of corn. Lespedeza and other hay average only about a ton per acre. The unimproved pasture provides not much more than meager grazing for the limited number of livestock.



A. Soil Resources

Soil symbols

- 30 Loring-Memphis
- 40 Grenada
- 42 Collins
- A Under 2% slope
- B 2-5% slope
- C 5-8% slope
- + Deposited material
- 2 Moderate sheet erosion
- 3 Moderately severe sheet erosion



B. Farm Layout, Alternative I

Field	Use	Acres
1	Cotton	8.0
2	Corn	8.5
3A	Pasture	23.0
3B	Pasture	12.5
4 & 5	Lespedeza-soybean rotation	18.0
6	Cotton	7.0
7	Garden	1.0
	Homestead	2.0
Total		80.0

Figure 8.—Present Soil Resources and Alternative Farm Layout, Representative Medium-sized Upland Farm, Haywood County, Tennessee

TABLE 32.—*Present and Alternative Farming Systems, Representative Medium-sized Upland Farm, Haywood County, Tennessee*

Item	Present system	Alternative systems		
		I Cotton- dairy- hogs	II Cotton- beef- poultry	III Beef- hogs- cotton
	Acres	Acres	Acres	Acres
LAND AND CROPS				
Cotton: Cropper	12.0	12.0	12.0	—
Operator	7.3	3.0	3.0	8.0
Corn: Cropper	7.0	2.0	2.0	—
Operator	8.0	6.5	6.5	15.5
Lespedeza hay	5.8	12.0	18.0	6.5
Other hay	1.8	6.0	—	6.0
Oats for grain	—	—	(9.0)	—
Button clover, vetch	—	(18.0c) (3.0v)	(3.0v)	(3.0v)
Other crops	1.1	—	—	—
Garden	1.0	1.0	1.0	1.0
Total	44.0	63.5	54.5	40.0
Double cropped	—	21.0	12.0	3.0
Used for crops	44.0	42.5	42.5	37.0
Idle cropland and failure	8.0	—	—	—
Unimproved pasture	25.0	—	—	—
Improved pasture	—	35.5	35.5	41.0
Woodland	—	—	—	—
Other land	3.0	2.0	2.0	2.0
Total land	80.0	80.0	80.0	80.0
LIVESTOCK				
	Number	Number	Number	Number
Dairy cows	3	18	—	1
Beef cows	—	—	17	17
Brood sows	1	1	1	5
Hogs raised	5	14	14	68
Hens	40	40	370	40
LABOR POWER				
Labor available				
(man-equivalents)	2.2	2.2	2.2	1.4
Operator family	1.4	1.4	1.4	1.4
cropper	0.8	0.8	0.8	—
Power used	Workstock	Tractor	Tractor	Tractor

The sharecropper on the representative farm shares in 12 acres of cotton and 7 acres of corn. He works for other farmers for a few weeks, chiefly during the cotton-picking season.²⁶ The total labor supply is equivalent to 2.2 able-bodied men. (This size labor force generally prevails on medium-sized farms whether or not the farms have cropper labor).

The capital resources, valued at \$9,600, consist mainly of land and buildings. Workstock (3 head) are used for power. Together

²⁶ Approximately half of the medium-sized farms have croppers.

with machinery and equipment they are valued at about \$500. Other livestock are valued at about \$1,000.

Costs and returns

(1) **Owner operated.** For the farm as a whole, family labor earnings at 1949 prices amount to about \$2,130. But with a cropper on the farm, this income is shared by two families. The cropper

TABLE 33.—*Financial Summary, Representative Medium-sized Upland Farm, Haywood County, Tennessee (1949 Price Level)*

Item	Present system	Alternative systems		
		I Cotton-dairy- hogs	II Cotton-beef- poultry	III Beef-hogs- cotton
	Dollars	Dollars	Dollars	Dollars
COSTS AND RETURNS				
Cash Receipts				
Crops	2,504	3,179	3,143	1,590
Livestock	300	1,149	2,527	4,252
Livestock products	103	3,168	2,281	120
Other	32 ¹	—	88	—
Total	2,939	7,496	8,039	5,962
Family living from the farm	405	465	465	465
Total income	3,344	7,961	8,504	6,427
Cash expenses and depreciation				
Crops	313	907	1,072	747
Livestock	178	1,176	1,223	620
Cropper labor ²	900	1,268	1,268	—
Other cash costs	240	700	745	721
Depreciation	—	644	670	622
Total expenses	1,631	4,695	4,978	2,710
Family farm earnings	1,713	3,266	3,526	3,717
Interest on investment	481	814	891	855
Family labor and management earnings	1,232	2,452	2,635	2,862
Hours of family labor	2,125	3,155	2,720	3,015
Earnings per hr. of labor and management	0.58	0.78	0.97	0.95
CAPITAL INVESTMENT				
Real estate	7,780	8,885	9,805	8,970
Machinery and equipment	290	2,610	2,245	2,245
Livestock	1,170	4,195	4,600	4,755
Feed and supplies	370	600	1,110	1,125
Total	9,610	16,290	17,760	17,095

¹ Net increase in inventory.

² Cropper's receipts are obtained from the share of crops grown plus an estimated cash value of perquisites.

gets \$900 and the operator \$1,232 (table 33). (About two-thirds of owner-operated farms have croppers). In addition, the operator earns 5-percent interest on the part of the investment owned free of debt. The cropper family also gets a house rent-free and a garden.

For this income the cropper family works 1,650 hours on crops, getting 54 cents an hour. The operator family is employed 2,125 hours on crops and livestock they average 58 cents an hour.

The size of the total labor force on owner-operated farms with no croppers is approximately the same as those with croppers. They grow, on the average, about the same acreages of corn and cotton. Consequently, when it is operated by the owner without cropper labor this representative farm returns approximately \$2,100 in family labor earnings for 378 10-hour days of work, or about 55 cents an hour.

(2) **Tenant operated.** If the operator is a share tenant, with cropper labor, he must share part of the farm income with the landlord as well as with the cropper. In this case, the operating tenant's family labor earnings at 1949 prices amount to \$1,000, or 47 cents an hour (table 35). The landlord receives about \$620 above cash expenses and depreciation.

About half of the share tenants do not employ cropper labor. Like the owner-operator families without croppers they have larger average family labor forces than those who have croppers. With the representative farm operated solely by the tenant family, labor earnings would amount to \$1,900.

TABLE 34.—*Cash Cost of Establishing Alternative Farming Systems, Representative Medium-Sized Upland Farm, Haywood County, Tennessee (1949 Price Level)*

Item	I Cotton-dairy-hogs			II Cotton-beef-poultry			III Beef-hogs-cotton
	Farm	Tenant	Land-lord	Farm	Tenant	Land-lord	Farm
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Buildings	250	—	250	1,900	—	1,900	250
Fences	825	—	825	1,110	—	1,110	870
Pasture improvement	1,160	—	1,160	1,165	—	1,165	1,160
Machinery and equipment	4,480	4,480	—	3,650	3,650	—	4,605
Livestock	2,590	1,295	1,295	3,575	1,787	1,788	3,015
Total	9,305	5,775	3,530	11,400	5,437	5,963	9,900

Alternative Systems on a Representative Medium-Sized Upland Farm

This section deals with three alternatives to the present cotton system. In two of these alternatives, it is assumed that the labor

force (2.2 man-equivalents) would remain the same as at present; in the third alternative, the labor supply would be reduced to 1.4 man-equivalents. In each system, a medium-sized tractor would be

TABLE 35.—*Comparative Investments, Costs and Returns of Tenant and Landlord, Representative Medium-sized Upland Farm, Haywood County, Tennessee, (1919 Price Level)*

Item	Present systems		Alternative systems			
			I		II	
	Cotton		Cotton-dairy-hog		Cotton-beef-poultry	
	Tenant	Landlord	Tenant	Landlord	Tenant	Landlord
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Total income	2,683	1,011	4,812	3,149	5,000	3,504
Total expenses	1,589	392	3,051	1,644	3,058	1,920
Family farm earnings	1,094	619	1,761	1,505	1,942	1,584
Interest on investment	92	389	233	581	257	634
Family labor and management earnings	1,002	230	1,528	924	1,685	950
Hours of family labor	2,125	xx	3,155	xx	2,720	xx
Earnings per hour of labor & management	0.47	xx	0.48	xx	0.62	xx
Capital investment						
Real estate	—	7,780	0	8,883	—	9,805
Cattle, hogs	—	—	2,070	2,070	2,300	2,300
Other livestock	1,170	—	58	—	—	—
Feed & supplies	370	—	300	300	555	555
Equipment	290	—	2,237	372	2,245	—
Total	1,830	7,780	4,665	11,625	5,100	12,660

substituted for the present workstock (3 head). In each alternative, the operator would adopt improved production practices. He would fit the crops to the soil resources and to livestock enterprises to get the highest long-time net return. All idle cropland would be incorporated into the crop and pasture program.

Alternative I. Cotton-Dairy-Hogs

Organization and practices

In this system cotton would remain the major cash crop, and, although the acreage would be reduced to 15, total production would be increased as a result of higher yields. To supplement income from cotton, the operator would establish an 18-cow grade B dairy herd. He would fatten all the hogs raised from 1 brood sow. Hay for the dairy herd would be produced from lespedeza and soybeans grown in a 3-year rotation with button clover. The button clover would be seeded after the second-year lespedeza. It would produce a seed crop to be turned under before soybeans

were planted. Some fall and winter grazing would be provided by this button clover, which is grown from a seeded or volunteer stand. An orchard grass and ladino clover pasture would provide most of the pasture. Button clover would provide some fall and spring grazing. With corn on bottom land, a relatively small acreage would produce the grain needed to feed the dairy cattle, hogs, and farm flock of chickens. (See table 32 for farm organization and figure 8 for field arrangement and soil resources).

Crop and livestock production practices for this improved farming system would be the same as those to be adopted for the alternative systems on the representative small upland farm. (See tables 21 and 22, pages 34 and 36.)

This alternative cotton-dairy-hog system would be operated with the present labor supply—2.2 man-equivalents. About \$9,300 in additional capital would be needed. Approximately half this amount would be used to buy a medium-sized tractor and tractor equipment, and dairy equipment, which would include two single-unit milking machines. The rest would be needed to establish the dairy herd and provide pasture, pasture fences, and a milking shed (table 34).

Costs and returns

(1) **Owner operated**—with a cropper family sharing in the production on 12 acres of cotton and 2 acres of corn, at 1949 prices labor earnings for the operator and family would approximate \$2,450, or 78 cents per hour of labor. This compares with \$1,230 and 58 cents obtained from the present system (table 33). The cropper's net cash income would amount to about \$1,270, which is almost 50 percent more than he obtains from the present system.

The tenant operator and his family would work an average of 225 10-hour days per man-equivalent on crops and livestock, an increase of 73 days above the number required for the present system. The cropper and his family would work only 160 days, as at present.

For the owner-operator family that could do all of the work, except part of the cotton picking (equivalent to 2 months hired labor), labor earnings would amount to about \$3,600.

(2) **Tenant operated**—this cotton-dairy-hog alternative, if operated by a share tenant and cropper, at 1949 prices, would produce labor earnings of about \$1,625 to the tenant and his family, or 51 cents per hour of labor. The cropper would get \$1,270 net return to labor and the landlord's return on capital would amount to \$1,500 (table 35).

With the tenant furnishing the machinery and half the livestock, his cash outlay would be considerably larger than the landlord's additional investment in pasture improvement, fences, remodeling the barn, and livestock (table 34).

Alternative II. Cotton-Beef-Poultry

Organization and practices

In this, as in the preceding alternative, cotton would be the major cash crop, but livestock would be shifted to an 18-cow beef herd and a 400-hen flock of chickens. The cropping system would be the same as in the preceding cotton-dairy-hog alternative, with one exception. In the cotton-beef-poultry system, oats for grain would be substituted in the 2-year lespedeza rotation for button clover.

Costs and returns at 1949 prices

If operated by the owner and his family with cropper labor operating as described previously, net labor returns would amount to \$2,635 for the operator and his family. This would exceed the net returns from the cotton-dairy-hog alternative by almost \$200 (table 33).

But the alternative with the beef and poultry would require \$2,000 more to establish, or a total of \$11,400 (table 34). Although interest was deducted from income to obtain net labor earnings, the extra cash outlay should be considered in comparing the two alternatives.

If this system is operated by a tenant and a cropper, the tenants' labor earnings would be approximately \$1,685, about \$150 more than he would obtain from the alternative with dairy cattle and hogs.

Alternative III. Beef-Hog-Cotton (with reduced labor supply)

The chief differences between this alternative and the two preceding systems lie in the reduction of the labor force to 1.4 man-equivalents. This situation would exist if the average operator lost his cropper labor supply.

By reducing the labor supply each full-time man (man-equivalent) in the labor force would have about 60 percent more crop and pasture land. This increase in the land-man ratio would bring adjustments in the farm organization. Cotton would be grown on only 8 acres so that family labor could handle the chopping and picking except for a few days of hired labor. Corn and hogs, which require relatively little labor, would be increased significantly. Enough pasture and hay would be produced for a beef herd of 17 cows.

This system would require \$9,900 of additional capital and 300 days of work on crops and livestock, or 215 days per man-equivalent.

At 1949 prices this system would return to the operator and family the largest labor earnings of either of the three alternative systems—about \$2,860 for the farm as a whole and \$2,045 per man-equivalent (table 33).

Effect of Changing Price Relationships on Labor Earnings

Varying the price of cotton

At 1949 prices for all farm products, labor earnings would range from 2 to 2 1/3 times as large for alternative systems I, II, and III as for the present system (table 36). With lower prices for cotton and 1949 prices for livestock, the alternative systems would have an increasing advantage over the present system. This would be true particularly for alternative III, in which cotton is a relatively minor crop, because of the reduction in the size of the labor supply. With cotton at 22 cents a pound, for example, labor earnings for alternative III would be reduced about 10 percent below earnings with cotton at 29 cents. This compares with about 25 percent reduction for alternatives I and II and 45 percent for the present system. These three systems would be operated with present labor forces and at a comparatively high level of cotton production.

TABLE 36.—*Estimated Family Labor Earnings with Varying Prices for Cotton and 1949 Prices for Livestock and Livestock Products, Present and Alternative Systems, Representative Medium-sized Upland Farm, Haywood County, Tennessee*

Farming systems	Cotton produced	Price of lint cotton in cents per pound				
		1949				
		18	22	29	35	40
	Bales	Dollars	Dollars	Dollars	Dollars	Dollars
Present	14.5	362	696	1,232	1,727	2,137
Alternative I	18	1,372	1,786	2,452	3,062	3,577
Alternative II	18	1,555	1,969	2,635	3,245	3,760
Alternative III	9.25	2,292	2,520	2,862	3,177	3,437

Conversely, as the price of cotton rises above the 1949 level, alternative III would be at a relative disadvantage with regard to labor earnings. Earnings would rise only about 10 and 20 percent if the price of cotton went up to 35 and 40 cents a pound, respectively. However, earnings for alternatives I and II would rise about 25 and 45 percent, respectively. For the present system earnings would rise 40 and 75 percent, respectively, if cotton prices rose to 35 and 40 cents.

Varying the price of livestock and livestock products

There are many possible combinations of price variations. To illustrate the effects of varying the prices and livestock products two levels of prices are assumed: (1) A decline of 10 to 15 percent and (2) a decline of 25 to 30 percent from the 1949 level. (See table 37 for assumed prices and estimated effect on labor earnings.)

If prices of all livestock and livestock products declined by 25 to 30 percent, for example, and the price of cotton stayed at the 1949 level, labor earnings for alternatives I and II would decline from about double the earnings from the present system to only about 10 to 20 percent above them. Earnings for alternative III,

beef-hogs-cotton, would decline from $2\frac{1}{3}$ times present earnings to $1\frac{1}{3}$ times them (table 37). If a decline of 10 to 15 percent in livestock prices occurs, labor earnings for alternatives I and II would still be about 60 percent larger than earnings for the present system. For alternative III, they would be 85 percent larger.

As livestock prices may change in their relations to each other, the effects of such changing price relationships should be observed. For example, at 1949 prices labor earnings for alternative II, cotton-beef-hens, would be almost \$200 larger than the cotton-dairy-hog alternative I. If, however, the price of either beef or eggs declined approximately 15 percent and other prices remain at the 1949 level, earnings from these two farming systems would be about equal (table 37). But, if the price of eggs were to fall 40 percent (to 30 cents a dozen) labor earnings from the cotton-dairy-hog system would be the more profitable of these two systems by about \$500.

TABLE 37.—*Estimated Family Labor Earnings with Varying Prices for Livestock and Livestock Products and 1949 Prices for Cotton, Present and Alternative Systems, Representative Medium-sized Upland Farm, Haywood County, Tennessee*

Price assumption	Present system ¹	Alternative systems		
		I Cotton-dairy-hog	II Cotton-beef-hens	III Beef-hogs-cotton
	Dollars	Dollars	Dollars	Dollars
Cotton produced in bales	14.5	18	18	9.25
All products sold at 1949 prices ²	1,232	2,452	2,635	2,862
I. Livestock reduced 10-15 percent:				
1. All livestock and livestock products ³	1,232	1,953	1,972	2,278
2. Grade B whole milk, \$3.30 cwt.	1,232	2,122	—	—
3. Beef, \$17.50 cwt.	1,232	—	2,464	2,691
4. Hogs, \$16.20 cwt.	1,232	2,394	2,593	2,519
5. Eggs, \$0.36 doz.	1,232	2,435	2,409	2,845
II. Livestock reduced 25-30 percent:				
1. All livestock and livestock products ²	1,232	1,473	1,364	1,708
2. Grade B whole milk, \$2.90 cwt.	1,232	1,792	—	—
3. Beef, \$14.60 cwt.	1,232	—	2,295	2,522
4. Hogs, \$13.80 cwt.	1,232	2,336	2,550	2,176
5. Eggs, \$0.30 doz.	1,232	2,418	1,983	2,828

¹ Assume no change in price of livestock under the present system.

² Cotton, \$0.29 lb.; grade B milk \$3.70 cwt.; hogs \$13.60 cwt.; beef, 450 lb. calves \$20.42 cwt.; hens \$0.24 lb.; eggs \$0.42 doz.

³ Includes certain miscellaneous livestock products other than beef, milk and eggs reported above. For details see appendix table 7.

The effects of changing price relationships may be indicated further by comparing labor earnings from alternatives II and III. At 1949 prices, alternative III, beef-hog-cotton, would produce almost 10 percent more labor earnings than alternative II, cotton-

beef-hens. But if the price of hogs fell from \$18.60 per hundredweight to \$16.20 per hundredweight, labor earnings for these two systems would be equalized approximately. But a further decline, to \$13.80 per hundredweight, would drop labor earnings of alternative III about \$450 below earnings of alternative II.

PRESENT AND ALTERNATIVE SYSTEMS ON MEDIUM-SIZED BOTTOM LAND FARMS

Present System on a Representative Medium-sized Bottom Land Farm

Topography and soils on this farm are favorable for crop production. Except for 2 acres, all land is on A and B slopes which range up to 5 percent. The Memphis-Loring and Grenada upland soils are on the more strongly rolling areas of the farm, which in combination with row-cropping have resulted in heavy soil losses, particularly on the Memphis-Loring soils (fig. 9). The Falaya bottom land, on which soil from the upland has been deposited, is the largest soil area. It makes up a little more than 40 percent of the total area.

Organization and practices

This is a typical cotton type of farm, which is almost identical in crop and livestock pattern with the representative medium-sized upland farm. The farmer grows cotton and corn on almost half the land and, except for a small acreage in lespedeza hay and miscellaneous crops, the rest is in unimproved pasture and idle land (table 38). In the pasture there are about 5 acres of woods. Except for 3 head of mules, livestock are kept primarily for home use.

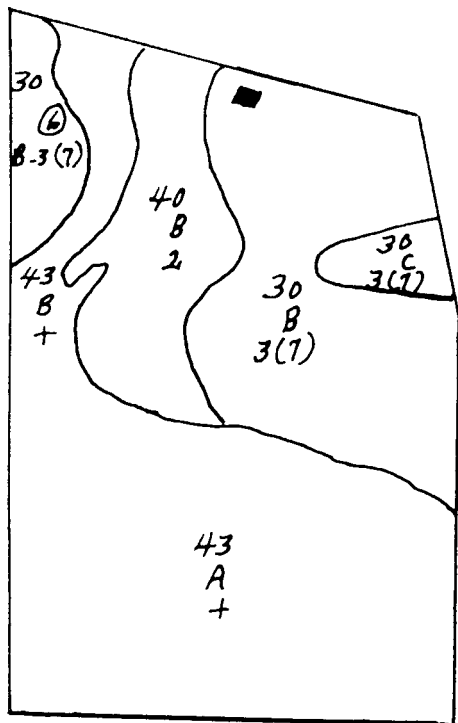
This representative farm is operated by the owner and his family. The total labor force is equivalent to 2.2 men.²⁷ Workstock are used for power. The capital investment of \$9,300 is made up chiefly of real estate.

Crop production practices and yields are similar to those on other bottom land farms. Cotton and corn, grown on bottom land, averages 425 pounds of lint and 22.5 bushels per acre, respectively. (See table 21, page 34, for production practices and rates of production.)

Costs and returns

This system produces family labor earnings of \$2,160, or 60 cents per hour of operator and family labor (table 39). The net labor earnings on this medium-sized bottom land farm as operated

²⁷ No budgets of tenants' and croppers' share of costs and returns were prepared as most of the farms were operated by owners and their families. For an example of costs and returns on tenant and cropper units, see the preceding analysis of the medium-sized upland farm.



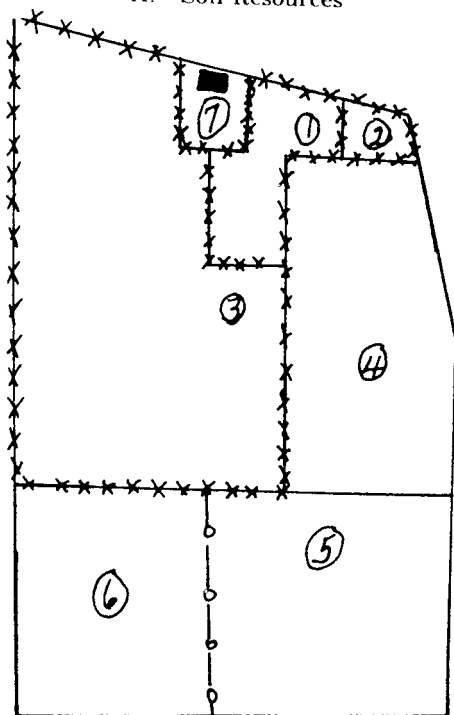
Scale: 1 inch = 660 feet

Symbols

- 30 Memphis-Loring soil
- 40 Grenada
- 43 Falaya soil
- A Under 2% slope
- B 2-5% slope
- C 5-8% slope
- + Soil deposit
- 2 Moderate sheet erosion
- 3 Moderately severe sheet erosion
- (7) Occasional gully

- Buildings
- Soil group boundary
- Fence
- Unfenced field boundary

A. Soil Resources



Field	Use	Acres
1	Hog pasture	4.0
2	Garden	1.0
3	Pasture (includes 5.5 acres of woodland)	29.5
4	Lespedeza hay	16.0
5	Corn	17.0
6	Cotton	13.0
7	Homestead	1.5
Total		82.0

B. Alternative Farm Layout

Figure 9.—Present Soil Resources and Proposed Farm Layout, Representative Medium-sized Bottom Land Farm, Haywood County, Tennessee

at present are no larger than the operator's labor earnings on the same sized upland farm, assuming that both farms are operated solely by owner families.

Alternative Systems on a Representative Medium-sized Bottom Land Farm

In two of the three alternative systems presented in this section, the present labor force would be retained (2.2 man equivalents). In the other alternative, it is assumed that the labor force would be reduced by about a third. Tractor power would be substituted in all alternatives for workstock in the present system.

TABLE 38.—*Present and Alternative Farming Systems, Representative Medium-sized Bottom Land Farm, Haywood County, Tennessee*

Item	Present system	Alternative systems		
		I Cotton-dairy-hogs	II Cotton-beef-hogs-poultry	III Hogs-beef-cotton
	Acres	Acres	Acres	Acres
LAND & CROPS				
Cotton	19.4	13.0	13.0	5.0
Corn	15.6	18.5	17.0	22.0
Lespedeza hay	3.0	14.5	16.0	10.0
Other hay	1.5	—	—	—
Oats for grain	—	—	(8.0)	—
Button clover	—	(14.5)	—	(10.0)
Other crops	2.0	—	—	—
Garden	1.0	1.0	1.0	1.0
Total	42.5	61.5	55.0	48.0
Double cropped	—	14.5	8.0	10.0
Used for crops	42.5	47.0	47.0	38.0
Idle cropland	12.0	—	—	—
Unimproved pasture	19.0	—	—	—
Improved pasture	—	28.0	28.0	37.0
Woodland	5.5	5.5	5.5	5.5
Other land	3.0	1.5	1.5	1.5
Total land	82.0	82.0	82.0	82.0
	Number	Number	Number	Number
LIVESTOCK				
Dairy cows	2	13	—	—
Beef cows	—	—	13	15
Brood sows	1	5	4	7
Hogs raised	5	68	52	98
Hens	40	40	370	40
LABOR POWER				
Man-equivalents ¹	2.2	2.2	2.2	1.4
operator	2.2	2.2	2.2	1.4
cropper	—	—	—	—
Power	Workstock	Tractor	Tractor	Tractor
	(3 head)			

¹ Exclusive of seasonal wage labor.

Alternative I. Cotton-Dairy-Hogs

Organization and practices

Compared with a similar system on the representative medium-sized upland farm, this system emphasizes hogs more and grade B dairying hogs less because of the larger acreage of bottom land

TABLE 39.—*Financial Summary of Present and Alternative Systems, Representative Medium-sized Bottom Land Farms, Haywood County, Tennessee (1949 Price Level)*

Item	Present system	Alternative systems		
		I Cotton-dairy-hogs	II Cotton-beef-poultry-hogs	III Hogs-beef-cotton
	Dollars	Dollars	Dollars	Dollars
COSTS & RETURNS				
Cash receipts				
Crops	2,815	2,793	2,793	1,177
Livestock	75	3,326	3,792	5,375
Livestock products	65	2,456	2,280	118
Miscellaneous	—	—	105	95
Total	2,955	8,575	8,970	6,765
Family living from the farm	560	600	600	450
Total income	3,515	9,175	9,570	7,215
Cash expenses and depreciation				
Crops	313	852	1,000	782
Livestock	116	1,287	1,400	732
Other cash costs	249	1,056	1,041	596
Depreciation	212	610	679	660
Total expenses	890	3,805	4,120	2,770
Family farm earnings	2,625	5,370	5,450	4,445
Interest on investment	465	830	870	865
Family labor and management earnings	2,160	4,540	4,580	3,580
Hours of family labor	3,650	4,250	4,030	3,120
Earnings per hour of labor and management	0.59	1.07	1.14	1.15
CAPITAL INVESTMENTS				
Real estate	7,785	8,495	9,255	8,610
Machinery and equipment	380	2,705	2,335	2,405
Livestock	745	4,030	4,340	4,705
Feed and supplies	400	1,420	1,455	1,570
Total	9,310	16,650	17,385	17,290

available for corn. With yields of 75 bushels per acre and hogs at \$18.60 per 100 pounds, corn on this land is more profitable than forage crops for dairy cows. Enough upland is available to produce forage for a 13-cow dairy herd if idle land is used and improved production practices are adopted. Most of the bottom land would be planted in corn and cotton—19 acres and 13 acres, respectively (table 38). This represents a decrease of 6 acres in cotton; but, with an average yield of 625 pounds of lint per acre, total production would increase. Furthermore, at 1949 prices, corn grown on bottom land and fed to hogs produces almost as much net return per acre as cotton grown on bottom land.²⁸

Costs and returns

At 1949 prices, this cotton-dairy-hog system would produce net labor earnings amounting to \$4,540. This is the net return to 2.2 man-equivalents of operator and family labor (table 39). This amounts to about twice the present labor earnings on this farm and a fourth more than on the medium-sized upland farm under the alternative cotton-dairy system.

Alternative II. Cotton-Beef-Hogs-Poultry

In this system the number of acres of the major crops would be about the same as in the preceding system; but a 13-cow beef herd would be substituted for the dairy herd, and a 400-hen flock would be added. Hogs would be reduced 20 percent (table 38).

The present labor force (2.2 man equivalents) would be retained, but a medium-sized tractor would be substituted for 3 head of workstock in the present system.

This alternative would produce \$4,580 in labor earnings for the operator and family labor force of 2.2 man-equivalents. The net

TABLE 40.—*Cash Costs of Establishing Alternative Farming Systems, Representative Medium-sized Bottom Land Farm, Haywood County, Tennessee (1949 Price Level)*

Item	I Cotton- dairy- hogs	II Cotton- beef-hogs- poultry	III Hogs- beef- cotton
	Dollars	Dollars	Dollars
Buildings	250	1,900	200
Fences	235	210	255
Pasture improvement	925	925	1,220
Machinery & equipment	4,220	3,570	3,855
Livestock	1,950	2,840	3,075
Total	7,580	9,445	8,605

²⁸ Estimated advantage of cotton over corn under these assumptions is about \$12.50 per acre. Corn and hogs have an advantage over cotton in the more uniform distribution of labor.

earnings per hour of labor required to produce the crops and live-stock would average \$1.14. These total earnings are a few dollars higher than those that would be obtained from the cotton-dairy-hog alternative.

The system with poultry would require almost \$2,000 more cash outlay to establish than the cotton-dairy-hog system (table 40). The cost of building brooder and laying houses would be the chief extra costs.

Alternative III. Hog-Beef-Cotton System (with reduced labor supply)

It is assumed that in this system the labor force would be reduced from 2.2 man-equivalents to 1.4. The farmer would use a medium-sized tractor for power. The labor force would grow only 5 acres of cotton. The rest of the land would produce corn, hay, and pasture for a 15-cow beef herd and hogs from 7 sows (table 38).

This system would produce about \$3,600 net labor earnings. Although the total amount would be \$1,000 less than the alternative systems with larger labor force (2.2 man equivalents), the average labor earnings per man are about a fourth more — \$2,560 and \$2,080, respectively. In comparison, the present system produces almost \$1,000 in net labor earnings per man (table 39).

The alternative hog-beef-cotton system requires about as much total capital (\$17,300) as the alternatives with the larger labor forces. But, the average investment per man (\$12,000) would be 50 percent more than would be required for the latter systems.

PRESENT AND ALTERNATIVE SYSTEMS ON LARGE UPLAND FARMS

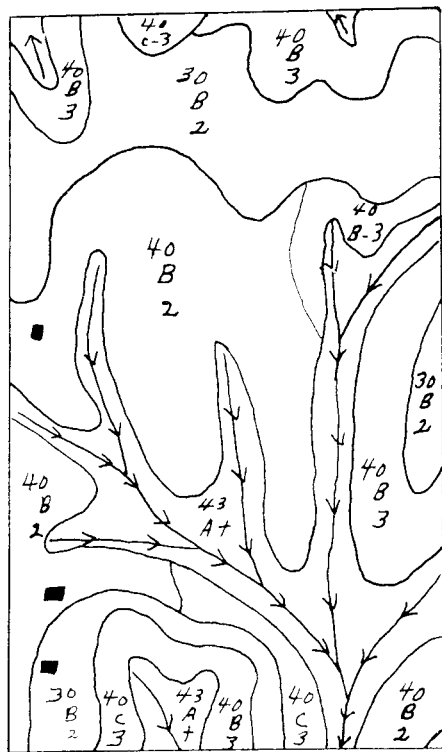
Farms that range in size from 100 to 370 acres make up about 25 percent of the farms in the area. The modal group of these farms range from 125 to 175 acres.

Approximately half of the large farms were upland farms; a fifth were bottom land farms; the rest were mixed and other classes of farms.²⁹ The modal size in large upland farms was 150 to 157 acres. As with all upland farms, about 60 percent of the large upland farms were operated by owners and 40 percent by share tenants. Both owner-operator and share tenants depend chiefly on croppers for their nonfamily labor supply.

Present System on a Representative Farm

This representative farm contains 156 acres, all of which is cleared except for a few acres in brush along the drainage areas. The upland soils are Grenada (85 acres) and the Memphis-Loring series (39 acres). The bottom land (32 acres) is Falaya. Compared with the average large upland farm, the representative farm has more Grenada, and less Memphis and Loring soil. The topography of this farm lend itself to mechanized crop production (fig. 10).

²⁹ Because of the small sample and the wide variability in acreage and soil resources on large bottom land farms and other classes of large farms, a representative farm could not be selected from any group except large upland farms. The techniques used in developing other case farms would apply to these farms.



A. Soil Resources

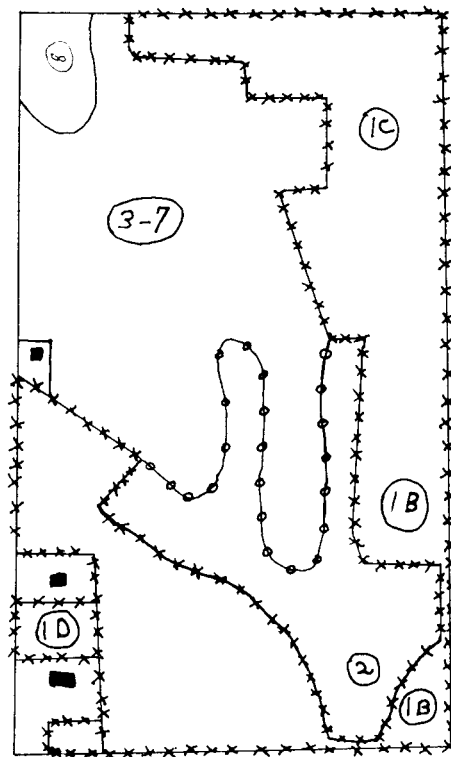
Symbols

- Soil group boundary
- Drainage
- 30 Memphis-Loring soil
- 40 Grenada soil
- 43 Falaya soil
- A Under 2% slope
- B 2-5% slope
- C 5-8% slope
- + Deposited material
- 2 Moderate sheet erosion
- 3 Moderately severe sheet erosion
- Buildings
- x-x- Field boundary, fenced
- o-o- Field boundary, unfenced

Land Use

Field	Use	Acres
1A	Permanent pasture	24.0
1B	Permanent pasture	24.5
1C	Permanent pasture	16.0
1D	Permanent pasture	3.0
2	Corn	20.0
	Waste land	3.5
3-7	Cotton, soybean hay, lespedeza	54.0
8	(Button clover cover crop)	4.0
	Secirca lespedeza	7.0
	Homestead	
Total		156.0

Scale 1" = 660'



B. Farm Layout, Alternative I

Figure 10.—Present Soil Resources and Alternative Farm Layout, Representative Large Upland Farm, Haywood County, Tennessee

Organization and practices

Approximately 60 percent of the land is in cotton, corn, and lespedeza. The rest consists of 13.5 acres idle, 19.5 acres in unimproved pasture, and 31 acres in brush, roads, and homestead (table 41).

About 5 acres of corn are grown on bottom land; all other crops are produced on upland. Cotton averages three-fourths of a bale per acre, and the yield of corn averages 25 bushels per acre. Eight

TABLE 41.—*Present and Alternative Farming Systems, Representative Large Upland Farm, Haywood County, Tennessee*

Item	Present system	Alternative systems		
		I Cotton-dairy-hogs	II Cotton-beef-hogs-poultry	III Beef-hogs-poultry-cotton
	Acres	Acres	Acres	Acres
LAND & CROPS				
Cotton cropper	27.0	15.0	15.0	6.0
operator	5.0	—	—	—
Corn cropper	18.1	—	—	—
operator	—	20.0	20.0	20.0
Lespedeza hay	13.0	24.0	39.0	27.0
Soybean hay	—	15.0	—	—
Sericea hay	—	4.0	4.0	4.0
Oats for grain	—	—	(15.0)	(6.0)
Button clover or vetch	—	(54.0 c)	(15.0 v)	(6.0 v)
Lespedeza for seed	13.0	—	—	—
Lespedeza not harvested	13.0	—	—	—
Garden	2.9	1.5	1.5	1.5
Total	92.0	133.5	109.5	70.5
Double cropped	—	54.0	30.0	12.0
Used for crops	92.0	79.5	79.5	58.5
Idle cropland	13.5	—	—	—
Unimproved pasture	19.5	—	—	—
Improved pasture	—	67.5	67.5	88.5
Other land, inc. brush	31.0	9.0	9.0	9.0
Total land	156.0	156.0	156.0	156.0
LIVESTOCK	Number	Number	Number	Number
Dairy cows	5	36	—	—
Beef cows	—	—	35	43
Brood sows	1	4	5	5
Hogs raised	6	51	66	66
Hens	40	60	550	370
LABOR-POWER				
Man equivalents	3.5	3.5	3.5 ¹	2.0
Operator	1.0	1.0	1.0	1.0
Cropper	2.5	2.5	2.5	1.0
Power	Workstock	Tractor	Tractor	Tractor

¹ Exclusive of 25 days of seasonal wage labor.

acres of the corn grown on upland soils are fertilized at the rate of 100 pounds of nitrate of soda per acre. The other corn is not fertilized. An application of 200 pounds of 6-12-12 fertilizer is used on cotton at the time of planting.

Hay is harvested from 13 acres of lespedeza and produces about one ton per acre. An equal acreage is harvested for seed; it av-

TABLE 42.—*Financial Summary of Present and Alternative Systems, Representative Large Upland Farm, Haywood County, Tennessee (1949 Price Level)*

Item	Present system	I Cotton- dairy- hogs	II Cotton- beef-hogs- poultry	III Beef-hogs- poultry- cotton
	Dollars	Dollars	Dollars	Dollars
COST & RETURNS				
Cash receipts				
Corn	4,723	2,578	2,818	1,031
Livestock	190	3,469	6,411	6,805
Livestock products	93	6,397	3,560	2,255
Other	—	—	24	—
Total	5,006	12,444	12,813	10,091
Family living from the farm	440	473	473	473
Total income	5,446	12,917	13,286	10,564
Cash expenses and depreciation				
Crops	521	1,161	1,417	1,274
Livestock	120	2,451	2,738	1,636
Cropper labor	1,930 ¹	2,874 ²	2,874 ³	1,541 ⁴
Other cash costs	558	1,269	1,099	946
Depreciation	247	933	944	933
Total expenses	3,376	8,688	9,072	6,330
Family farm earnings	2,070	4,229	4,214	4,234
Interest on investment	859	1,563	1,632	1,653
Family labor and management earnings	1,211	2,666	2,582	2,581
Hours of family labor	2,070	2,400	2,580	2,490
Earnings per hour of labor and management	0.58	1.11	1.00	1.04
CAPITAL INVESTMENTS				
Real estate	15,215	17,505	18,975	18,600
Machinery & equipment	470	2,890	2,575	2,575
Livestock	1,045	8,820	8,895	10,005
Feed and supplies	455	2,050	2,200	1,880
Total	17,185	31,265	32,645	33,060

¹ Croppers' net receipts: Cotton \$1,650, and value home products \$280.

² Croppers' net receipts: Cotton \$1,115, milk \$1,429, value home use products \$330.

³ Croppers' net receipts: Cotton \$1,115, wages 1,429, and value home use products \$330.

⁴ Croppers' net receipts: Cotton \$426, wages \$1,000, and value home use products \$115.

erages 420 pounds per acre. Another 13-acre field of lespedeza was not harvested. No fertilizer was applied to the lespedeza.

Livestock consist of 4 head of workstock, 5 dairy cows, 1 brood sow, 6 hogs fed out for home use or market and 40 hens (table 41).

Total capital resources, valued at \$17,185, consist mainly of land and buildings. Investments in livestock and machinery make up less than 10 percent of this total.

The labor force is made up of the owner-operator and two cropper families. The total labor supply is equivalent to 3.5 able-bodied men, or 1.0 man equivalent of operator labor plus 2.5 man-equivalents in the cropper families. The farm operator has 5 acres of cotton and the lespedeza crop. Each cropper family grows approximately 15 acres of cotton and 9 acres of corn on shares.

Costs and returns

(1) Owner operated—with the farm operated by the owner and two croppers, labor earnings amount to \$3,140. However, these earnings must be divided three ways. The operator and his family get \$1,210. Each of the two croppers gets about \$965 (table 42). In terms of labor earnings per hour, the operator receives 58 cents and the croppers 50 cents.

(2) Tenant operated—the labor force of the average tenant family consists of 2.0 man-equivalents of labor, and that of the cropper family 1.5. The landlord rents the entire farm to the tenants for a third of the cotton crop. The tenant has 20 acres of cotton and 10 acres of corn. He subrents 12 acres of cotton and 8 acres of corn to a sharecropper. Under this system, the cropper family receives about \$925 for its labor; the tenant family gets \$1,985, or \$993 per man (table 44). In addition, the tenant receives 5 percent interest on a \$1,970 investment in livestock, machinery, and supplies. The landlord's returns on a \$15,215 investment in real estate amounts to \$905.

Alternative Systems on a Representative Large Upland Farm

Three alternative systems of farming are proposed for the large upland farm. In the first two it is assumed that the labor force on the farm would remain at 3.5 man-equivalents. If the owner operates the farm, his labor supply would consist of one man-equivalent plus two cropper families with 1.25 man-equivalents each. If the farm is operated by a tenant, his labor supply would consist of 2 man-equivalents plus a cropper family with 1.5 man-equivalents. Under the third alternative, it is assumed that farms operated by either owners or tenants as shown above would lose approximately a third of their total labor supply. That is, one cropper family would leave the farm in the long run. Tractor power would be substituted for workstock and better production practices would be followed under the proposed than under the present system.

With the present regular labor force two levels of cotton acreage are assumed for both alternatives I and II as follows: (1) approximately a 50-percent reduction to 15 acres, and (2) a 20-percent reduction to 25 acres. The latter represents approximately the acreage allotment in 1955.

Alternative I. Cotton-Dairy-Hogs

Organization and practices—15 acres of cotton

In this alternative the acreage of cotton would be reduced from 32 to 15. The acreage of corn would remain about as at present. However, production would about triple because of adoption of better production practices and use of bottom land. In order to control erosion and run-off, a 4,300-foot sodway would be established along the two main drainage areas (fig. 10). Forage for a 36-cow grade B dairy herd would be provided mainly by 67 acres of improved ladino clover-grass pasture and 43 acres of hay (table 41.) Supplementary winter grazing would be provided from 54 acres of button clover seeded in a 4-year cotton, soybean hay, and lespedeza hay rotation. In addition to the dairy herd, 4 brood sows would be kept and about 50 hogs would be fed out for market.

The direct cash costs for establishing this system would amount to \$15,455 (table 43). About two-thirds of this cash outlay would go for livestock (\$5,900) and replacement of workstock with tractor power (\$5,000).

Costs and returns

(1) Owner operated—it is assumed that each of the two cropper families would have 7.5 acres of cotton and would receive an eighth of the proceeds from the sale of milk (less the cost of hauling), or its equivalent, for milking, feeding, and doing other chores with the 36 dairy cows. (Income from work on the dairy herd on a share basis is equivalent to the income based on a wage basis.) Other field crops and hogs would be produced by the owner-operator.

From this alternative system each cropper would receive a labor return of \$1,437, about \$400 more than present earnings. The owner-operator would receive \$2,666 in family labor earnings, approximately twice the earnings of the present system. This amounts to \$1.11 return per hour of labor (table 42).

(2) Tenant operated—it is assumed that under a share-tenant system the crop and livestock organization on this farm would remain the same as under the owner-operator.³⁰ The tenant family with a labor force of 2.0 man-equivalents would grow all the crops, except 10 acres of cotton, which would be subrented to a share-cropper family. In addition, the sharecropper would work part time for the tenant on a wage basis.

With the tenant providing half of the investment in livestock

³⁰ For the landlord tenure leasing arrangements, see appendix table 6.

TABLE 43.—*Cash Costs of Establishing Alternative Farming Systems on Representative Large Upland Farm, Haywood County, Tennessee (1919 Price Level)*

Item	Alternative systems					
	I Cotton-dairy-hogs		II Cotton-beef- poultry-hogs	III Beef-hogs- poultry-cotton		
	Tenant		Total farm	Tenant		Landlord
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Buildings	—	455	2,100	—	—	2,100
Fences	—	1,900	2,000	—	—	2,000
Pasture improvement	—	2,200	2,200	—	—	2,905
Machinery and equipment	4,590	405	4,044	4,044	—	—
Livestock	2,952	2,953	7,156	4,118	—	4,118
Total	7,542	7,913	17,500	8,162	—	11,123

TABLE 44.—*Comparative Costs and Returns and Investment of Tenant and Landlord, Representative Large Upland Farm, Haywood County, Tennessee (1919 Price Level)*

Item	Alternative systems					
	Present system		I Cotton-dairy- hogs		III Beef-hogs- poultry-cotton	
	Tenant		Tenant		Tenant	
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Total income ¹	3,933	1,537	7,297	5,667	5,737	4,874
Total expenses	1,850 ²	631	4,125 ³	2,833	2,050 ⁴	2,740
Family farm earnings	2,083	906	3,172	2,834	3,687	2,134
Interest on investment	98	761	407	1,156	426	1,227
Family labor and management earnings	1,985	145	2,765	1,678	3,261	907
Hrs. of family labor	4,260	xx	5,160	xx	4,980	xx
Earnings per hour of labor & management	0.47	xx	0.54	xx	0.65	xx
Capital investments:						
Real estate	—	15,215	—	17,505	—	18,605
Livestock	1,045	—	4,455	4,365	5,000	5,000
Feed & supplies	455	—	1,025	1,025	940	940
Equipment	470	—	2,675	215	2,575	—
Total	1,970	15,215	8,155	23,110	8,515	24,545

¹ Sum of tenant's and landlord's income and of expenses will not equal those of owner-operator's (table 42) because of the tenants large value of family living and his smaller cost of cropper labor that results from the larger family labor force (2 man-equivalents for tenant and 1 for owner-operator).

² Cropper's net receipts: Cotton \$723 and cash value of home-used products, \$200.

³ Cropper's net receipts: Cotton \$743, wages and value of home-used products, \$200.

⁴ Cropper labor eliminated, reducing labor force to 2 man-equivalents.

and the cost of shifting from workstock to tractor power, he would need about \$7,540 in additional capital. This is less than \$500 below the additional capital that would be needed by the landlord (table 43).

The labor earnings of the tenant and his family would be about \$2,765, after deducting from gross income cash expenses, depreciation, and 5 percent interest on an average investment of approximately \$8,150. This compares with the tenant's present income of about \$1,985 (table 44). For this extra income the tenant and his family would work almost 90 days. Thus, the average return per hour of labor would not differ significantly from present hourly earnings.

The landlord would fare better than the tenant. His net return above interest charged at 5 percent would increase by about \$1,300.

Alternative IA—25 acres of cotton

It is assumed that in this organization 10 acres of cotton would be substituted for the operator's 10 acres of bottom land corn in the preceding alternative, making a total of 25 acres of cotton. With this reduction in acreage of corn, the number of hogs would be reduced to only enough for home use. Three acres of land in hog pasture would be released for hay and pasture to feed another cow.

At 1949 prices, this adjustment to 25 acres of cotton would increase family labor earnings about \$250. Costs of making the various adjustments include net returns to labor that would have been earned from the hogs replaced because of the increase in acreage of cotton, as well as the direct costs of producing the additional acreage of cotton. These direct cost items include about 600 hours seasonal wage labor to handle the extra cotton chopping and picking. The overall investment would be decreased almost \$400, resulting chiefly from the reduction in the hog inventory.

Changes in relative prices would change the comparative earnings of the two systems. For each 1-cent change in the price per pound of lint cotton, labor earnings for alternative IA with 25 acres of cotton would decline about \$62; and for each change of \$1.00 per hundredweight of hogs, labor earnings would fall about \$103. Thus, the income advantage of the 10 additional acres of cotton versus corn and hogs, for example, would disappear if the price of lint cotton declined from the 1949 price of 29 cents to 25 cents, or if the price of hogs advanced from \$18.60 per hundredweight to \$21.00. This assumes that with the change in price of one product the price of all other products would not change.

Alternative II. Cotton-Beef-Hogs-Poultry

Organization and practices

The cropping program for this alternative would be the same as that for the cotton-dairy-hog alternative, except that lespedeza would replace 15 acres of soybeans for hay and an equal acreage of

lespedeza would be double cropped with oats for grain. Button clover would be dropped from the cropping system.

Livestock would consist of 35 beef cows, 5 brood sows, 66 hogs, and a 550-hen flock.

Costs and returns

(1) Owner operated—it is assumed that each cropper family would have 7.5 acres of cotton, and that, in addition, it would receive approximately \$715 in wages for work on the owner's crops and livestock. The croppers' earnings, which would include the value of products furnished by the operator for use in the home, would total \$1,437 per cropper.

Labor earnings for the operator and family would amount to almost \$2,600, which is about equal to the labor earnings that would be obtained under the cotton-dairy-hog system. This compares with present labor earnings of about \$1,200 (table 42).

The operator would work 40 more days than at present, but the average hourly labor earnings would rise from 58 cents to \$1.00. This alternative would require an additional cash outlay of \$17,500. Most of this amount would be used to buy machinery, and to establish the beef and poultry enterprises (table 43).

(2) Tenant operated — tenure arrangements between landlord and tenant and between tenant and sharecropper can be worked out similar to those shown under the cotton-dairy-hog system previously presented. Labor returns and investments would be at approximately the same level.

Alternative II A, with 25 acres of Cotton

Increasing the acreage of cotton for alternatives II to 25 acres would increase labor earnings about \$185 with 1949 prices. The extra 10 acres of cotton would replace 10 acres of bottom land corn. As the corn from this acreage would feed about 47 225-pound hogs, one cost of growing the additional cotton would be the labor earnings from hogs. However, the reduction in number of hogs would release about 3 acres of pasture. In alternative IIA, this would be used to produce feed for a beef cow and calf.

To make these adjustments would take 630 hours of labor, mainly for chopping and picking cotton. But the average capital investment would be about \$400 less, chiefly because of the reduction in the hog inventory.

If the price of lint cotton declined from the 1949 level of 29 cents to 26 cents, for example, net income of alternative II with 15 acres of cotton and alternative IIA with 25 acres of cotton would be equalized. Net incomes also would be equalized if the price of hogs increased \$1.80 per hundredweight, or from \$18.60 to \$20.40, while the price of cotton remained at 29 cents.

Other comparative net incomes from these two systems may be computed approximately by changing net incomes \$62 for every change of 1 cent per pound of lint cotton and \$103 for every change of \$1.00 per hundredweight of hogs.

Alternative III. Beef-Hog-Poultry-Cotton (with reduced labor supply)

Organization and practices

With about a one-third reduction in the total labor supply, farm organization would need to be shifted toward more extensive crop or livestock enterprises, or both.³¹ Cotton would be reduced to 6 acres; pasture would be increased to 88.5 acres. Approximately 33 acres in fields 3 through 7 would be strip cropped with 6 acres of cotton followed by oats; 6 acres each of first, second, third, and fourth year lespedeza; and 3 acres of fifth year lespedeza. All the land in fifth year lespedeza, plus 3 acres of fourth year lespedeza, would be seeded in vetch before the return to cotton. Other land in fields 3 through 7 would be included in the pasture. Livestock would consist of 43 beef cows, 5 brood sows, 66 hogs and a 400-hen flock.

Costs and returns

(1) Owner operated—it is assumed that a sharecropper would grow the 6 acres of cotton and that his income from a share of the cotton would be supplemented by wages paid for work performed for the operator (\$1,000) and family perquisites (\$115). Total cropper labor returns would amount to about \$1,540, or approximately \$490 more per man than would be obtained under the other alternative systems.

Family labor earnings for the operator would total \$2,580, or an average of \$1.04 per hour. In both total and average hourly earnings, this alternative does not differ significantly from the preceding alternatives, but it is almost double the present system. Although this alternative would require about 20 percent less work than the present system, the average capital investment needed would be about doubled (table 42). Approximately \$19,000 in new capital would be required (table 43).

(2) Tenant operated — it is assumed that the tenant family (about 2 man-equivalents) would carry on the farming operation and that the tenants' sharecropper shown under the alternative cotton-dairy-hog system would leave the farm. Income, expenses, and investments would be shared by landlord and tenant, as indicated for other tenant-operated systems (appendix table 6, page 91).

The tenant family that operated alternative system III under these conditions would produce \$496 more labor earnings than would be earned by operating the alternative cotton-dairy system I. Earnings would be about \$900 more than is earned with the present cotton system (table 44).

The landlord also would gain from this alternative beef-hog-

³¹ The labor force would consist of: Operator, 1 man-equivalent and share-cropper, 1.0 man-equivalent.

poultry-cotton system III compared with the present cotton system. After allowing 5 percent interest on a \$9,000 larger investment, he would have about \$750 more return above this interest allowance than is obtained from the present system. Compared with the alternative cotton-dairy-hog system, however, alternative III would return about \$770 less to the landlord after he allows 5 percent interest on the investment (table 44). Thus, it would be to the landlord's interest to keep the present labor force (3.5 man-equivalents), which would grow a relatively large acreage of cotton combined with livestock enterprises. It would also be to his interest to encourage the operator to adopt efficient production practices to go along with the more balanced crop and livestock organization.

SIZE OF FARMS, INCOMES, AND RELATED FACTORS

In previous sections present and alternative systems of farming on representative small, medium-sized, and large farms were analyzed. In this analysis, it was assumed that the levels of management, production practices, and rates of production in the alternative systems would be the same for all farms. Except for certain alternatives on the small farm for which the present labor supply is assumed, tractor power and milking machines on dairy systems would be used on all alternative farming systems. The present labor forces would remain on these farms for alternative systems I and II; but for alternative III in each size group, the labor force would be reduced approximately a third.

In this section the farms in each size group are compared as to net returns and related items. Net returns are measured in terms of labor income, or what the operator and his family have left of cash receipts after paying all cash expenses and charging off depreciation and 5 percent interest on average investment.

Effect of Size with Present Labor Force

Under the present systems the net returns (labor income) to all labor per man-equivalent on the representative farms increase slightly with increased size of farms (measured in acres of cleared land). This relationship also holds true for returns to operator and family labor, but the difference between the representative small and medium-sized farms is very slight (table 45). The operator of the medium-sized farm receives less labor income than the cropper (\$827 compared with \$900). However, the operator also receives interest on his equity in the capital investment and possibly a larger value of food and housing used by the operator's family. The small differences between farm size groups in labor returns result partly from similarities in number of acres in cotton and in total acreage in crops and pasture per man-equivalent in the labor force. The acreage of cotton ranges from 8.8 acres per man on the medium-sized farm to 9.6 acres on the small farm, and the acreage of crops and pasture acreage ranges from an average of 28 acres on the small farm to 32 acres on the large farm.

TABLE 15.—*Relation of Size of Farm to Labor Income and Related Items, Present and Alternative Systems of Farming on Owner Operated Upland Farms with Present Labor Force, Haywood County, Tennessee (1949 Price Level)*

Size and system of farming	Labor available		10-hour days worked per man-equivalent		Average investment	Land used per man-equivalent		Labor income per man-equivalent ¹		Labor income per hour	
	Operator-family	All labor ²	Operator-family	All labor	Per man-equivalent (all labor)	Crops and pasture	Cotton	Operator-family	All labor ³	Operator-family	All labor
	Man-equivalents	Number	Number	Number	Dollar	Acres	Acres	Dollar	Dollar	Dollar	Dollar
Present:											
Cotton:											
Small farm	1.3	1.3	190	190	4,460	28	9.6	582	582	0.31	0.31
Medium farm	1.4	2.2	152	172	4,370	31	8.8	591	785	.39	.46
Large farm	1.0	3.5	207	170	4,910	32	9.1	771	771	.37	0.45
Alternatives:											
Cotton-dairy-hogs, (Alternative I):											
Small farm	1.3	1.3	252	252	6,565	38	7.3	1,490	1,490	.59	.59
Medium farm	1.4	2.2	225	217	7,405	35	6.8	1,419	1,480	.63	.68
Large farm	1.0	3.5	240	225	8,930	42	4.3 ⁴	2,193	1,448	.91	.65
Cotton-beef-hogs and/or poultry, (Alternative II):											
Small farm	1.3	1.3	250	250	7,150	38	7.3	1,625	1,625	.65	.65
Medium farm	1.4	2.2	194	197	8,070	35	6.8	1,550	1,565	.80	.79
Large farm	1.0	3.5	258	182	9,325	42	4.3 ⁴	2,109	1,424	.82	.78

¹ Labor income in contrast to labor earnings used in preceding tables excludes value of family living from the farm.

² All labor refers to combined labor forces of operators, croppers and their families.

³ Average cash returns per man-equivalent of combined operator and cropper labor.

⁴ With about 3 months additional labor, the acreage of cotton per man would be increased to 7.1 acres.

As to alternative systems I and II, labor incomes for both the farm operators and for the total labor force would be significantly higher than is obtained from the present system. On the basis of labor income per man-equivalent, operators on the representative large farm would receive the highest returns from both alternatives I and II. But when the returns to all labor are considered, the large farms rank lowest of the three size groups, particularly for alternative II, the cotton-beef-hog-poultry system. This stems chiefly from the assumed reduction in the acreage of cotton per man on the large farm from 9.1 acres in the present system to 4.3 acres in the alternative systems. With croppers growing all the cotton, the operator shares in the cotton crop. He also gets the net returns from the livestock enterprises that would be developed in the alternative systems.

With the present labor force continued for the alternative systems, labor would not be fully utilized, especially on the representative large farm where beef, hogs, and poultry are combined with a relatively small acreage of cotton (alternative I). The number of days' work required per man would increase above the present system for the operator, but the labor requirement per man for the total labor force would not increase for this alternative system. The croppers would be underemployed, even though they helped with the general farm work as well as grew all the cotton. Labor use also would be relatively low on the medium-sized farm for both alternatives I and II. The reduction in acreage of cotton would not be as large as on the large farm, but the crop and pasture acreage per man would be almost 20 percent lower on the medium-sized farm. The number of days work per man on the representative small farm would be kept relatively high, partly by the use of workstock for power and partly by the relatively large acreage of cotton per man.

Average investment per man-equivalent in alternatives I and II would increase as the size of the representative farms increased. Investment on the small farm would be kept low relative to the larger farms, partly because workstock would be retained for power whereas the larger farms would shift to tractor power. Furthermore, the increased emphasis on livestock as size of farms increased would add to the investment in livestock and livestock housing and equipment.

So far as investment in machinery is concerned the medium-sized farm would be at a disadvantage relative to the large farm by having a higher investment per man. Both farms would have about the same total investment in machinery. Consequently, the overhead costs of machinery on the medium-sized farm would be relatively high per hour of use.

Effects of Size with Reduced Labor Force³²

With the downward trend in farm population and farm labor supply in recent decades, further declines may occur. To indicate the probable effects of such declines on farm organization and on costs and returns on farms of varying sizes, it is assumed that the labor supply on each of the representative farms would be reduced thus. On small farms it would drop from 1.3 man-equivalents to 0.85; on medium-sized farms from 2.2 man-equivalents to 1.4; and on large farms from 3.5 to 2.0 man-equivalents. On the small farm, the family labor force would be reduced—possibly through part-time, nonfarm employment. Only the large farm would have cropper labor.

With these reductions in the labor supply, cotton would occupy a less important place on each of the representative farms than in the alternative systems with the present labor forces. The representative large farm would have the smallest acreage of cotton relative to the amount of labor, or an average of 3 acres per man, which compares with slightly less than 6 acres per man on the small and medium-sized farms (table 46).

Land diverted from cotton would be used to grow corn, hay, and pasture for livestock, as would all other cropland. The large farm would have 73 acres per man available for crops and pasture compared with about 56 acres per man on the small and medium-sized farms.

With this relatively high land-man ratio on the large farm, the livestock organization would consist of a comparatively large beef cattle enterprise (22 cows per man) together with hogs and poultry. This system would require an average investment of about \$16,500, the largest of any of the alternative farming systems in this study. Despite the drastic reduction in acreage of cotton, the labor income to the operator and family would amount to approximately \$2,100 per man, about a fourth more than would be earned per man on either the small or medium-sized farm. The average returns per hour of operator and family labor (85 cents) on the large farm is 5 to 10 percent larger than either of the other two sizes of farms.

The small and medium-sized farms are very similar in both the farm organization, average investment, labor requirements and in net returns per man and per \$100 invested.

When all labor, including cropper labor, is considered, the average returns per man on the large farm are reduced to \$1,825 per man. But this average is roughly \$100 larger than returns per man to the operator and family labor on the small and medium-sized farms.

These estimates indicate that at 1949 prices net returns from alternative systems with reduced labor supplies and greatly reduced acreages of cotton could be increased, not only above present net income but above net returns from the alternative systems with present labor forces and relatively large number of acres

³² Upland farms are used in this analysis.

TABLE 46.—*Summary Comparison of Alternative Systems of Farming on Representative Owner Operated Upland Farms with Reduced Labor Forces, Haywood County Tennessee¹ (1949 Price Level)*

Item	Unit	Alternatives by size of farm		
		Small	Medium	Large
		III Beef- hogs- cotton	III Beef- hogs- cotton	III Beef-hogs- poultry- cotton
Labor, man equivalents	No.	0.85	1.4	2.0
Crop and pasture land per man	acres	57.6	55.6	73.4
Enterprises per man:				
Cotton	acres	5.9	5.7	3.0
Dairy cows	No.	—	—	—
Beef cows	No.	14	12	22
Hogs	No.	49	39	33
Hens	No.	35	28	200
Investment per man	Dol.	12,365	12,210	16,530
Days worked per man: operator and family	No.	227	215	249
Labor income of operator and family	Dol.	1,735	1,712	2,108
Returns per hour of operator & family labor	Dol.	0.76	0.80	0.85

¹ The labor force would be reduced about one-third from the present supply.

of cotton. They also indicate that when all labor is considered, the average net returns per man do not vary greatly between farm size groups. But, when only the labor of the operator and his family is considered, the net returns per man are highest on the representative large farm.

OBSTACLES OF MAKING DESIRABLE ADJUSTMENTS

Four important obstacles to making desirable adjustments are: (1) the lack of capital, (2) the lack of experience and managerial ability of farm operators, (3) greater risks, and (4) the lack of satisfactory rental arrangements.

Capital

As labor incomes under the present systems are less than \$1,000 per man-equivalent, and since the new systems require up to about \$9,600 in new capital per man-equivalent, it would be difficult to pay for adjustments out of current capital savings.³³ To pay for these adjustments from increased labor income that would be obtained from the alternative systems of farming would take from 2 to 16 years. Consequently, most of this new capital must come

³³ The amount of new capital required per man-equivalent ranges from \$2,000 for alternative I on the representative upland farm to \$9,640 for alternative III on the representative large upland farm.

from some kind of credit. These capital needs, it should be recalled, do not include funds for buying more land, as the sizes (in acres) of the representative farms in this study would not change in the alternative systems.

The total capital required to establish improved systems may be minimized in the early stages of the adjustment period. Probably the greatest immediate returns would come from increasing yields, especially of corn. By marketing corn through hogs or poultry, an additional income can be added in about 2 years. Then production of hay and pasture can be increased gradually and dairy and beef cattle can be added. This process of "growing" into the new system would enable operators to pay part of the expenses from current earnings. They can also gain valuable experience with the new enterprise as they are added.

If the present land, labor, and other resources remain at their present levels of productivity, the new capital should yield a return of between 15 and 35 percent. As the labor in the area gains managerial ability, however, because of new and more varied experiences, the costs of labor would tend to rise. As the cost of labor increases some of the expected 15 to 35 percent returns initially going into capital would be needed to pay the additional labor cost.

Managerial Ability

The introduction of new enterprises into the farming systems proposed in this study requires many new managerial and labor skills. These abilities may be developed by formal education or by experience in handling these enterprises. Until the farmers in this area have had opportunity to control the new systems of farming, it is difficult to evaluate the limitation of this factor. It will be more difficult for the first operators to achieve success in the new systems than for those who make adjustments later. It will be more difficult to change systems of farming than to maintain the new systems after they are established.

Risks

The proposed systems contain risks that are not present in the existing system of farming. For example, production of forage and corn, especially new seeding of permanent pastures, are more adversely affected by dry weather than is production of cotton. Recent droughts provide abundant evidence of this relationship of weather to production of these crops.

Furthermore, the chances of loss from mismanagement probably would be greater in producing livestock than in producing cotton. Losses from inadequate control of diseases and parasites, for example, could be serious. They might be particularly so in the initial stages of establishing the livestock enterprises, when the operators have not yet learned how to handle livestock properly.

Losses that result from this lack of "know-how" could be

minimized by (1) developing the livestock enterprise gradually while acquiring the new skills by experience, and (2) intensive efforts by local agricultural workers to acquaint farmers with improved livestock production practices.

Rental Arrangements

If the alternative systems of farming are to be successful on tenant farms, the rental arrangements must be adjusted so that all concerned benefit from the adjustments. A more stable tenant-landlord relationship will be needed, as benefits from many improved practices will not be realized during the crop-year they are applied. The more complex systems of farming will require more complex agreements to assure that each party benefits from his contribution to the business.

APPENDIX I

SAMPLING PROCEDURE

To obtain a representative sample of farms in Haywood County, a stratified random sample was obtained as follows:

A map of the agricultural land of the county was stratified into four geographic areas, each of which was further stratified into 2-mile square blocks. From each geographic area, sample blocks were selected at random. The number of blocks drawn from a given area was proportionate approximately to the size of the area. A total of eight blocks were selected.

The 2-mile square block was decided upon as the geographic sampling unit over the 1-mile square block because the relatively large number of farms within the larger block would provide a better basis for an analysis of the possibilities of combining farm units.

So far as possible, a survey record was obtained from all farm operators whose headquarters were located within the boundaries of the sample blocks.

APPENDIX II

DEFINITIONS OF CAPABILITY CLASSES³⁶

Definitions of capability classes as used in this report are shown below. Capability of the land, determined by such physical factors as character of the soil, steepness of slope, and degree of erosion, is the basis for all recommendations for its use and treatment. Each farm is mapped before planning and the land is placed into capability classes. Six classes and four subclasses are used in this district.

³⁶ Adapted from Guide to Land Use and Treatment for Soil and Water Conservation, Soil Conservation District, Tennessee, 1947-48.

CLASS I: Land that is suitable for intensive use for row crops without danger of deterioration, provided ordinary good farming methods are used. It is nearly level, easily worked, and has suffered little or no erosion.

CLASS II: Land that can be cultivated safely provided such practices as short rotations, cover crops, fertilization, contour cultivation and, in some cases, terracing are used. This land usually slopes gently and moderate erosion is common.

SUB-CLASS II-A: Land that is imperfectly drained but that is suited to intensive use for row crops with ordinary good farming methods after establishment of a drainage system to remove excess surface water.

CLASS III: Land that can be cultivated safely only if such practices as terracing, contour cultivation, strip cropping, moderately long rotations, cover crops, and fertilization are used. This is moderately sloping land and moderate to severe erosion is common.

SUB-CLASS III-A: Land that is poorly drained and moderately limited as to crop adaptation. It can be used intensively for adapted crops with ordinary good farming methods, when a drainage system to remove excess surface water has been established.

CLASS IV: Land that is best suited for permanent vegetation for hay and pasture, but which can be cultivated occasionally, usually not more often than 1 year in 6. This land is usually moderately steep and severe erosion is common.

SUB-CLASS IV-A: Land that is very poorly drained and is severely limited as to crop adaptation. It can be used for adapted crops, preferably hay and pasture crops, when a drainage system to remove excess surface water has been established.

SUB-CLASS V-A: Swamp land on which drainage appears to be impracticable at present. In some instances the land has an overwash of sand.

CLASS VI: Land that is best suited for permanent vegetation, preferably for hay and pasture. May be used for trees. Usually steep or severely eroded or both. Requires careful management to stabilize erosion.

CLASS VII: Land best suited for timber or wildlife with selected areas suited to grazing. Usually very steep or very severely eroded or both.

APPENDIX IIA

DEFINITIONS OF FARM MANAGEMENT TERMS

1. **A farm** is a unit of land on which the operator does the planning, furnishes the supervision, owns the power and equipment, and provides the labor force which may consist of either, or a combination of, wage hands, sharecroppers, the operator, and unpaid labor of the operator's family.

2. **Farm organization** relates to the selection of land, labor, and equipment for a farm, the choice of crops to be grown, the selection of livestock to be kept, and the proportions in which all of these elements of the farm business should be combined.
3. **Farming system** is the detailed organization, method of operation, and practices used on a particular farm.
4. **A farm enterprise** is an income-producing branch of the farm business such as a crop or a class of livestock.
5. **Farm operator** is one who organizes and directs the operation of a farm. He may own all the land operated, rent all, or own part and rent part.
6. **Cropper or sharecropper** is a tenant who furnishes manual labor and may pay part of the direct costs in crop production; but he furnishes no power or equipment. He receives as his pay a share of the crop.
7. **Labor used** is the total time spent on field crops, pastures, and livestock.
8. **Family labor** refers to that part of labor that is furnished by the operator and his family.
9. **Man-equivalent** is the total labor used in the farm business expressed as numbers of able-bodied men working full time. The time of women and children is reduced to its equivalent in man time. One man-equivalent is one man working 12 months.
10. **Capital investment** is the average value of real estate (including dwelling) comprising the farm, livestock, equipment, feed, and other supplies.
11. **Farm budget** is a plan for a system of farming on a farm for a given period. It includes the major uses of the land, crops to be grown, livestock to be kept, estimated production, capital investments, receipts, expenses, and net income.
12. **Family living from the farm** equals the value of products grown on the farm and used by the operator's household. (Rental value of the dwelling is excluded).
13. **Total income** is the sum of the cash receipts and value of family living from the farm.
14. **Total expenses** is the sum of cash expenses for items used in production and depreciation on such items as buildings, fences, livestock, and machinery.
15. **Family farm earnings** is the total income less total expenses. This is the return to operator and family labor, management, and capital.
16. **Family labor earnings** equals the family farm earnings less 5 percent interest on the average capital investment. This is the return to labor and management.
17. **Family labor income** is the family labor earnings less the family living from the farm.

APPENDIX III

CHARACTERISTICS OF SELECTED SOIL GROUPS³⁷

GROUP 30 — SOILS

WELL DRAINED SILT LOAM AND FINE SAND LOAM UPLANDS AND TERRACES

REPRESENTATIVE SERIES: Memphis, Loring, Lintonia, Dexter

This group of deep, well drained, reddish-brown, loessial upland and terrace soils permit free moisture movement and root penetration for deep rooted crops and is moderately well supplied with phosphate and potash. These soils respond readily to good farm practices. However, they are subject to severe sheet and gully erosion and extreme care should be exercised in their use and treatment.

Crops that require a constant supply of moisture throughout the growing season do well on these soils. Under favorable conditions of slope and erosion these soils are well adapted to such crops as alfalfa, red clover, kudzu, cotton, small grains and truck crops. These are also excellent soils for most pasture grasses and legumes.

GROUP 40 — SOILS

SOILS WITH IMPERFECT INTERNAL DRAINAGE DUE TO PAN DEVELOPMENT IN THE SUBSOIL

REPRESENTATIVE SERIES: Grenada, Richland, Freeland,
Providence

These are moderately deep loessial upland and terrace soils usually found on gently rolling topography. They are usually yellowish-grey or brownish-grey at the surface, becoming yellowish in the upper subsoil. Surface drainage is adequate. However, internal or subsoil drainage is restricted by a gray, compact layer or "pan" found at depths of from 24 to 30 inches. This condition limits the amount of moisture available to crops in dry summer months and yet causes an excess of water in the surface soil in winter and until late spring. These soils have only moderate natural fertility. Severe sheet and gully erosion may be expected unless care is taken in the use and management of these soils.

Such crops as cotton, annual lespedeza, sericea lespedeza, and winter-growing small grains and legumes are adapted to these soils. Alfalfa and kudzu are not generally recommended. Most pasture grasses and legumes do fairly well on these soils if properly limed and fertilized.

³⁷ Adapted from Guide to Land use and Treatment for Soil and Water Conservation, Soil Conservation District, Tennessee, 1947-48.

GROUP 42 — SOILS**MODERATELY DRAINED FIRST BOTTOM SOILS****REPRESENTATIVE SERIES:** Collins, Hymon

These are deep, moderately well drained bottom land soils from loessial and mixed materials. They are found along both large and small stream valleys and are often called "made land." They have light-brown or yellowish-brown surface layers and are mottled yellow and gray subsoils. Surface drainage is fair. Flood waters do not stand for long periods. The subsoil is imperfectly drained, and such devices as levees, open ditches, and diversion ditches are usually necessary for best results. They are easily tilled and respond rapidly to good soil management practices.

These soils are well adapted to the growth of such crops as corn, soybeans, cotton, lespedeza, and truck crops except when severe overflow is a hazard. Pasture grasses and legumes also do well on these soils.

GROUP 43 — SOILS**POORLY DRAINED FIRST BOTTOM SOILS****REPRESENTATIVE SERIES:** Falaya, Ina

This a group of moderately wet or poorly drained bottom land soils formed from loessial and mixed loessial, and coastal plains materials. They are found extensively along the stream bottoms throughout the loessial belt. The surface layers are light brownish-gray in color. The subsoils are usually gray mottled. The water table is usually variable but high in wet seasons. These soils are often subject to flooding and in rainy seasons water is inclined to "pond" in low places. In this condition their usefulness is limited largely to pasture grasses and legumes and to summer crops that can grow and mature after the soils dry out in the spring. They are moderately low in natural fertility.

Proper drainage will reduce the water hazard for many commonly grown crops, such as corn, soybeans, and lespedeza. Cotton is inclined to mature late on these soils. Where water is a severe hazard, pasture is the best use for these soils.

APPENDIX IV STATISTICAL TABLES

*Appendix Table 1. Relationship of Age of Males in the
Labor Force to the Man-equivalent Rating, 141 Farms,
Haywood County, Tennessee, 1917*

Average number of		Average number of	
Age of males in years	man-equivalents per male	Age of males in years	man-equivalents per male
11-15	.60	56-60	.82
16-20	.87	61-65	.77
21-45	1.00	66-70	.85 ¹
46-50	.96	71-75	.25
51-55	.95	76-80	.45 ¹

¹ These deviations from the downward trend which is associated with increasing age results from the small number of persons in the sample.

Appendix Table 2.—Average Prices Received for Farm Products Sold, Tennessee, 1949

Item	Unit	Pr. per Unit Dollars	Item	Unit	Pr. per Unit Dollars
Cotton lint	lb.	0.29	Veal calves	Cwt.	23.60
Cottonseed	Ton	68.50 ¹	Baby beeves	Cwt.	20.42 ²
Corn	Bu.	1.70 ¹	Beef cows	Cwt.	14.00 ²
Oats	Bu.	.79	Milk cows	Head	185.00
Lespedeza hay, loose	Ton	18.70	Hogs	Cwt.	18.60
Soybeans for beans	Bu.	2.04	Chickens, exc. broilers	Lb.	.24
Lespedeza seed	Cwt.	9.60	Eggs	Doz.	.42
White clover seed	Lb.	.75	Horses	Head	47.00
Crimson clover seed	Cwt.	16.80	Mules	Head	67.00
Condensery milk	Cwt.	3.70			

¹ Adjusted to trend of 1934-49 data. ² Estimated by applying the price ratio of these classes to medium steers on the Nashville market in 1949.

Appendix Table 3.—Estimated Prices Paid by Farmers for Items Used in Production, Haywood County, Tennessee, 1949

Item	Unit	Pr. per Unit Dollars	Item	Unit	Pr. per Unit Dollars
Conservation Drainage ditch (drag line)	Cu. yd.	0.16	Oats	Bu.	1.55
Ponds	Cu. Yd.	.25	Feed		
Fertilizer and lime			Cottonseed meal	Ton	86.00
Lime	Ton	4.00	Starter mash	Cwt.	4.90
2-12-6	Ton	38.00	Growing mash	Cwt.	5.10
6-8-8	Ton	46.00	Laying mash	Cwt.	4.75
6-8-6	Ton	45.00	Scratch feed	Cwt.	3.90
6-8-4	Ton	44.00	Supplement 33%	Cwt.	6.00
6-12-12	Ton	52.10	Oyster shells	Cwt.	.80
0-0-50	Ton	58.80	Tankage	Cwt.	6.86
0-12-12	Ton	38.00	Calf meal	Cwt.	5.25
32-0-0	Ton	69.44	Miscellaneous		
0-48-0	Ton	60.00	Motor oil	Gal.	1.21
16-0-0	Ton	66.00	Gasoline	Gal.	.23
0-20-0	Ton	29.37	Low grade tractor fuel	Gal.	.13
4-12-4	Ton	42.80	Grease	Lb.	.23
3-9-6	Ton	40.00	Barbed wire	80 rds.	8.00
Seed			Woven wire 72"	rod	1.37
Cotton seed	Cwt.	13.00	Woven wire 32"	rod	.78
Hybrid corn	Bu.	9.93	Post, wooden 4"	Each	.56
Korean lespedeza	Lb.	.10	Electric fence	Each	25.50
Kobe lespedeza	Lb.	.13	Sexed pullets	Each	.21
Sericea lespedeza	Lb.	.16	Ginning cotton	Bale	8.50
Orchard grass	Lb.	.36	Cotton picking	Cwt.	2.75
Ladino clover	Lb.	2.10	Wages, no board or rm.	Hour	.44
Fescue	Lb.	.65	Wages, room and/or board	Hour	.37
Hairv vetch	Lb.	.23			
Button clover	Lb.	.24			
Ogden soybeans	Bu.	2.04			

*Appendix Table A.—Prices Paid by Farmers for Farm Equipment,
Haywood County, Tennessee, 1919*

Tractor equipment		Workstock equipment	
Kind	Value	Kind	Value
	Dollars		Dollars
(1) 1-row tractor equipment:		Stalk cutter, 1-row	96
Tractor	1,045	Turning plow,	
Breaking plow, 1 bottom	156	moldboard, 2-H	23
" " 2 disk	215	Disk harrow	96
Disk harrow, 5 ft.	144	Section harrow, 2 sections	45
Harrow, 60 tooth	58	Cultipacker, 10 ft.,	
Cultivator, 1-row	99	single	90
Planter-distributor,		Cultipacker, double	169
1-row	89	Planter, 1-row	51
Mower, 4½ ft.	124	Fertilizer distributor,	
" 6 ft.	196	2-H	180
Side delivery rake	210	Cultivator, 2-Horse,	
Grain drill, 7 ft.	321	1-row	96
Lime spreader, 10 ft.	163	Cultivator, 1-Horse	7
End gate spreader	63	Mower, 4½ ft.	163
		Rake, dump	96
(2) 2-row tractor equipment:		Side delivery rake, 10 ft.	196
Tractor	1,680	Grain drill, with	
Breaking plow, 2 bottom	215	fertilizer attachment	309
" " 2 disk	240	Lime spreader, 10 ft.	163
Disk harrow, 6 ft. tandem	219	End gate spreader	56
Section harrow, 30 tooth	68	Wagon, 2-Horse	152
Planter-fertilizer			
distributor	205		
Cultivator	235		
Lister or bedder	134		
Mower, 6-7 ft.	263		
Side delivery rake	260		
Middlebuster	231		
Grain drill, 8 ft.	316		
Trailer, 4 wheel, rubber	238		
Stalk cutter	114		
(3) Other Equipment:			
Manure spreader with			
lime attachment	379		
Two single-unit milking			
machines	404		

Appendix Table 5. A comparison of the Acreages of Cotton per Farm used in Budgeting Present and Alternative Systems of Farming on Representative Farms with Theoretical Acreages Based on 1955 Acreage Allotments, Haywood County, Tennessee

Farm group	Present Actual	Present Adjusted to 1955 Allotments ¹	Alternative systems	
			Present labor supply	Reduced labor supply
	Acre	Acre	Acre	Acre
Upland farms				
Small	12.5	10.5	9.5	5.0
Medium-size	19.3	16.1	15.0	8.0
Large	35.0	29.3	15.0 ²	6.0
Bottom land farms				
Small	12.0	10.0	10.0	5.0
Medium-size	19.4	16.2	13.0	5.0

¹ The ratio of the State's 1955 acreage allotment to the State's 1947 actual acres in cultivation July 1 (83.7 percent) multiplied by the present (actual) acreage on representative farms.

² Also 25 acres, assuming seasonal wage labor for picking and chopping is available.

Appendix Table 6. Landlord-Tenant Share in Income, Costs and Investments, Present and Alternative systems of Farming, Haywood County, Tennessee

Item	Alternative system		Present system	
	Tenant	Landlord	Tenant	Landlord
Income				
Cotton	2/3	1/3	2/3	1/3
Corn	¹	¹	2/3 ²	1/3
Hay	¹	¹	all	—
Livestock	1/2	1/2	—	—
Livestock products	1/2	1/2	—	—
Increase in livestock inventory	1/2	1/2	—	—
Costs				
Direct cash expenses ³				
Cotton	2/3	1/3	2/3	1/3
Corn	—	all	2/3	1/3
Hay	—	all	all	—
Pasture	—	all	—	—
Productive livestock ⁴	1/2	1/2	—	—
Decrease in livestock inventory	1/2	1/2	—	—
Labor	all	—	all	—
Power and general farm equip.	all	—	all	—
Land, buildings, fences	—	all	—	all
Investments				
Real estate	—	all	—	all
Livestock	1/2	1/2	—	—
Power and machinery	all	—	all	—

¹ Fed to livestock.

² Some tenants get all of the feed crops produced.

³ Fertilizer, lime seed bought, ginning cotton, spray materials.

⁴ Feed, feed grinding, hauling, veterinary and medicine, specialized livestock equipment, electricity.

Appendix Table 7. Effect of Change in Relationship of Prices Received by Farmers for Specific Farm Products on Family Labor Earnings, Representative Medium-sized Upland Farm, Haywood County, Tennessee

Product	Unit	Reduction from 1949 price	Number units sold and change in values							
			Present system	Alternative systems						
				I		II		III		
		Dollars	Units	Dollars	Units	Dollars	Units	Dollars	Units	Dollars
Corn	Bu.	0.20	—	—	50	10	—	—	—	—
Cotton (lint, seed)	Bale	37.00	14.5	536	18	666	18	666	9.25	342
Beef, 450-lb. calf	Hd.	13.15	2	26	—	—	13	171	13	171
Hogs, 220 lbs.	Hd.	5.28	—	—	11	58	8	42	65	343
Pigs	Hd.	1.50	2	3	—	—	3	5	2	3
Milk, Grade B	Cwt.	0.40	14	6	825	330	—	—	—	—
Veal	Hd.	2.00	1	2	13	26	—	—	1	2
Cow	Hd.	20.00	—	—	3	60	2	40	2	40
Eggs	Doz.	0.06	135	8	280	17	5,430	326	280	17
Hens, 6 lbs.	Hd.	0.24	—	—	34	8	330	79	34	8
Total all products		xx	xx	581	xx	1,175	xx	1,329	xx	926
Total livestock		xx	xx	45	xx	499	xx	663	xx	584
Corn	Bu.	0.45	—	—	50	23	—	—	—	—
Cotton	Bale	60.00	14.5	870	18	1,080	18	1,080	9.25	570
Beef, 450-lb. calf	Hd.	26.20	2	52	—	—	13	340	13	340
Hogs, 220 lbs.	Hd.	10.56	—	—	11	116	8	85	65	686
Pigs	Hd.	4.00	2	8	—	—	3	12	2	8
Milk, Grade B	Cwt.	0.80	14	11	825	660	—	—	—	—
Veal	Hd.	4.00	1	4	13	52	—	—	1	4
Cow	Hd.	35.00	—	—	3	105	2	70	2	70
Eggs	Doz.	0.12	135	16	280	34	5,430	652	280	34
Hens, 6 lbs.	Hd.	.36	—	—	34	12	330	112	34	12
Total all products		xx	xx	961	xx	2,082	xx	2,351	xx	1,724
Total livestock		xx	xx	91	xx	979	xx	1,271	xx	1,154

Appendix Table 8. Estimated Labor Requirements Per Acre of Crops and Per Head of Livestock on Farms Using Workstock for Power, Improved Systems of Farming, Southern Brown Loam Area, Tennessee

Enterprise	Total Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Man-hours per acre													
Corn (45 bu.)	37.4	0.1	0.3	1.8	4.3	6.6	7.1	3.1	—	—	5.2	5.2	3.7
Corn (75 bu.)	44.9	0.1	0.3	1.8	4.3	6.6	7.1	3.1	—	—	8.0	8.0	5.6
Cotton (500 lbs. lint)	139.7	0.6	0.4	2.0	5.7	19.0	24.3	9.5	.4	26.3	36.8	14.7	—
Cotton (625 lbs. lint)	158.4	0.6	0.4	2.0	5.7	19.0	24.3	9.5	.4	32.6	45.6	18.3	—
Lespedeza (1.8 T)	14.5	—	—	1.3	.9	—	—	—	6.2	6.1	—	—	—
Lespedeza (1.0 T)	13.6	—	—	2.0	1.3	—	—	—	5.2	5.1	—	—	—
Small grain (40 bu.) ¹	5.3	—	—	—	—	—	2.0	—	—	1.6	1.7	—	—
Soybeans (25 bu.)	15.8	—	—	—	7.0	7.0	1.8	—	—	—	—	—	—
Est. and main. pasture	6.4	—	—	1.0	—	—	1.7	—	1.7	.5	.5	.5	.5
Cover crops	5.0	—	—	—	—	—	—	—	—	2.0	3.0	—	—
Sericea Lespedeza	23.0	—	—	1.0	1.4	—	10.3	—	—	10.3	—	—	—
Man-hours per head													
Dairy cows (hand milked)	145.0	12.6	12.0	11.9	12.2	12.6	12.2	12.6	12.3	11.7	11.8	11.4	11.7
Dairy cows (mch. milked)	100.0	8.8	8.2	8.6	8.6	8.1	7.7	8.0	8.0	7.8	8.6	8.8	8.8
Bulls	50.0	5.0	5.0	5.0	4.0	4.0	4.0	3.0	3.0	3.0	4.0	5.0	5.0
Other "cattle"	20.0	4.0	4.0	3.0	1.0	.5	.5	.5	.5	.5	.5	2.0	3.0
Hogs (inc. breeding stock)	10.0	.8	.8	1.3	.4	.4	.4	.4	.4	1.3	1.0	1.4	1.4
Hens	2.0	.2	.2	.1	.1	.1	.1	.1	.1	.2	.3	.3	.2
Chickens	1.0	—	.2	.2	.1	.1	.1	.1	.1	.1	—	—	—

¹ Custom harvesting of soybeans and oats; oat straw saved by the operator.

Appendix Table 9. Estimated Labor Requirements Per Acre of Crops on Farms Operated with Tractors and Tractor Equipment, Improved Systems of Farming, Southern Brown Loam Area, Tennessee¹

Crop	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Man-hours per acre													
Corn (45 bu.)	24.7	0.1	0.2	0.7	3.0	3.3	3.3	1.0	—	—	4.8	4.8	3.5
Corn (75 bu.)	32.0	.1	.2	.7	3.0	3.3	3.3	1.0	—	—	7.5	7.5	5.4
Cotton (500 lbs. lint)	116.2	.4	.3	1.3	3.6	12.0	15.4	6.0	0.4	25.9	36.4	14.5	—
Cotton (625 lbs. lint)	134.3	.4	.3	1.3	3.6	12.0	15.0	6.0	.4	32.1	45.1	18.1	—
Lespedeza (1.8 T)	10.3	—	—	.7	.5	—	.7	—	4.2	4.2	—	—	—
Lespedeza (1.0 T)	7.7	—	—	1.0	.7	—	—	—	3.0	3.0	—	—	—
Small grain (40 bu.) ²	6.1	—	—	—	—	—	3.7	—	—	—	2.4	—	—
Soybeans (25 bu.) ²	6.6	—	—	—	—	—	4.0	1.2	—	—	1.4	—	—
Establish and maintain pasture	2.6	—	.2	.3	—	—	.7	—	.8	.2	.4	—	—
Cover crops	2.4	—	—	—	—	—	—	—	—	—	2.4	—	—
Lespedeza Sericea (2 T)	12.7	—	—	.4	.3	—	6.0	—	—	6.0	—	—	—

¹ Labor requirements on livestock are the same as shown in Appendix Table 8.

² Custom harvesting of the soybeans and oats, oat straw saved by operator.