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CROP AND LIVESTOCK OPPORTUNITIES

On

Eastern Oklahoma Prairie Land Farms

By

W. F. LAGRONE

Agricultural Experiment Station
DIVISION OF AGRICULTURE
Oklahoma A. & M. College, Stillwater

and

Production Economics Research Branch
AGRICULTURAL RESEARCH SERVICE
United States Department of Agriculture

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Cooperating farmers contributed of their time, knowledge, and farm business records. Without their help and interest the study would have little practical basis or purpose.

The economic evaluations and interpretations remain the responsibility of the author.

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Crop and Livestock Opportunities On Eastern Oklahoma Prairie Land Farms

Prepared for Publication by

W. F. LAGRONE

Agricultural Research Service, United States Department of Agriculture, stationed at Stillwater, Okla., with the Department of Agricultural Economics, Oklahoma A. & M. College.

INTRODUCTION

Important agricultural changes are occurring in eastern Oklahoma. Cotton is declining in importance as a major source of cash farm income. Farmers are looking for more profitable methods of cotton production, and for alternative enterprises to supplement or replace it. Typical questions are:

"Shall I put most emphasis on crops, or on livestock?"

"If I grow mainly crops, what crops and methods of growing them will give me the most income?"

"If I emphasize livestock on my farm, should it be dairy cattle or beef cattle?"

Sound answers to these and similar questions call for much detailed information. This bulletin reports results of farm management research aimed at getting some of the needed information.

The figures presented here were gathered on prairie-land farms in seven counties of east central Oklahoma. Therefore they apply most directly to farms on such land in those counties. Much of the information, however, is equally applicable elsewhere in eastern Oklahoma, as shown by Figure 1.

How the Information Was Obtained*

The information presented in this bulletin was obtained from many sources. Personal visits were made to more than one hundred farms in the area. Considerable time was spent with the operator of each of these farms, to get complete and detailed information on how each farmer grew his crops and handled his livestock, on his crop and livestock yields, and on other subjects concerning his farm operations.

The farms to be visited were carefully selected to be representative of different types of farms in the area. The first step was to secure Census data on a sizeable sample of all farms in the seven counties. This provided a general description of farming in the area, as summarized on Pages 9 to 16. It was also used to classify farms by size and type: cotton, cotton-cattle, cotton-grain, cattle, and dairy. Finally, it was used to select the individual farms to be visited. These were chosen not only to represent different sizes and types, but also apparent future possibilities.

Before any farms were visited, a detailed soils map of each sample farm was studied and interpreted by a soils scientist. His report provided a basis for selecting farms having comparable soil resources, and also a starting point for more detailed study of the physical resources of each farm at the time it was visited.

Some of the cooperating farm operators kept records in Oklahoma Farm Account Books provided by the Oklahoma A. & M. College, and these gave a continuing record of farm performance during the period of study.

After information about existing methods of farm operation had been collected, an effort was made to determine the prob-

* Details of the methods used in assembling and analyzing the information presented herein are described in more detail in the Appendix, page 49.

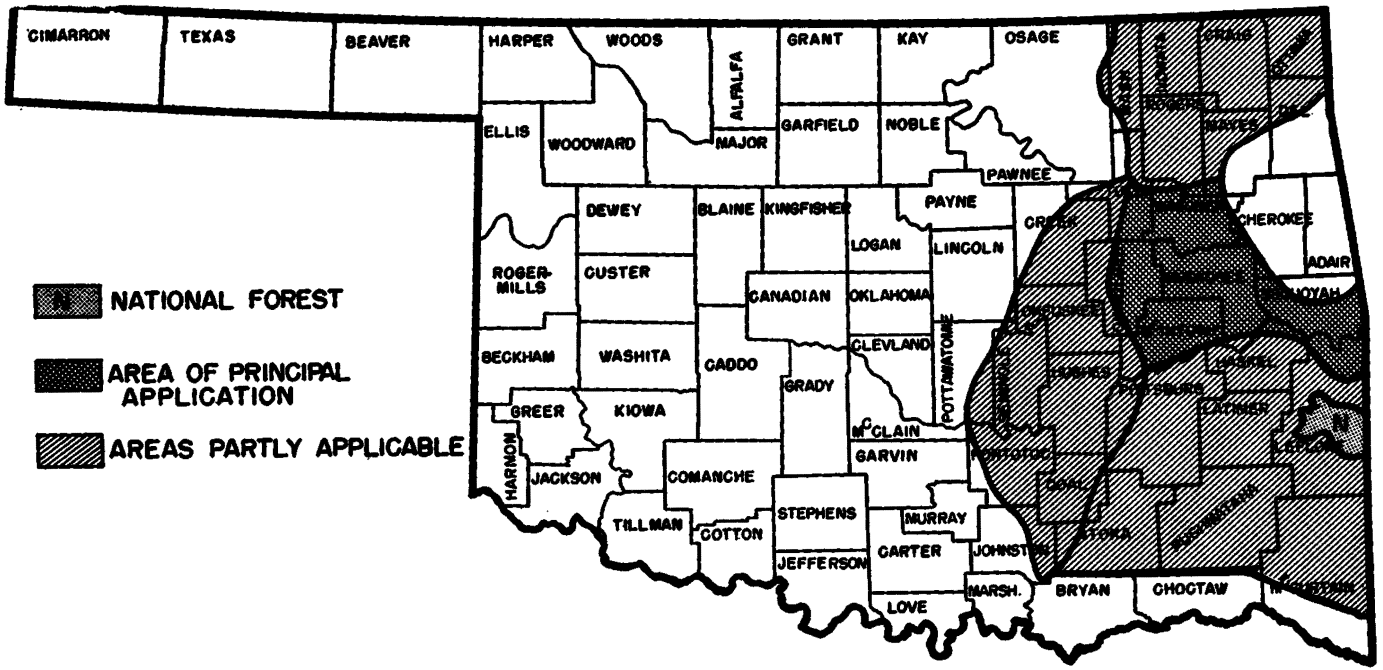

Figure 1.—Location of areas of application.

able effect of possible changes. This was done by what farm economists call "the budget method of analysis." In this method, an average-sized farm of the type under consideration is assumed. Inputs of labor and capital are balanced against probable returns from crops and livestock. Thus it is possible to calculate the effects of a change in management of the land; for example, from cotton farming to dairy farming; or from no fertilization to use of commercial fertilizers. This sort of analysis, obviously, must be guided by a thorough knowledge of the practical problems involved. Therefore the suggested changes were discussed with many persons and groups: farmers in the area; county agricultural agents of the A. & M. Extension Service; field personnel of the Soil Conservation Service, Production and Marketing Administration, and Farmers Home Administration in the area; and farm machinery dealers, cotton gin operators, and feed and seed dealers in the area.

In comparing present practices with practices shown by research to be most desirable, the author had the assistance of crops, livestock, soils and farm engineering specialists in the Experiment Station and the A. & M. Agricultural Extension Service. The men who took the lead in providing this help are listed by name in the acknowledgements, page 3. Numerous other research and extension workers helped with particular phases; for example, sections dealing with use of fertilizers were checked by soils scientists.

Use of the Information

The information assembled as a result of the efforts described in preceding paragraphs is presented here in three parts:

1. A description of current farm practices on prairie-land farms of eastern Oklahoma.
2. Comparison of these current practices with practices recommended by the A. & M. Division of Agriculture.
3. An evaluation of the probable effect on farm income of substituting the improved practices for those now being used, on several different types of farms.

This information is intended primarily for reference use by county agricultural agents and others who advise and assist farmers. However, it can also be used by individual farmers who are seeking ideas for increasing the income from their operations.

LOCATION AND DESCRIPTION OF AREA

(Figure 1)

The Arkansas Valley and Uplands farming area extends from east central Oklahoma to the Arkansas border. The agricultural history of the area may be traced to its Indian occupants in the early part of the nineteenth century. The unique communal land system of the Cherokee, Creek, and Choctaw Indian Nations contributed to the development of cattle ranching as the major type of agriculture during the early years of settlement. More intensive types of farming, grain, cotton, and other crop production, came into prominence with the opening of the area to settlement and continued into the twentieth century. In recent years, apparently, the trend has been a return toward more emphasis on extensive types of production such as livestock, pasture and hay.

Agricultural Trends

(Tables 1 to 4)

There has been some increase in land classified as farms, but amount of farming on the land apparently is decreasing. Despite a major increase in mechanization, there were actually fewer acres of harvested crops in 1949 than in 1929. In 1950 about one million acres of land, or 45 percent of all land in the area, were considered to be cropland. Of this total, less than 60 percent was in harvested crops in 1949. Total cropland was reduced from 1930 to 1950 and the percentage of cropland actually used for crops was reduced still more.

Although cotton and corn are still the main crops in this area, acreages have sharply decreased. In 1949 the acreage of cotton harvested was only 31 percent of that of 1929, and 79 percent of that in 1944. The greatest reductions in cotton acreage occurred in the 1930's, the period of active governmental acreage reductions and controls.

Numbers of all cattle and calves are increasing although rates of increase are varied and are influenced by the cyclical nature of cattle production. Quality of cattle improved.

The number of farms has decreased sharply. The average size of farms in 1950 was 142 acres or 64 percent larger than in 1929.

Table I.—Trends in the Agriculture of the Arkansas Valley and Uplands Area of Eastern Oklahoma, 1930-50.[1]

Item	Unit	1930	1935	1940	1945	1950
Land use:	1000					
All land in farms	acres	2058	2210	2171	2246	2233
Cropland	acres	1399	1352	1388	1055	1003
Cropland harvested	acres	1058	921	836	834	587
Percent of farmland in cropland	percent	68.0	61.2	63.9	47.0	45.0
Major crops:	1000					
Cotton	acres	440	306	208	172	136
Corn	acres	418	313	302	276	220
Oats	acres	61	81	114	121	31.
All hay	acres	73	113	85	103	118
Sorghums	acres	22	64	47	64	20
Major livestock:	1000					
All cattle and calves	head	105	183	159	213	191
All hogs and pigs	head	111	94	83	82	83
Horses and mules	head	78	66	57	51	34
Number of farms	number	23893	25231	19816	18797	15752
Average size of farm	acres	86.2	87.6	109.5	119.5	141.7
Number of tractors	number	341	[2]424	1230	3353	5091
Population:	1000					
Total	people	249	[2]	248	[2]	213
Farm	people	126	131	114	82	70

[1] Source: U. S. Census reports. These data are for the following counties: Haskell, LeFlore, McIntosh, Muskogee, Okmulgee, Sequoyah, and Wagoner.

[2] Not reported. 1935 tractor numbers estimated from tractor registrations.

Numbers of tractors on farms have increased tremendously in the last 15 years, from an estimated 424 in 1935 to 5091 in 1950. Other data revealed that about 4200 farms, mostly growing products for sale, reported the use of tractors in 1950. As farms with tractors are generally larger than others, a high proportion of the agricultural products of the area is now produced with tractor power.

Most of the decrease in total population of the area occurred between 1940 and 1950. The decrease of more than 50 percent in farm population between 1930 and 1950 was relatively steady after 1935. The greatest reduction in numbers of farm people occurred between 1940 and 1945.

In summary, Table I indicates that what has been happening in the area is:

> Percentage in cropland down, and lower percentage of cropland harvested.
>
> Cattle and calves increasing; mostly beef.
>
> Number of farms down, and size up.
>
> Mechanization on the march; sharp increase in number of tractors.

With the increase in size of farms between 1945 and 1950, differences in distribution by size groups are minor (Table 2).

A large proportion of the total number of farms reported by the Census for 1945 and 1950 were part-time, residential, or subsistence units (Table 3). In 1945, there were 6900 non-commercial farms, 37 percent of all farms. By 1950, the number of these farms increased to about 8300 farms, or 53 percent of all farms in the area. The proportionate decline in commercial farms was much greater than the decline in the total number of farms. The reduction in cotton farms was about 2600, more than 50 percent, but the relative decline in other field crop farms was even greater.

Livestock farms, mainly beef cattle, and dairy farms were the only type groups showing increases in numbers between 1945 and 1950. For the first time in many years, livestock farming was more important as a source of income than cotton to more farmers.

The decline in the number of cotton and other types of farms other than livestock and dairy may be emphasized by the fact that for every additional cattle or dairy farm there was a decrease of 6.5 farms in all other commercial-type groups. These are significant changes in the source of income for farm people and for the area generally. However, further investigation reveals that major attempts were made to hold on to cotton as a source of farm income. The number

Table 2.—Distribution of Farms by Size of Farm, 1945 and 1950.*

Size of farm (acres)	1945 Number	1945 percent	1950 Number	1950 percent
0-29	3864	20.6	2511	15.9
30-69	4053	21.6	3448	21.9
70-139	5563	29.6	4444	28.2
140-219	3144	16.7	2971	18.9
220-499	1771	9.4	1900	12.1
500 & over	402	2.1	478	3.0
All farms	18797	100.0	15752	100.0

* Source: U. S. Census reports.

of farmers harvesting cotton declined from about 9800 in 1944 to about 6400 in 1949. If all farms that harvested cotton are considered as commercial farms, a higher percentage of commercial farmers reported cotton harvested in 1949 than in 1944, 86 percent in 1949 compared with 74 percent of all commercial farms in 1944.

From 1940 to 1950 major shifts to ownership of farm land by operators took place. (Table 4). Two factors favorably affecting farm ownership in the area were the Homestead Tax laws and the increase in numbers of part-time farmers.

Table 3.—Distribution of Farms by Type of Farm, 1945 and 1950.*

Type of farm	1945 Number	1945 percent	1950 Number	1950 percent
Cotton[1]	5010	26.9	2375	15.1
Other field crop	2036	10.9	369	2.3
General	1886	10.1	1386	8.8
Livestock	1695	9.1	2421	15.4
Dairy	460	2.5	516	3.3
Vegetable	284	1.5	161	1.0
Poultry	209	1.1	152	1.0
Fruit and nut	104	0.5	44	0.3
Horticulture	14	.1	[2]	--
Forest products	15	.1	[2]	--
Total commercial	11713	62.8	7424	47.2
Other farms[3]	6936	37.2	8299	52.8
Total[4]	18649	100.0	15723	100.0

* Source: U. S. Census reports.

[1] An additional 4826 farms reported cotton harvested in 1944, an additional 4004 farms in 1949 although cotton was not the major source of income on these farms.

[2] Not reported.

[3] Mostly part-time and residential or subsistence units.

[4] 148 farms excluded for 1945 and 29 farms excluded for 1950—not classified.

Table 4.—Number of Farms by Tenure of Operator, 1940-50.*

Tenure of operator	1940 Number	1940 percent	1945 Number	1945 percent	1950 Number	1950 percent
Full owners	5048	25.5	8170	43.5	7810	49.6
Part owners	2072	10.4	2236	11.9	2836	18.0
Tenants	12624	63.7	8324	44.3	5063	32.1
Managers	72	.4	67	0.3	43	0.3
Total	19816	100.0	18797	100.0	15752	100.0

* Source: U. S. Census reports.

Physical Features

(Figure 2 and Table 5)

The area studied includes parts of five different physiographic regions. The western edge of Okmulgee county is in the Sandstone Hills region. Wagoner, eastern Okmulgee, and most of Muskogee and McIntosh counties are in the Prairie Plains region. A finger of the Ozark Mountain region extends into northeastern Wagoner county, and part of the Ouachita Mountain region covers parts of Sequoyah and LeFlore counties. The Arkansas Valley region includes the bottomlands of the Arkansas and Canadian rivers and is most important in northern Haskell, northern LeFlore and southern Sequoyah counties.

The major soil groupings in eastern Oklahoma are the Eastern (Cherokee) Prairies, Southern Ozarks (Ouachita Highlands), Central Cross Timbers, and Alluvial soils.

The Eastern Prairie soils make up the most important soil grouping found on farms in the area. These soils account for almost half of the land in farms, more than half of the cropland, and a significant proportion of the pasture land. In addition, most of the prairie pasture land was open permanent pasture compared with a large proportion of heavily wooded and brush land pasture areas on the other soil groupings. The Ouachita Highland soils, which account for more of the total land area than the Cherokee Prairies, was next in importance in land uses on farms. A greater percentage of Alluvial soils than of Cross Timber soils was in cropland, although the Cross Timbers area contained a greater total acreage of land in farms.

The Prairie soils, of which the more important are the Bates-Dennis-Parsons Association, have developed under a cover of tall prairie grasses. The Bates and Dennis soils, derived mainly from sandstones, siltstones and a small proportion of shale, have developed dark topsoils and have permeable or moderately permeable subsoils. In general, they are the most productive and are the Prairie soils most extensively used for crops in the area. The Parsons soils,

Table 5.—Major Land Uses by Major Soil Groupings.[1]

Major soil grouping	All land in farms		Cropland		Pasture[2]	
	1000 acres	percent	1000 acres	percent	1000 acres	percent
Eastern Prairies (Cherokee prairies)	1023	45.6	585	55.4	400	39.6
Southern Ozarks (Ouachita Highlands)	650	28.9	186	17.6	371	36.7
Central Cross Timbers	349	15.5	129	12.2	177	17.5
Alluvial Soils (Bottomlands)	204	9.1	150	14.2	51	5.1
Other	20	0.9	6	.6	11	1.1
Total	2246	100.0	1056	100.0	1010	100.0

[1] Estimated from SCS land use inventory information, 1945 U. S. Census of Agriculture, and other data.

[2] Woodland pastured and other pasture not cropland.

derived mainly from shale containing a small percentage of very fine sand grains and a high percentage of clay particles, have developed gray to grayish brown topsoils and have moderately permeable to very slowly permeable (dense claypan) subsoils. The deep phases of Parsons soils are moderately productive and respond to improved soil management practices. Only small areas of shallow or dense claypan Prairie soils remain in cultivation.

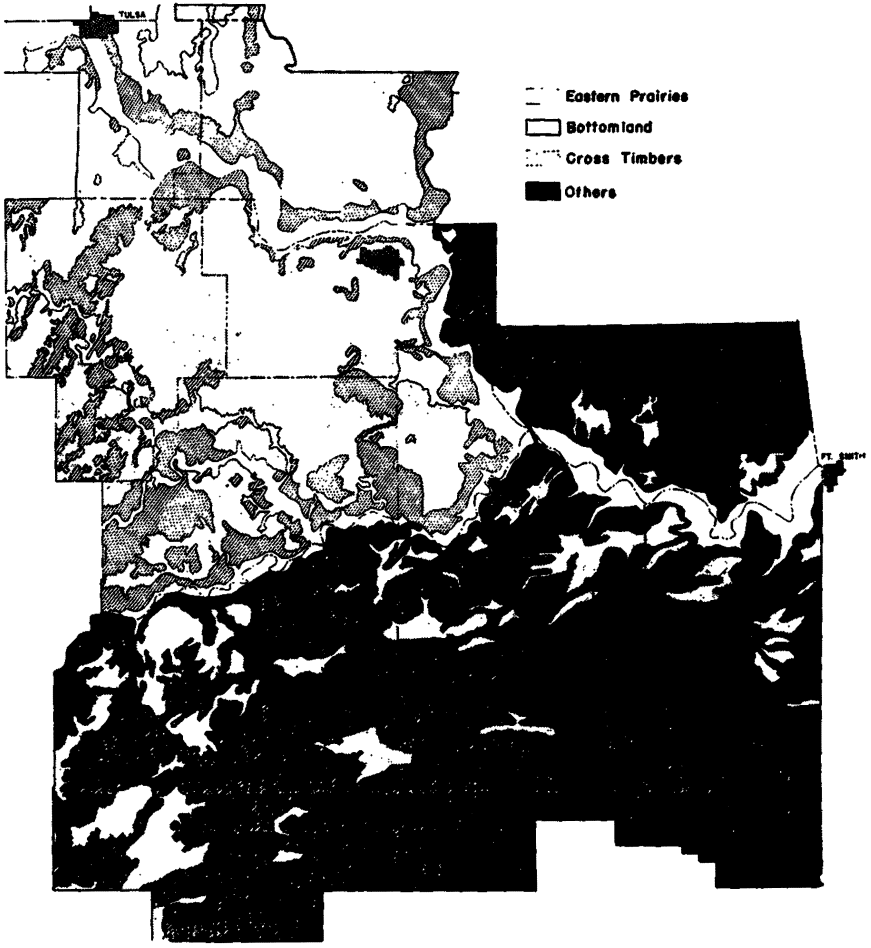

Figure 2:—Major soil groupings in eastern Oklahoma.

Climate

(Figures 3 and 4)

The climate of the Arkansas River Valley and the Uplands area of eastern Oklahoma is favorable for agricultural production. The long-time average annual rainfall for Muskogee is 40.86 inches. This varies from a minimum of about 37 inches in western Okmulgee county to 45 inches in LeFlore county. During the 10-year period (1943-52) rainfall at Muskogee averaged almost 45 inches, varying from a high of 58.77 inches in 1945 to a low of 32.53 inches during the dry year of 1952. April, May, and June are the high rainfall months of the year and almost two-thirds, 62.6 percent, of the average rainfall is received during the April-September growing season although there has been considerable yearly variation during the 10-year period.

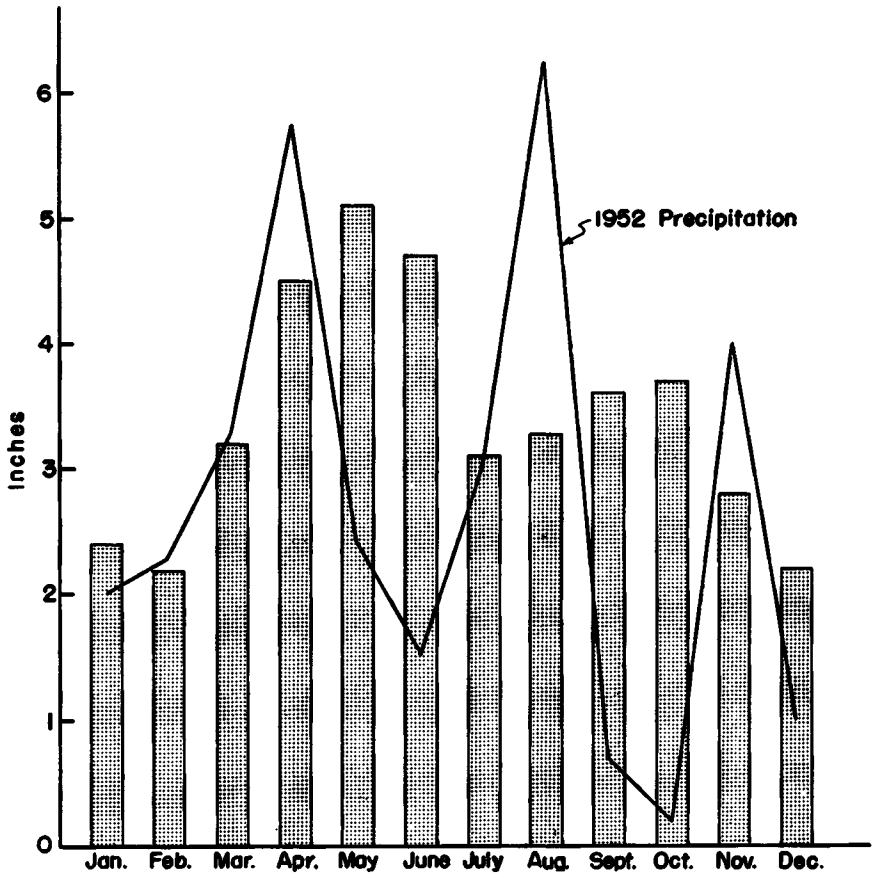

Figure 3.—Monthly precipitation, Muskogee, Oklahoma, 1899-1952 (54-year average.)

The average length of growing season for the area is about 213 days with a range of approximately 197 to 223 days. The last killing frost in the spring ranges from March 26 to April 11 and the first killing frost in the fall from October 25 to November 4. The long-time average January temperature readings have been about 40 degrees and July temperatures about 82 degrees. Extremes have included a minimum of 18 degrees below zero and a maximum of 116 degrees above zero.

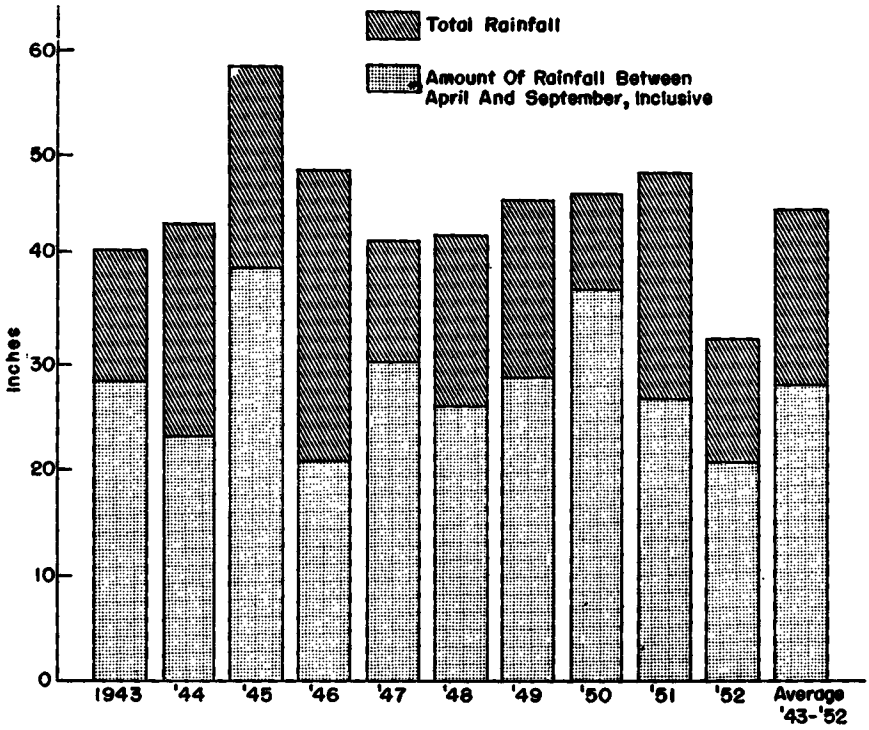

Figure 4:—Annual precipitation, Muskogee, Oklahoma, 1943-1952.

PRACTICES, PRODUCTION AND PRODUCTION REQUIREMENTS OF CROPS AND LIVESTOCK

This section compares *present practices,* possible *improved production practices,* and the resulting crop yields and livestock production rates. "Present practices" are the most common practices reported by farmers with Bates-Dennis-Parsons (Prairie) soils. Crop yields and livestock production rates with present practices are the average or normal production expected under average farming conditions such as have prevailed in the past. "Improved practices" are based on available research results and the experiences of farmers and agricultural workers with fertilization rates, seeding rates, rotations, and livestock production methods that give best results on farms. Crops yields and livestock production rates with improved practices are the average production expected to be attained through the adoption of the specified improved practices on farms with Bates-Dennis-Parsons soils. With similar soil and other farm resources, production practices are a major determining factor of the level of crop yields and livestock production rates.

This information is presented to assist farmers and agricultural workers to compare present practices on individual farms with recommendations of production specialists. The improved practices, yields, and production rates also are used in the budgeting of alternative farming systems for farmers with Bates-Dennis-Parsons soils (discussed in later sections of this bulletin). Since they are presented as average rates or usual requirements, soil tests and similar guides would be needed to determine the specific recommendations for individual farms. Also, fertilizer recomendations are reported on the basis of rates of a particular fertilizer analysis but approximately the same amount of plant nutrients could be applied with varying quantities of other fertilizer materials.

Crops

Major crops considered are cotton, corn, grain sorghums, oats and sweet clover used in rotations, oat and lespedeza hay, and temporary pasture crops—vetch and rye, and Sudan.* Labor and power requirements for these crops are based on two-row tractor equipment. Principal emphasis in improved crop production is on proper fertilization, insect control on cotton, and rotation with a legume (see pages 24 to 26).

* *Wheat* has a place in farming systems in the northern part of the area. Research results and farmer experience indicate profitable wheat yield increases (5 to 8 bushels per acre) from use of fertilizer on soils needing fertilizer, such as Bates-Dennis-Parsons. *Peanuts* also can prove profitable on the sandier of these soils, primarily in the southern counties of the area, provided improved soil management to reduce erosion and maintain fertility is followed. *Alfalfa* would be a most desirable hay crop on soils of above average fertility.

COTTON

(Table 6)

Cotton yields attained with present practices can be doubled through effective insect control, proper fertilization, and use of a legume in rotation with cotton. Effective insect control must be accomplished before significant results can be expected from fertilization and other improved practices. Biennial sweet clover is recommended as the legume to be used in rotation with cotton.

Labor requirements for cotton would increase from about 46 hours per acre with present practices to 64 hours per acre with improved practices due primarily to the increased time required to harvest the higher yield. Preharvest labor requirements with improved practices would be 8 hours less than with present practices. There is a saving of 9.6 man hours in hoeing and cultivating labor with improved practices by the use of a 2-row rotary hoe attachment on the cultivator. Tractor hours are increased 2.2

Table 6.—Cotton: Production Requirements and Yields, per Acre, with Present and Improved Practices.

Item	Unit	Present practices[1]	Improved practices[4]
Seed	pound	20	20
Fertilizer (5-10-5)[2]	pound	--	150
Insecticides[3]			
3-5-40	pound	--	40
3-10-40	pound	--	10
Application (contract)[4]	dollar	--	0.50
Labor			
Prepare, plant, cultivate	man hours	5.0	4.4
Poison	man hours	0.0	1.5
Chop and hoe	man hours	15.0	6.0
Harvest	man hours	25.9	51.8
Power			
2-row tractor[5]	hours	6.3	8.5
Yield[6]	pounds seed cotton	470	940

Distribution of man labor per acre with improved practices:[7]

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
.3	.6	.3	.2	.8	4.2	4.8	.3	5.0	20.2	20.8	6.2	63.7

[1] No systematic rotation with present practices—improved practices, 5-year rotation: cotton, cotton, cotton, spring oats and sweet clover with oats harvested for grain, sweet clover harvested for seed and turned under.

[2] Fertilizer applied on cotton after sweet clover at these rates: 1st yr. 100 lbs.; 2nd. yr. 150 lbs.; 3rd yr. 200 lbs.

[3] 3% gBHC, 5% DDT, 40% sulfur for boll weevil; 3% gBHC, 10% DDT, 40% sulfur for boll worm and boll weevil.

[4] Contractor furnishes insecticide applicator for 5 applications in an average year at 10 cents per acre per application (farmer uses own tractor for power).

[5] Assumes hauling to gin with tractor-trailer.

[6] Picked seed cotton equivalent: present practices, 150 lbs. lint and 280 lbs. cottonseed; improved practices, 300 lbs. lint and 560 lbs. cottonseed.

[7] Assumes one-third of acreage following sweet clover to be plowed in fall.

hours per acre with improved practices compared with present practices because of poisoning operations and the greater yield to haul to market. Peak labor requirements are concentrated in June and July, when cotton must be hoed and cultivated, and from September through December, the months of cotton harvest. *The extreme peaks of labor requirements in October and November, which account for almost two-thirds of total requirements, point up one of the major problems in cotton production.*

CORN

(Table 7)

Provided increased rates of fertilization are combined with a legume in rotation, corn yields can be doubled compared with yields attained with present practices. Major emphasis in fertilization is the use of nitrogen as a side dressing on corn in addition to the use of proper amounts of a starter fertilizer. With the application of more fertilizer, the seeding rate of an adapted hybrid corn variety would be increased to 10 pounds per acre. Total man hours to produce corn with improved practices would be almost 2 hours per acre less than with present practices. The saving in hoeing labor from use of a rotary hoe cul-

Table 7.—Corn: Production Requirements and Yields, per Acre, with Present and Improved Practices.

Item	Unit	Present practices[1]	Improved practices[2]
Seed	pound	7	10
Fertilizer			
4-12-4	pound	100	--
5-10-5[2]	pound	---	150
33-0-0	pound	---	100
Labor			
Prepare, plant, cultivate	man hours	4.1	4.3
Hoeing	man hours	5.0	0.0
Harvest (hand)	man hours	6.0	9.0[3]
Power			
2-row tractor	hours	6.6	8.1
Yield	bushel	20	40

Distribution of man labor per acre with improved practices:[4]

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
.6	.7	.5	.4	.7	.8	.2	.0	5.4	3.6	.2	.2	13.3

[1] No systematic rotation with present practices—improved practices, 5-year rotation: corn, corn, corn, spring oats and sweet clover with oats harvested for grain, sweet clover harvested for seed and turned under.

[2] 5-10-5 applied on corn after sweet clover at these rates: 1st yr., 100 lbs.; 2nd yr., 150 lbs.; 3rd yr., 200 lbs. 33-0-0 applied on corn after sweet clover at these rates: 1st yr., 50 lbs.; 2nd yr., 100 lbs.; 3rd yr., 150 lbs.

[3] Custom harvesting by mechanical picker would reduce man labor requirements 5 hours and tractor power 1.5 hours. Usual custom rate $4.00 per acre.

[4] Assumes one-third of acreage following sweet clover to be plowed in fall.

tivator attachment is more than enough to offset increases in labor requirements for side dressing and for harvesting the greater yield. However, power requirements would be increased. Labor requirements are greatest in the harvest months of September and October.

GRAIN SORGHUM

(Table 8)

Grain sorghum is not a common enterprise in present farming systems. However, the new Darset and Redlan varieties of grain sorghums offer promising opportunities for development of grain sorghum as a major crop on Prairie soils of eastern Oklahoma. These varieties can be harvested with a combine, and labor and power requirements, excluding hauling, amount to only 4.5 hours per acre. Grain sorghum also has greater drought resistance than corn. Recommended fertility practices include the use of a starter fertilizer and the use of sweet clover as a legume in rotation.

Table 8.—Grain Sorghum: Production Requirements and Yields, per Acre, with Improved Practices.[1]

Item	Unit	Improved practices
Seed[2]	pound	5
Fertilizer (5-10-5)[3]	pound	150
Labor		
Prepare, plant, cultivate	man hours	3.5
Harvest (combine)	man hours	1.0
Hauling (contract)[4]	dollar	2.45
Power		
2-row tractor	hours	4.5
Yield	bushel	35

Distribution of man labor per acre with improved practices:[5]

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
.0	.6	.7	.9	.5	.4	.0	1.0	.0	.0	.2	.2	.4.5

[1] Insufficient data to determine present practices, not a common enterprise in present farming systems—improved practices, 5-year rotation: Grain sorghum, grain sorghum, grain sorghum, spring oats and sweet clover with oats harvested for grain, sweet clover harvested for seed and turned under.

[2] New Darset or Redlan varieties recommended.

[3] Fertilizer applied on grain sorghum after sweet clover at these rates: 1st yr., 100 lbs.; 2nd yr., 150 lbs.; 3rd yr., 200 lbs.

[4] Hauling from combine to town hired at 7¢ per bushel. Custom rate for combining $3.25 per acre.

[5] Assumes a third of the acreage following sweet clover to be plowed in fall.

OATS AND SWEET CLOVER
(Table 9)

Biennial sweet clover has a high capacity for nitrogen fixation and its deep root system improves soil structure in heavy textured sub-soils of the Bates-Dennis-Parsons soil association. For these reasons sweet clover was selected as the most promising legume for use in rotations. In addition, a seed harvest and considerable grazing may be obtained without reducing appreciably the fertility value of sweet clover. Spring oats, to be planted with sweet clover, would pro-

Table 9.—Oats and Sweet Clover: Production Requirements and Yields, per Acre, with Present and Improved Practices.

Item	Unit	Present practices	Improved practices
First Year (oats and sweet clover)			
Seed[1]			
Oats	pound	80	50
Sweet clover	pound	--	15
Lime[2]	ton	--	2
Fertilizer[3]			
5-10-5	pound	--	200
0-20-0	pound	--	100
33-0-0	pound	--	75
Labor			
Preharvest	man hours	2.4	3.2
Harvest oats[4]	man hours	1.2	1.4
Power			
2-row tractor	hours	3.4	4.3
Production			
Oats	bushel	22	40
Grazing (sweet clover)	animal unit month	--	0.3

Distribution of man labor per acre with improved practices:

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.4	.8	.6	.4	.0	.8	.6	.0	.0	.0	.0	.0	4.6

Second Year (sweet clover)			
Production			
Sweet clover grazing	animal unit month	--	2.1
Sweet clover seed[5]	pound		200

[1] Recommended spring oat varieties: Andrew, Cherokee, and Nemaha drilled in 14 inch rows. Ohio Evergreen is recommended sweet clover variety although common white may be used.

[2] Lime applied 12 months before, to be mixed in soil through regular land preparation operations for row crops. Lime will last 10 years or 2 rotations.

[3] 5-10-5 applied at oat planting time, 0-20-0 applied at time of planting sweet clover, 33-0-0 applied as oat top dressing.

[4] Farmers with small acreages usually hire oats combined and hauled. Custom rates are $3.25 per acre for combining and $.04 per bushel for hauling oats to market.

[5] Custom rate for combining sweet clover $3.25 per acre. Cost of cleaning and sacking $0.50 per cwt.

vide production for sale or use as feed during the first year and would afford a better seedbed for sweet clover.

Lime should be applied at the rate of 2 tons per acre, or as soil tests indicate, for successful production of sweet clover. Oats would receive both a starter fertilizer and a nitrogen top dressing.

After oats are drilled, sweet clover would be drilled across the oat rows and fertilized with superphosphate. After oats are combined in June, sweet clover could be grazed lightly in the fall of the first year. Second year sweet clover will usually be ready for grazing about March 15. It may be grazed until plants start blooming. Then livestock should be removed to permit a seed crop to develop. Used in rotation with improved permanent pasture, one acre of second-year sweet clover would provide as much grazing as one acre of permanent pasture though in a more concentrated grazing season. In the second-year, sweet clover would be plowed under in November and December in preparation for planting a row crop the next spring.

The estimated yield of oats with improved practices would be 40 bushels per acre compared with 22 bushels per acre now obtained from oats grown alone with present practices. Labor requirements for oats and sweet clover with improved practices would be only 1 hour more per acre than for oats alone with present practices. Labor requirements for combining sweet clover seed would be about 1 hour per acre.

Table 10.—Oats and Lespedeza for Hay: Production Requirements and Yields, per Acre, with Improved Practices.

Item	Unit	Improved practices[1]		
		Oats	Lespedeza	Total
Seed[2]	pound	50	15	--
Fertilizer				
5-10-5	pound	200	--	200
33-0-0 (top dressing)	pound	75	--	75
Labor				
Preharvest	man hours	2.8	.4	3.2
Harvest	man hours	2.0	2.0	4.0
Contract (baling)[3]	dollar	6.00	6.00	12.00
Power				
2-row tractor	hours	4.3	1.9	6.2
Yield	tons	1.0	1.0	2.0

Distribution of man labor per acre with improved practices:

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.4	.8	.6	.4	.0	2.0	2.0	.0	.0	.0	.0	.0	7.2

[1] Insufficient data to determine present practices, not usual to grow oats and lespedeza together for hay in present farming systems. Same land to be reserved for hay for 5 years or more.

[2] Andrew, Cherokee, or Nemaha oats drilled in 14 inch rows. Korean lespedeza drilled across oat rows.

[3] Hay baled in field at custom rate of $6.00 per ton.

OAT AND LESPEDEZA HAY
(Table 10)

Planted together on the same cropland, spring oats and Korean lespedeza offer opportunity to produce high quality palatable hay crops at limited expense. The oat hay would be harvested about June 1 when the grain is in the dough stage and would allow ample time for maturity of the lespedeza hay, usually about July 15-August 1. Fertilizer would be applied directly only to the oats, but the lespedeza would benefit. Man labor requirements, excluding baling, would amount to 7.2 hours per acre and power requirements, 6.2 hours per acre. The total yield of 2 tons per acre should be reasonably certain because the growing season is concentrated during the months of usually favorable rainfall conditions.

On farms with cropland of above average fertility, alfalfa, a perennial, might be substituted for oat and lespedeza hay to advantage.

TEMPORARY PASTURE CROPS
(Table 11)

Promising temporary pasture crops on Prairie soils are vetch and rye for late fall, winter, and spring grazing, and Sudan for summer grazing. Vetch and rye would be fertilized with superphosphate. Sudan grass would not receive fertilizer but would be planted on cropland which had been seeded to vetch and rye or oat and lespedeza hay the year before. Man labor and tractor power requirements for preparing seedbed and planting would amount to 3.0 hours per acre for vetch and rye and 2.5 hours per acre for Sudan.

Estimated production per acre of vetch and rye is 3.0 animal unit months of grazing which is 0.7 of an animal unit month greater than estimated production from an acre of improved permanent pasture. Although some grazing would be secured during late fall and winter, most of the production would be obtained

Table 11.—Temporary Pastures: Production Requirements and Yields per Acre with Improved Practices.[1]

Item	Unit	Kind of pasture	
		Vetch and Rye	Sudan grass
Seed			
Vetch	pound	15	--
Rye	pound	55	--
Sudan	pound	--	15
Fertilizer (0-20-0)	pound	200	--
Man labor	hours	3	2.5
Tractor power	hours	3	2.5
Production—			
Animal unit months equivalent		3.0	2.0

[1] Insufficient data to determine present practices, not common enterprises in present farming systems.

in April and May, also months of peak grazing from permanent pastures. Based on an average date of seeding of about June 1, Sudan grass production would be expected to produce about 2.0 animal unit·months of grazing per acre, about evenly distributed between July, August, and the first 2 or 3 weeks of September. Careful management is needed to obtain maximum grazing from both vetch and rye and Sudan. Rotational grazing of these crops and permanent pasture would provide a practical method of management. This would permit the two crops to be grazed down and then rested long enough to recover. Prussic acid poisoning in the grazing of Sudan grass is a definite danger which must be guarded against. Vetch and rye and Sudan would have most value in a pasture program for dairy farms.

Crop Rotations

Returns from crop rotations with improved practices and straight cropping with present practices are compared for cotton and corn. No basis for comparison of two systems of growing grain sorghum, a relatively new crop, is readily available, but relative returns would be expected to be similar to those from corn. The rotation used is 1 year in spring oats and sweet clover, 1 year in second-year sweet clover, and 3 years in cotton, corn, or grain sorghum.

COTTON
(Table 12)

An economic evaluation of a cotton rotation system with increased use of fertilizer and other practices compared with a straight cotton system with present practices indicates that with 1946-50 prices a rotation system would return about $16 more per acre per year than a straight cotton system on Bates-Dennis-Parsons soils of eastern Oklahoma. The costs and returns in the table are calculated on the basis of 3 acres in cotton, 1 acre in spring oats and first-year sweet clover, and 1 acre in second-year sweet clover for the rotation system and 5 acres in cotton with no rotation. The profitableness of this rotation would be affected by the extent improved production practices, including proper fertilization and insect control, are adopted. These recommended practices are reported in detail in the "Production Practices" section.

The value of the production of cotton and rotation crops is based on prices included in Appendix Table 8, p. 63. All costs, except land, overhead, and management, required in producing and harvesting cotton and other crops in the rotation are included. Only direct costs of operating tractor and machinery are included as depreciation would occur with or without the rotation system.

There appear to be additional advantages, hard to measure in dollars and cents, which the rotation system has over the straight cotton system. If the farmer has livestock, considerable grazing could be obtained from oats and sweet clover without materially affecting the yields harvested or their fertility value. Variations in yield from year to year are likely to be smaller; and, after several rotation periods, average yields may actually exceed the yields used in this com-

parison because of organic matter accumulations, decreased erosion, and all-around better soil structure and physical condition.

CORN

(Table 13)

A corn rotation system, including improved production practices, would return $11.40 more per acre than a cropping system with straight corn and present practices. Both costs and returns are calculated on the basis of 3 acres of corn, 1 acre of spring oats and sweet clover and 1 acre of second-year sweet clover for the rotation system, and 5 acres of corn with no rotation. The percentage increase in present returns above direct costs by using a rotation and improved practices system is approximately the same for both corn and cotton, amounting to a 65 percent increase for corn and a 64 percent increase for cotton.

Costs and returns for comparison of the corn rotation were calculated in the same manner as those for cotton. Corn is affected more by periods of drouth and

Table 12.—Estimated Direct Costs and Returns from Continuous Cotton and Present Practices and a 5-year Rotation with Improved Practices.

Item	Unit	Continuous cotton[1]	Cotton rotation[2]
Crop acres:			
Cotton	acre	5	3
Oats and sweet clover	acre	—	1
Sweet clover	acre	—	1
Crop production: (from 5 acres)			
Seed cotton	pound	2350	2820
Oats	bushel	0	40
Sweet clover seed	pound	0	200
Value of Production		$282.00	$392.00
Direct expenses per year:			
Seed		$ 10.00	$ 9.33
Fertilizer		---	8.55
Lime		---	3.50
Insecticides		---	18.90
Labor		125.28	116.07
Power		12.76	11.62
Machinery		5.03	3.69
Custom harvest and haul oats		---	4.85
Custom harvest sweet clover		---	4.25
Total direct costs		$153.07	$180.76
Returns to land, overhead, and management per year:			
Total for 5 acres		$128.93	$211.24
Per acre		25.79	42.25

[1] With present practices.
[2] With improved practices.

Table 13.—Estimated Direct Cost and Returns from Continuous Corn, with Present Practices and a 5-year Rotation with Improved Practices.

Item	Unit	Continuous corn[1]	Corn rotation[2]
Crop acres:			
Corn	acre	5	3
Oats and sweet clover	acre	—	1
Sweet clover	acre	—	1
Crop production:			
Corn	bushel	100	120
Oats	bushel	—	40
Sweet clover seed	pound	—	200
Value of Production		$150.00	$234.00
Direct expenses per year:			
Seed		$ 5.95	$ 8.43
Fertilizer		10.00	29.40
Lime		---	3.50
Insecticides		---	---
Labor		28.00	25.86
Power		13.36	9.31
Machinery		4.87	3.58
Custom harvest haul oats		---	4.85
Custom harvest sweet clover		---	4.25
Total direct costs		$ 62.18	$ 89.18
Returns to land, overhead, and management per year:			
Total for 5 acres		$ 87.82	$144.82
Per acre		$ 17.56	$ 28.96

[1] With present practices.
[2] With improved practices.

high temperatures than is cotton, and the reduction in year to year variations in yields from using the rotation system probably would be less for corn than for cotton. Grain sorghum may be preferred over corn on many prairie farms because of its greater drouth resistance and the recent development of varieties adapted to conditions in eastern Oklahoma.

Permanent Pasture*

(Table 14)

The introduction of a complete program of pasture improvement including adapted legumes, liming and fertilization would more than double the present

* This section outlines a system of permanent pasture improvement including an adapted permanent sod such as *Bermuda-grass*. In the past, this has been the system of pasture improvement most commonly recommended and used. However, recent research indicates a possibility of using fescue, brome grass, vetch, and adapted clovers in a permanent pasture program. Alfalfa-brome or alfalfa-fescue mixtures would be adapted to prairie soils of above average fertility. Pastures of this type could be readily converted should there be a desire or need for more cropland.

carrying capacity and beef production per acre on Bates-Dennis-Parsons soils. About half of the present open permanent pastures on farms with Prairie soils have received a seeding of *Korean lespedeza*. Very few acres have received proper fertilization, liming, or seeding with adapted clovers. Two sets of improved practice recommendations for permanent pastures are presented, one for complete renovation of present sod or the seeding of cropland to pasture and one for overseeding of present pastures. Pastures with weedy stands of undesirable grasses and cropland converted to pasture require complete renovation, including plowing, disking, Bermuda-grass sodding, and overseeding with adapted clovers such as *Hop* and

Table 14.—Permanent Pasture: Production Requirements and Carrying Capacity per Acre with Present and Improved Practices.

Item	Unit	Present practices[1]	Improved practices overseeding[2]	Improved practices renovation[3]
Establishment				
Seed				
Hop clover	pound	0.2	1	1
Korean lespedeza	pound	8	15	0
Bermuda sodding (contract)	dollar	--	0	8.00
Ladino clover	pound	--	0	1
Lime[4]	ton	0.2	0	2
Fertilizer (0-20-0)	pound	30	200	200
Machine rental[5]	dollar	--	0.75	0.75
Man labor	hour	1.1	2.2	4.5
Tractor power	hour	0.6	1.5	4.5
Establishment and maintenance prorated on annual basis[6]				
Seed				
Hop (no reseeding necessary)	pound	--	0.1	0.1
Lespedeza (once in 5 years)	pound	1.6	3	0
Bermuda sodding (contract)	dollar	--	0	0.80
Ladino (no reseeding necessary)	pound	--	0	0.1
Lime (once in 10 years)	ton	0.02	0	0.2
Fertilizer (0-20-0) (once in 2 years)	pound	15	100	100
Machine rental	dollar	--	0.18	0.18
Man labor				
Prepare, seed, fertilize	hour	0.3	0.6	0.8
Mow-(4 out of 10 years)	hour	0.3	0.3	0.3
Tractor power				
Prepare, seed, fertilize	hour	0.2	0.4	0.8
Mow	hour	0.3	0.3	0.3
Production				
Animal unit months equivalent[7]		1.1	2.3	2.3
Net lbs. beef per acre		66	140	140

[1] Present practices estimated from reports of farmers and are based on average treatment per acre of open permanent pasture and not application per acre treated.

[2] Overseeding of present desirable base grass, such as Bermuda-grass, without complete renovation or liming. However, liming is desirable in many pastures.

[3] Complete renovation, including Bermuda-grass sodding and overseeding with clovers.

[4] Spreading included in price of lime.

[5] Farmers not owning grain drills usually rent seeding and fertilizing equipment and furnish own labor and power; rental rates for combination seeding-fertilizing drill 75 cents per acre; for fertilizer spreader 25 cents per acre.

[6] Over a 10-year period.

[7] Animal unit values based on total yearly gain of 504 pounds per brood cow and calf as one animal unit.

Ladino. Overseeding with *Korean lespedeza* and *Hop* or other clovers is recommended on some present pastures which have a good stand of adapted grass such as Bermuda. Both renovation and overseeding would require regular fertilization once every 2 years with superphosphate or its equivalent in other phosphate fertilizer. An average of 2 tons of lime per acre would be required for pasture renovation. Lime requirements for particular pastures would be dependent on soil tests for both renovation and overseeding but the use of *Korean lespedeza* as the major legume could eliminate lime needs in overseeded pastures. *Korean lespedeza* would need to be overseeded once in about 5 years to maintain stands in the overseeded pastures. Other regular maintenance required for both renovated and overseeded pastures would be disking once in 5 years and mowing in 4 of 10 years. In order to approximate yearly requirements, establishment and maintenance of improved practices have been prorated on an annual basis over a 10-year period.

The carrying capacity of improved permanent pastures was estimated to be 3.6 acres per brood cow with a yearly gain of 504 pounds of beef from grazing and supplemental winter roughage. This would allow 3 acres per brood cow and calf and 0.6 acres per brood cow for replacement heifers and bulls. About 6 acres of unimproved permanent pasture is presently being used per brood cow. This has resulted in an average yearly gain per brood cow and calf of 394 pounds of beef from grazing and supplemental winter feed.

Pasture requirements for mature dairy cows were estimated to be 2 acres of improved permanent pasture, 1 acre of vetch and rye, and .5 acre of Sudan grass; for dairy heifer calves, 1.5 acres of improved permanent pasture, and; for dairy heifer yearlings, 3.0 acres of improved permanent pasture.

Livestock

Improvements in the level of feeding, including quantity and quality of pasture and supplemental feeds, and livestock management practices such as a better breeding program would materially increase livestock production on prairie land farms. Major emphasis was on beef cattle and dairy production, although some farmers may have had opportunities to engage in hog, sheep, or poultry production.

BEEF CATTLE

(Table 15)

Interest in production of beef cattle has been increasing for some years. Many farmers have either added beef cattle to their old farming program or developed this enterprise as a major source of farm production and income. Adoption of improved practices would increase beef production available for sale 110 pounds per brood cow or 28 percent compared with present practices. Major improvements in practices are better management to increase the calf crop percentage and provision for more and better quality pasture and supplemental winter roughage. The winter feeding of 1½ tons of good hay per brood cow would eliminate the need for cottonseed cake or grain *provided at least half of the roughage is*

legume hay. In the winter feeding program, oat hay would predominate (two-thirds oat hay, one-third lespedeza hay) before calving and lespedeza hay (⅔ lespedeza hay, one-third oat hay) after calving. For best results, calving would be concentrated in January and February. This program would allow production of 500 pound feeder calves for sale about October 15. With improved practices an average of 18 hours of man labor per brood cow would be required with monthly totals greatest during the winter feeding and calving periods. Improved practices would include more complete control of external and internal parasites although the costs for veterinarian, medicine, and sprays shown in Table 15 are the same for both present and improved practices.

As 15 percent of the brood cows would be replaced annually (12 percent sold as culls and a 3 percent death loss) replacement heifers as well as bulls would require a share of pasture and feed resources. These other cattle in the herd would require 20 percent as much feed

Table 15.—Beef Cattle: Production Requirements and Production Per Brood Cow,[1] per Year with Present and Improved Practices.

Item	Unit	Present practices	Improved practices
Feed			
Concentrates			
Cottonseed cake	pound	125	0
Grain	pound	300	0
Hay			
Prairie	ton	1.0	0
Oat hay	ton	0	0.75
Lespedeza hay	ton	0	0.75
Pasture[2]	animal unit month	5.5	7.0
Salt and minerals	dollar	1	1
Veterinary, medicine, spray	dollar	1	1
Calf crop (weaned basis)	percent	85	93
Death loss cows	percent	3	3
Replacement rate	percent	15	15
Man labor[3]	hour	15	18
Production for sale			
Calf	pound	280	390
Cull cow[4]	pound	114	114

Distribution of man labor with improved practices:

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
2.1	2.1	2.0	1.6	1.4	1.1	1.0	1.0	1.0	1.4	1.5	1.8	18.0

[1] Herd composition per brood cow: heifer 1-2 years, 0.15, and heifer weaning to 1 year, 0.15, to allow 15 percent of cows raised as replacements annually; herd bull, 0.04, annual bull death loss of 5 percent; 20 percent of bulls culled annually and sold at $140 each; 25 percent of bulls replaced annually, purchased at $300 each. Total cow equivalent in terms of feed and pasture needs 0.20 or 20 percent as much feed and pasture needed for replacement heifers and bulls as for brood cows.

[2] Animal unit months of grazing calculated on improved practices basis. Seven A.U.M. of grazing, plus supplemental feed and other improved practices, results in weight gain of 504 pounds per brood cow and calf which is considered as 1 animal unit.

[3] Man labor for improved practices increased to allow for more care of cows at calving time and increased care of bulls for better control of calving date.

[4] 12 percent of cows culled annually and sold at 950 pounds.

and pasture as the brood cows. For all beef cattle, land requirements would amount to 4.5 acres per brood cow, 3.6 acres of pasture and 0.9 acre of hay.

DAIRY CATTLE
(Tables 16-17)

Most farmers in eastern Oklahoma have 2 to 4 milk cows which provide the family milk supply and allow the sale of some veal calves and cream or butterfat. Generally, the calf is permitted a goodly proportion of the cow's milk supply which accounts partly for the low average milk production of 2800 pounds. The calf also shares in the 1450 pounds of concentrate feeds fed per cow. A haphazard breeding program is generally followed. A small fee is usually paid to the owner of a nearby bull. Bulls are of the beef type as well as low quality dairy stock. This helps to explain why a high percentage of family milk cows are replaced by purchase.

Commercial dairy production has increased but at a slower rate than production of beef. This increase has occurred in the form of fluid milk, mostly Grade A, on specialized dairy farms or butterfat on farms that produce both milk and beef. The commercial production considered here is limited to production of fluid milk on specialized dairy farms. It is estimated that the average milk production per milk cow could be raised to 6000 pounds of 4 percent milk if recom-

Table 16.—Dairy Cattle: Production Requirements and Milk Production, per Cow, per Year with Present and Improved Practices.

Item	Unit	Family cow	Commercial cow
Feed			
Concentrates			
Grain	pound	1200	1100
Cottonseed meal	pound	250	200
Hay			
Prairie or sorghum bundles	ton	1.0	---
Oat hay	ton	---	1.0
Lespedeza hay	ton	---	1.0
Pasture	AUM	5.5	8.7
Salt and minerals	dollar	1.00	1.00
Veterinary, medicine, spray	dollar	1.00	2.50
Breeding fee	dollar	1.00	---
Calf crop	percent	85	95
Death loss	percent	3	3
Replacement rate	percent	15	18
Production			
Milk (4% equivalent)	pound	2800	6000
Week old calf	dollar	---	12
Cull cow	pound	102	142
Veal calf	pound	300	---
Man labor	hours	125	100[1]

[1] Based on 23-cow herd and machine milking.

mended feeding and management practices, as presented in Table 16, were followed. The recommended feeding practices include 1300 pounds of concentrates, 2 tons of hay (½ legume), and 8.7 animal unit months of grazing per milk cow.

The estimated replacement rate of 18 percent of milk cows annually (15 percent sold as culls and 3 percent death loss) would require the maintenance of 36 percent as many heifers as mature cows, divided equally between heifer calves and yearlings. One bull would be required for each 25 cows. Feed and pasture requirements for replacement heifers and the herd bull are presented in Table 17. Hay and pasture for all cattle in the herd would require 5.5 acres of land per milk cow, 4.3 acres of pasture and 1.2 acres of hay.

Table 17.—Dairy Cattle: Feed and Pasture Requirements per Head per Year for Replacement Heifers and Herd Bull in Commercial Dairy Herd.[1]

Item	Unit	Dairy heifers		Herd bull[2]
		1 week to 1 year old	1 to 2 years	
Feed				
Milk	pound	450	—	—
Grain	pound	950	360	1450
Cottonseed meal	pound	250	40	250
Hay	ton	0.7	1.5	2.0
Pasture	animal unit month	3.5	7.0	
Salt and minerals	dollar	.30	.80	1.00
Veterinary, medicine, spray	dollar	.25	.50	2.50
Man labor	hours	20	15	115

[1] Herd composition per dairy cow: heifer 1-2 years, 0.18, and heifer 1 week to 1 year, 0.18, to allow 18 percent of cows raised as replacements annually; herd bull, 0.04 annual bull death loss—5 percent; 20 percent of bulls culled annually and sold at $120 each; 25 percent of bulls replaced annually, purchased at $300 each.

[2] Assumes confinement of herd bull in small enclosure.

Table 18.—Production Requirements and Production per Farm Flock of 50 Hens with Present Practices.

Item	Unit	Amount
Feed		
Purchased		
Chix feed	pound	500
Laying mash	pound	1000
Home grown grain	pound	3000
Baby chicks bought	number	100
Purchase price of chicks	dollar	13
Misc. costs	dollar	7
Egg production	dozen	500
Sales	dozen	300
Home use	dozen	200
Meat production		
Sales	pound	60
Home use	pound	140

OTHER LIVESTOCK
(Tables 18-19)

Other livestock usually found on eastern Oklahoma farms consists of 2 pigs for home use, and a flock of about 50 hens. The farm flock provides eggs and meat for home use with a small surplus for sale. Baby chicks are usually bought from a local hatchery. Two feeder pigs are fattened for the family pork supply.

As this study is limited to tractor farms, no requirements for horses and mules are presented. The proportion of tractor farms with horses and mules is steadily decreasing and those that remain have little economic significance.

COMPARISON OF PRESENT AND ALTERNATIVE FARMING SYSTEMS

The following discussion will center on the problems of fitting the various enterprises together and the probable financial returns from several alternative farming systems (assuming a 1946-50 level of prices, and costs discussed in detail in Appendix Table 8).

Alternative farming systems are presented to consider opportunities for increasing net farm income. Most farmers select, within their knowledge and expectations, the enterprises that promise to add most to net incomes. The end result depends upon the quantity, quality, and price of farm resources together with market conditions or prices for products sold. Some farm production factors are more or less fixed but individual farmers have considerable control over the selection and size of farm enterprises and the degree of efficiency in their production. Measures for improving efficiency in production for selected major enterprises have been discussed previously.

The selected alternative farming systems are standard enterprise combinations which are applicable to eastern Oklahoma farms with predominately Prairie soils. These combinations are important on groups of present farms and they are expected to be of importance in the future agriculture of the area.

Table 19.—Production Requirements and Production of Two Pigs for Home Use.

Item	Unit	Amount
Feed		
Purchased	pound	200
Home grown grain	pound	1000
Purchase price of pigs	dollar	24
Misc. cost	dollar	1
Pork liveweight	pound	400

Description of the Systems

PRESENT FARMING SYSTEMS (Table 20)

The present representative tractor farm on typical Prairie soils is composed of 160 acres of land with about 94 acres in cropland. It has 41 acres of generally unimproved permanent pasture and 25 acres of other land, woods, waste, roads, farmstead, and so on. On this farm, cropland usually is divided about equally among cotton, corn, and oats. Livestock consists of 4 milk cows, used both for the family milk supply and production of veal for sale, and 50 hens. Two pigs are usually bought and fattened for the family pork supply.

Typical soils are principally of the Bates-Dennis-Parsons soil association. Most of the cropland soils are deep, of medium permeability, and occur on moderate slopes, usually less than 3 percent.

The typical labor force is composed of the operator and two other family workers. This labor force is equal to about 1.8 man equivalents but the family labor available is conditioned and reduced by school attendance of the children.

The farms under discussion are more or less going concerns but their operators face many problems of adjustment. The history of agricultural adjustments in eastern Oklahoma appears to be characterized by confusion and contradictions. All this apparently adds up to a considerable drop in total agricultural production and much less dependence on agriculture as a source of income for people in the area. There is little evidence to indicate that many farmers have fully utilized their farm resources, or that they have adopted widely improved methods in their production plans.

Production of cotton on Prairie soils has been characterized by low per acre yields; and, unlike those in many other humid cotton growing areas, cotton yields have shown no discernible tendency to increase with drastic declines in acreage planted to cotton. Low yields on Prairie soils appear to be closely associated with fertility depletion and insect damage. These facts emphasize the particular importance of improved practices in successful production of cotton. Another major obstacle to production of cotton has been the extreme variations in labor requirements with the peak labor requirements concentrated in June, when cotton is chopped and hoed, and in fall harvest months. The farm family can plant and cultivate a much larger acreage than they can harvest. In recent years, the labor supply for contract cotton harvesting has been both uncertain and relatively high priced.

Livestock production offers an alternative to cotton. The increasing relative importance of livestock as a source of farm income was mentioned earlier. Although the representative or modal 160 acre prairie-land farm depended primarily on cotton and other crops for cash income, many other farms in the area had large livestock enterprises. Some of these livestock farms were studied in order to consider some of the problems in livestock production. In general, farmers have received many educational and credit aids to improved livestock production. Many farmers have responded to relatively high prices for livestock and livestock products by building up herds, improving pastures, and increasing production. Even with these advantages many livestock producers have found it difficult to obtain the necessary capital and to arrange for its repayment. Management and risk factors peculiar to livestock production have not always been fully considered.

ALTERNATIVE FARMING SYSTEMS

(Table 20)

Five possible alternative farming systems were developed for farms on Prairie soils. Four systems were 160 acre units, (1) Cotton, (2) Cotton and Cash Grain, (3) Cotton and Beef Cattle, and (4) Dairy. The fifth is a 320 acre Beef Cattle system. All systems include a poultry flock of 50 hens and two pigs for home use.

The typical quarter section used in these alternatives was determined on the basis of available soils information for the area and the existing soils situation on the individual farms studied. This typical quarter section included about 120 acres that can be plowed, provided good soil management practices are followed. About 25 acres should not be plowed and 15 acres would be left in farmstead, roads, or waste. Therefore, of this 160 acres, 120 acres are available for crops or pas-

Table 20.—Cropland and Livestock Organizations for Present and Alternative Farming Systems.

Item	Present system and practices	Alternative systems (Improved production practices)				
		Cotton	Cotton-cash grain	Cotton-beef cattle	Dairy	Beef cattle
		Acres				
Land use:						
Cropland	94	120	120	54	84	59
Permanent pasture	41	25	25	91	61	234
Woods and other	25	15	15	15	15	27
Total land	160	160	160	160	160	320
Cropland organization:						
Cotton	31	72	18	18	—	—
Corn	32	—	—	—	12	—
Grain sorghum	—	—	54	—	—	—
Oats	31	—	—	—	—	—
Oats & sweet clover	—	24	24	6	4	—
Sweet clover (2nd yr.)	—	24	24	6	4	—
Oat & lespedeza hay	—	—	—	24	29	59
Vetch & rye pasture	—	—	—	—	23	—
Sudan pasture	—	—	—	—	12	—
		Number				
Livestock organization:						
Dairy cows	4	2	2	2	23	2
Dairy heifers (1-2 yrs.)	—	—	—	—	4	—
Dairy heifer calves	—	—	—	—	4	—
Dairy bulls	—	—	—	—	1	—
Beef cows	—	—	—	25	—	63
Beef heifers (1-2 yrs.)	—	—	—	4	—	10
Beef heifer calves	—	—	—	4	—	10
Beef bulls	—	—	—	1	—	3
Hens	50	50	50	50	50	50
Pigs (purchased)	2	2	2	2	2	2

ture and 25 for pasture only, with 15 not practically available for either crops or pasture. Any increases in acreage of cropland compared with the present system would be accomplished by converting 26 acres of the present acreage of pasture to cropland. This conversion would be made on the basis of depth of topsoil, topography, and general adaptability to cropland use of this acreage of present pasture land. About 10 acres of present waste and idle land could be converted to pasture, which apparently would be as productive as present unimproved pasture land, merely by fencing. In all livestock systems of farming, each acre of pasture land, either presently cropland, unimproved pasture, or idle land, would be improved through complete renovation and overseeding as explained previously (24).

These alternatives vary significantly with respect to labor requirements, investment demands, and income. All of them include the use of improved production practices and the expected crop yields and livestock production rates, previously discussed.

Cotton System

In the Improved Cotton system, the main aim is to produce as much cotton as the land will stand and to produce it more efficiently. With this in mind, all of the crops included are those needed in a 5 year cotton rotation. For the cotton system to be practical, a basic assumption is necessary that *sufficient hired labor* would be available for cotton harvesting. Cotton would be planted on 72 acres, 60 percent, of the 120 acres in cropland; spring oats and sweet clover on 24 acres, 20 percent, of the cropland; and second-year sweet clover on 24 acres, 20 percent, of the cropland. This organization is for farmers who wish to specialize in cotton production and who are willing to follow improved practice recommendations for its success. Dairy cows are reduced to two head, the minimum number needed for the family milk supply.

Cotton and Cash Grain System

The cropland would be maintained at 120 acres, as in the Cotton system. The cotton acreage would be reduced to 18 acres compared with 31 acres in the present or usual organization but the total production of cotton would be 20 percent more than that on the present representative farm because of the increased yield per acre. The Darset or Redlan variety of grain sorghum, which would be harvested with a combine, would be planted on 54 acres. In order to provide a 5-year rotation for both cotton and grain sorghum, the same acreage of oats, and sweet clover, second-year sweet clover, (24 acres of each), would be included as in the Cotton system. Livestock numbers also would be the same.

Cotton and Beef Cattle System

In the Cotton and Beef Cattle system, cropland would be reduced to 54 acres, with 30 acres in the cotton rotation—18 acres of cotton, 6 acres of oats and sweet clover, and 6 acres of second-year sweet clover—and 24 acres of oat and lespedeza hay for winter feed. There would be 91 acres of improved permanent pasture compared with 25 acres of unimproved pasture in the Cotton and the Cotton and Cash Grain systems (Table 22). Pasture also would be available from the small acreage of sweet clover.

The acreage of improved pasture plus the hay crop would permit the inclusion of a herd of 25 beef cows, 2 milk cows, 4 yearling beef heifers, and 4 beef heifer calves. The calves available for sale would be marketed as feeders in the fall.

Dairy Systems

The Dairy system would include 84 acres of grain, hay, and temporary pasture crops. Corn would be grown on 12 acres with 4 acres of oats and sweet clover and 4 acres of second-year sweet clover to make up the rotation. The winter supply of roughage would require 29 acres of oat and lespedeza hay. Vetch and rye for pasture would be planted on 23 acres and Sudan for pasture on 12 acres of cropland. There would be 61 acres in improved permanent pasture. With this pasture program, grain feeding of milk cows would amount to 1 pound of grain to 4.6 pounds of 4 percent milk. About 86 percent of the grain needs would be supplied by corn and oats produced on the farm.

Dairy livestock numbers would include 23 head of milk cows, 1 bull, 4 yearling dairy heifers, and 4 heifer calves for replacement. Management practices would include keeping the bull in a small enclosure and adjusting the breeding program to have cows freshen throughout the year. Different housing, equipment, and sanitary requirements are set up to produce Grade A fluid milk or Grade C milk for manufacturing, Appendix Table 8.

Beef Cattle System (320 acres)

The Beef Cattle system includes 320 acres of total land or twice as much land as the other alternative systems discussed above. Oat and lespedeza hay would be produced on 59 acres of cropland and improved permanent pasture would be established on 234 acres.

In this organization devoted entirely to the production and sale of beef, livestock numbers would include 63 beef cows, 2 milk cows, 3 bulls, 10 yearling beef heifers, and 10 beef heifer calves. The beef calves would be marketed as feeders in the fall. January and February would be the main calving months in order to take advantage of spring and summer grass and to produce 500 pound feeders by about October 15.

Labor and Power Requirements
(Figure 5)

Production opportunities on farms and the value of alternative farming systems are conditioned and in some cases determined entirely by labor requirements for competing crop and livestock enterprises. In any kind of adjustment planning on farms, consideration should be given to both the labor *needed* and the labor *available* for proposed crop and livestock production. Estimates for the several enterprises have been used in obtaining labor requirements for the various systems. Labor for contract hay baling, or combining, were not included in the labor totals. Estimated labor requirements for overhead would be 15 percent of total crop and livestock requirements. As much of the work overhead, repairing buildings, fences, etc. can be done at any time, the monthly distribution of overhead labor was greatest in months with least labor required directly for crop and livestock

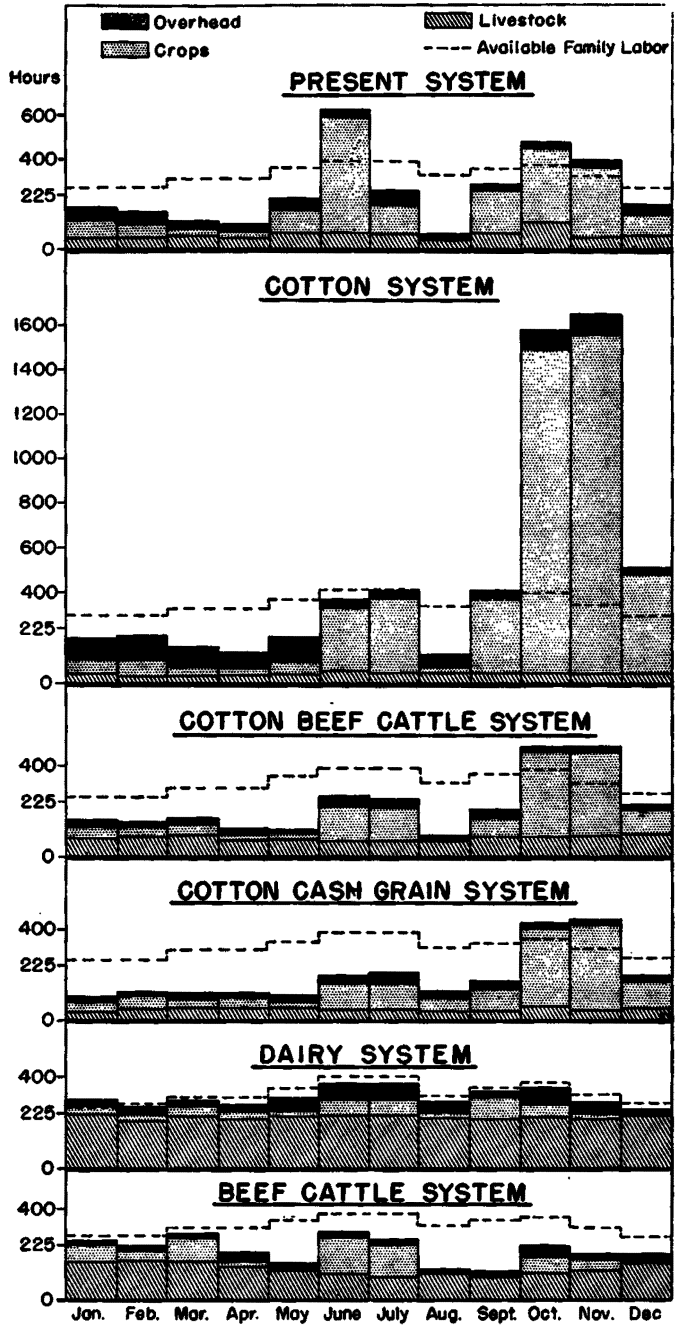

Figure 5.—Man labor requirements and labor available by specified systems of farming on Prairie soils in eastern Oklahoma.

enterprises. However, in no month was overhead labor less than 5 percent of the total crop and livestock labor requirements.

Monthly or seasonal labor requirements for the alternative farming systems are more important to farmers than total requirements because seasonal requirements indicate points of greatest labor needs in comparison with the family labor supply (Figure 5). Details of the monthly distribution of man labor requirements are presented in Appendix Table 6.

Labor requirements would pile up during the cotton harvest, particularly in October and November. The Improved Cotton system would require about 1600 hours of labor in October and the same amount in November, or for the two months about 54 percent of the total annual requirements. Labor requirements on the Improved Cotton system for September through December would exceed the family labor supply by 2768 hours and would require the hiring of approximately 78 percent of cotton harvesting. The mechanical cotton stripper may offer an answer to the problem of cotton harvesting on the prairies of eastern Oklahoma. A farmer who cannot obtain, or is not willing to be troubled with, large amounts of hired labor or mechanization for cotton harvesting would not be interested in the Improved Cotton system of farming. However, in the past history of eastern Oklahoma, more farm problems appear to have been caused by low yields and too little cotton than by high yields and too much cotton for the available labor supply.

The June peak in labor requirements for cotton, as indicated by the present system, would be cut down through use of a rotary hoe attachment on the cultivator. Use of the rotary hoe is estimated to reduce chopping and hoeing labor from an average of 15 to 6 hours per acre.

Both the Cotton-Cash Grain and the Cotton-Beef Cattle system would require some hired labor for cotton harvesting, but the amount would be minor compared with the Improved Cotton system. About 19 percent of the cotton harvesting on the Cotton-Cash Grain system and 32 percent of the cotton harvesting on the Cotton-Beef Cattle system would be hired. This would be in line with present proportions and needed hired labor would be expected to be available.

The Cotton-Cash Grain system would be the poorest utilizer of family labor of any selected alternative and both it and the Cotton-Beef Cattle system would use fewer hours of available family labor than does the Present system. Apparently there would be ample opportunity for the operator of the Cotton-Cash Grain system to do custom combining for other farmers and still have sufficient labor for his own crops during the harvest months for oats, sweet clover, and grain sorghum.

The Dairy system makes fullest use of available family labor of any alternative presented. Although labor requirements and availability are very close in most months, a dairyman with this organization would require no outside labor other than contract hay baling and combining.

The Beef Cattle system would require no hired labor, although swapping of labor usually would be practiced for some jobs. The 320 acre Beef Cattle system would utilize more hours of available family labor than either the Cotton-Cash Grain or the Cotton-Beef Cattle farming systems.

Tractor power requirements would be greatest on the Improved Cotton system with 760 hours and on the Beef Cattle system with 690 hours per year. Power requirements would be smallest on the Cotton-Beef Cattle system with only 470 tractor hours required per year. Tractor power requirements and distribution by months are reported in detail in Appendix Table 7.

Investments
(Table 21)

Total investment for 160 acre farming systems, excluding value of the farm dwelling, range from about $6400 for the Improved Cotton system to about $12,500 for the Grade A Dairy system (See Table 21, p. 40 for a summary and Appendix Table 8 for a detailed comparison of investment requirements). The investment required for both the Cotton-Beef Cattle and Grade C Dairy systems is slightly less than the Grade A Dairy system. The Cotton-Cash Grain system would require an investment of about $7000 compared with an investment of about $6500 for the present system. The 320 acre Beef Cattle unit, having twice the number of acres of land as the other alternatives, would require an investment of about $22,400 or nearly twice the investment required for the 160 acre alternatives with major beef cattle or dairy enterprises.

Individual buildings and machinery and equipment items reported in Appendix Table 8 are inventoried at one-half the new value (1946-50 price level). The new cost would be twice the amount reported. The investment in livestock represents the average value of the animals for the several age groups. For mature cows and bulls it represents the average value (1946-50 price level) over the productive life of the animals on the farm. This amounts to $120 per head for family milk cows, $135 per head for good grade beef cows, and $160 per head for good grade dairy cows. The price of young cows would be higher and the price of old cows lower than these values.

The investment required would affect the ability of individual farmers to make adjustments in their farming business. The additional investment required for a farmer to change from the present system with present practices to alternative farming systems with improved practices would amount to about $500 for the Cotton system, $1600 for the Cotton and Cash Grain system, $5800 for the Cotton and Beef Cattle system, $8000 for the Grade A Dairy system, $6500 for the Grade C Dairy system, and $17,000 for the Beef Cattle system. The additional investments required would be the cost of new buildings, farm machinery, and special equipment and the amount of money needed at 1946-50 prices to buy a herd of beef or dairy cattle, including replacement heifers, for the various alternative farming systems with improved practices. The additional investment for the 320 acre Beef Cattle system also would include the cost of 160 acres of prairie land with surface rights only.

All of the additional investment required to change from the present system to the Cotton system and Cotton and Cash Grain system would be for farm machinery, including a small combine for the Cotton and Cash Grain system. Investment in livestock would require about $4100 of the additional investment for the Cotton and Beef Cattle system, $4000 for the Dairy systems, and $10,700 for the Beef Cattle system. Buildings and special equipment would require a larger proportion of the additional investment for the Dairy systems than for the systems with beef cattle enterprises.

The total investment required when changing from the present system with present practices to an alternative system with improved practices would be greater than the average investment because the new cost of buildings and machinery would be twice the value shown in Table 21 and Appendix Table 8. For example, the Grade A Dairy system established with new machinery, equipment, and buildings would require an investment of about $4000 more than is indicated by the average investment.

Table 21.—Comparison of Costs, Returns, and Investment for Alternative Farming Systems.

Item	Present system and practices	Alternative systems (Improved production practices)					
		Cotton	Cotton-cash grain	Cotton-beef cattle	Dairy grade A	Dairy grade C	320 Acre beef cattle
		Dollars					
Investment:*							
Land	4000	4000	4000	4000	4000	4000	8000
Buildings	700	625	625	1010	1648	1173	1500
Farm machinery & equip.	1281	1520	2070	1830	2320	2052	1628
Livestock	530	290	290	4605	4540	4540	11255
Total	6511	6435	6985	11445	12508	11765	22383
Gross cash income:							
Crops:							
Cotton	1748	8121	2030	2030	0	0	0
Gr. sorghums	0	0	2646	0	0	0	0
Other crops	1256	1070	1070	111	74	74	0
Total crops	3004	9191	5746	2141	74	74	0
Livestock:							
Beef and veal	249	124	124	2541	596	596	6140
Milk and butterfat	61	0	0	0	6525	4763	0
Chickens & eggs	125	125	125	125	125	125	125
Lotal livestock	435	249	249	2666	7246	5484	6265
Total cash income	3439	9440	5995	4807	7320	5558	6265
Cash expenses:							
Seed, insect. fert. & lime	246	1101	707	815	849	849	1463
Cotton harvesting	119	1741	121	190	0	0	0
Contract & other labor	187	180	24	189	378	378	708
Feed & grinding	184	138	138	118	548	548	310
Other livestock expenses	144	94	94	218	211	211	444
Auto and hauling	202	239	372	210	892	892	210
Tractor, mach. & equip.	328	447	368	278	381	371	396
Overhead (repairs, tax, etc.)	126	198	139	211	444	334	388
Total cash expenses	1536	4138	1963	2229	3703	3583	3919

Table 21.—Continued.

Item	Present system and practices	Alternative Systems (Improved production practices)					
		Cotton	Cotton-cash grain	Cotton-beef cattle	Dairy grade A	Dairy grade C	[illegible] cattle
Net cash income	1903	5302	4032	2578	3617	1975	2346
Depreciation	240	259	358	337	478	399	346
Home used products	413	391	391	391	391	391	391
Returns to capital, family labor and management	2076	5434	4065	2632	3530	1967	2391
Interest on investment	326	322	349	572	625	588	1119
Returns to family labor and management:							
Total	1750	5112	3716	2060	2905	1379	1272
Per hour of family labor	0.64	1.63	1.75	0.85	0.77	0.36	0.48

* Includes only surface value of land. Value of buildings, farm machinery and equipment based on ½ new cost at 1946-50 price levels.

Income
(Table 21)

"Will it pay?" and "how much will it pay?" are questions which every farmer wants to have answered about proposed farm adjustments and alternative farming systems. In this section several alternative farming systems are discussed and evaluated. The most profitable alternative farming system would be the Cotton system of farming. It would have the highest net cash income, and the highest net returns to capital, family labor, and management (Table 21). In order, the next most profitable systems would be the Cotton-Cash Grain, Grade A Dairy, and Cotton-Beef Cattle. The present system has the lowest net cash income (cash receipts minus cash expenses) of any, although very little lower than the Grade C Dairy system. If annual depreciation is charged on buildings and machinery and value of home-used products added in, the result is returns to capital (investment), family and operator's labor, and management. This is approximately the amount of money that the farmer and his family would have left to maintain the farm dwelling, to buy clothes and food, to pay installments on the television set and other household appliances, and to make any principal or interest payment on long-term debts and for savings. This return would range from a high of about $5400 for the Cotton system down to $2000 for the Grade C Dairy. Using this measure, the Grade C Dairy system would be less profitable than the present system.

If 5 percent interest is charged on the total investment in land, buildings, machinery, and livestock, the Cotton system would return more to family labor and management than any other system. The 320 acre Beef Cattle system and the Grade C Dairy System would return the least to family labor and management. On the basis of returns per hour of family labor the Cotton-Cash Grain system leads with $1.75 compared with $1.63 per hour from the Cotton system. However, total returns are higher from the Cotton System because it utilizes considerably more hours of family labor. Only $0.36 per hour of operator and family labor would be returned by the 160 acre Grade C Dairy system and $0.48 per hour by the 320 acre Beef Cattle system.

These incomes are the results of production and sale of farm products minus the indicated expense items. Details of the production and disposition of farm products by systems of farming may be determined from Appendix Table 9. Feed needs associated with systems of farming are presented in Appendix Table 10. Operating and overhead costs for a specialized dairy enterprise are presented in Appendix Table 11. A summary of all overhead costs by systems of farming appears in Appendix Table 12.

Effects of Changes in Price of Products and Costs On Income
(Table 22)

The level of prices and costs and relationships between individual product prices and costs would affect considerably the profitability of alternative farming systems. The relative returns from the Grade A and Grade C Dairy systems furnish an illustration of this fact (Table 21). The difference in price received, $5.00 per cwt. for Grade A and $3.65 per cwt. for Grade C milk, is the major reason for considerably lower returns from the Grade C Dairy system.

At the same milk production rate per cow for both Dairy systems, annual cash expenses would be only $120 less, annual depreciation $79 less, and interest on investment only $37 less on the Grade C System than on the Grade A System. Lower costs, therefore, have a relatively minor effect compared with lower prices on net income from the Grade C system.

A wide variety of differences in prices and costs relationships have been considered to indicate the probable effect of variations in prices and price relationships on the income derived from the various alternative farming systems.

Hired cotton harvesting would be a major cash cost on the Cotton system. The cost of hiring cotton harvesting amounts to $1741 or 42 percent of total cash expenses on the basis of $3.25 per hundred pounds (picked equivalent), or about $49 per bale. Therefore a crossword puzzle type of comparison of income results using varying prices of cotton and cost of cotton harvesting has been prepared (Table 22a). The Cotton system shows up well considering the range of prices used for comparison. If the price of seed cotton were to decline to 10.5 cents a pound (28 cents lint basis) and the cost of harvesting to increase to $4.00 per cwt. ($60 per bale), the income returns would be as favorable as returns from the Cotton-Cash Grain system with cotton at 12 cents per pound of seed cotton and grain sorghums at $1.40 per bushel. The price of seed cotton would have to go below 9 cents per pound (24 cents per pound of lint) and the cost of cotton harvesting to more than $5.00 per cwt. ($75 per bale) before income returns from the Cotton system would be as low as returns from the Cotton-Beef Cattle system with beef calves at 20 cents a pound and cotton at 12 cents per pound. If seed cotton declined to 7.5 cents a pound (20 cents per pound of lint) and harvesting costs remained at $3.25 per 100 pounds, the returns from the Cotton system would be as great as returns from the Cotton-Beef Cattle system at prices of 20 cents for beef calves and 12 cents for cotton. A decline in the price of seed cotton to 9 cents a pound (24 cents per pound of lint) and maintenance of harvesting costs at $3.25 per cwt. would reduce returns from the Cotton system to approximately the level of returns from the Grade A dairy system with milk at $5.00 per cwt. and present costs.

No price comparisons were computed for the Cotton-Cash Grain system (Table 22b) which would equal returns from 12 cent seed cotton and $3.25 per cwt. harvesting costs on the Cotton system. However, price of seed cotton would have to decline to 7.5 cents per pound and price of grain sorghums to 90 cents a bushel before returns from the Cotton-Cash Grain system would be as low as returns from the Cotton-Beef Cattle system with 20 cent beef calves and 12 cent seed cotton. If the price of seed cotton were to decline to 7.5 cents a pound and the price of grain sorghums to less than $1.40 a bushel, returns from the Cotton-Cash Grain system would be less than returns from the Grade A Dairy system with milk at $5.00 per cwt.

Like the Cotton-Cash Grain system, no price comparisons were computed for the Cotton-Beef Cattle system (Table 22c) which would equal returns from 12 cent seed cotton and $3.25 per cwt. harvesting costs on the Cotton system. But, if the price of beef calves were to rise to 35 cents a pound (and comparable prices for cull cows marketed) and seed cotton remained at 12 cents a pound, returns would be higher for the Cotton-Beef Cattle system than for the Cotton-Cash Grain system with 12 cent seed cotton and $1.40 grain sorghum. The price of seed cotton would have to decline to 7.5 cents a pound with the price of beef calves remaining at 20 cents a pound for the return from the Cotton-Beef Cattle system to be as low as returns from the 320 acre Beef Cattle system.

Table 22a.—Effect of Changes in Price of Cotton and Cost of Harvesting on Operator's Return for Family Labor and Management—Cotton System.[1]

Cost of harvesting per cwt. seed cotton	Price of seed cotton—cents per pound[2]					
	7.5	9	10.5	12	13.5	15
	Operator's returns in dollars					
5.00	1139	2154	3169	4184	5199	6214
4.00	1669	2684	3699	4714	5729	6744
3.25	2067	3082	4097	5112[3]	6127	7142
2.00	2729	3744	4759	5774	6789	7804
1.00	3259	4274	5289	6304	7319	8334

[1] Assumes no change in other prices and costs.
[2] Multiply seed cotton price by 2.67 to get approximate price of lint per pound.
[3] Represents estimated returns at the 1946-50 price level.

Table 22b.—Effect of Changes in Prices of Cotton and Grain Sorghums on Operator's Returns for Family Labor and Management—Cotton and Cash Grain System.*

Price of grain sorghum cents per bushel	Price of seed cotton—cents per pound					
	7.5	9	10.5	12	13.5	15
	Operator's returns in dollars					
175	3617	3870	4124	4378	4632	4886
160	3333	3586	3840	4094	4348	4602
140	2955	3208	3462	3716**	3970	4224
120	2577	2830	3084	3338	3592	3846
105	2293	2546	2800	3054	3308	3562
90	2010	2263	2517	2771	3025	3279

* Assumes no change in other prices and cost.
** Represents estimated returns at the 1946-50 price level.

Table 22c.—Effect of Changes in Prices of Cotton and Beef Calves on Operator's Returns for Family Labor and Management—Cotton and Beef Cattle System.[1]

Price of beef calves cents per lb.[2]	Price of seed cotton—cents per pound					
	7.5	9	10.5	12	13.5	15
	Operator's returns in dollars					
35	3167	3420	3674	3928	4182	4436
30	2544	2797	3051	3305	3559	3813
25	1922	2175	2429	2683	2937	3191
20	1299	1552	1806	2060[3]	2314	2568
15	676	929	1183	1437	1691	1945
10	54	307	561	815	1069	1323

[1] Assumes no change in other prices and costs.
[2] Assumes a comparable change in price of cull beef cows sent to market.
[3] Represents estimated returns at the 1946-50 price level.

The Grade A Dairy system would exceed returns from the Cotton system with 12 cent seed cotton if the price of milk was $6.75 per cwt. and costs remained the same as with the $5.00 per cwt. price of milk (Table 22d) A price of $6.00 for milk and the same costs would result in a greater return from the Grade A Dairy system than from the Cotton-Cash Grain system with 12 cent seed cotton and $1.40 grain sorghum. Returns from the Grade A Dairy system would be greater than returns from the Cotton-Beef Cattle system (12 cent seed cotton and 20 cent beef calves) with milk at $4.50 per cwt. The 160 acre Grade A Dairy system would return about the same amount as the 320 acre Beef Cattle system (20 cent calves) with milk at $3.75 per cwt. No actual losses were evident in the calculations for alternatives discussed above but the Grade A Dairy system would show a loss if the price of milk was $3.75 per cwt. or less and if cash expenses were 150 percent of those calculated. A milk price of $3.00 per cwt. would result in loss if cash expenses were 125 percent of those calculated.

A price of 35 cents a pound for beef calves and calculated costs would result in a higher return from the 320 acre Beef Cattle system than from the 160 acre Cotton system with a seed cotton price of 12 cents per pound (Table 22e). A price of 30 cents a pound for beef calves would result in returns greater than those from the Cotton-Cash Grain system with 12

Table 22d.—Effect of Changes in Price of Milk and Cash Cost on Operator's Returns for Family Labor and Management—Grade A Dairy System.*

Percent of present cash expenses	Price of milk—dollars per hundred weight					
	3.00	3.75	4.50	5.00	6.00	6.75
	Operator's returns in dollars					
150	—1556	—577	402	1054	2359	3338
125	— 631	348	1327	1979	3284	4263
100	295	1274	2253	2905**	4210	5189
75	1221	2200	3179	3831	5136	6115
50	2146	3125	4104	4756	6061	7040

* Assumes no change in other prices or fixed costs.
** Represents estimated returns at the 1946-50 price level.

Table 22e.—Effect of Changes in Price of Beef Calves and Cash Costs on Operator's Returns for Family Labor and Management—Beef Cattle System.*

Percent of present cash expenses	Price of beef calves—cents per pound**					
	10	15	20	25	30	35
	Operator's returns in dollars					
150	—3704	—2195	— 687	821	2330	3838
125	—2725	—1216	292	1800	3309	4817
100	—1745	— 236	1272***	2780	4289	5797
75	— 765	744	2252	3760	5269	6777
50	214	1723	3231	4739	6248	7756

* Assumes no change in other prices or fixed costs.
** Assumes a comparable change in price of cull beef cows sent to market.
*** Represents estimated returns at the 1946-50 price level.

cent seed cotton and $1.40 grain sorghum. A price of 25 cents a pound for beef calves would result in returns for the 320 acre beef cattle system only slightly lower than returns from the Grade A system with a milk price of $5.00 per cwt. Losses would result from a 10 cents per pound price for beef calves even if cash expenses were only 75 percent of those calculated at the 1946-50 price level. Losses would result from a 15 cent a pound price for beef calves if cash expenses were the same (100 percent) or greater than those first calculated. A drop in the price of calves from 30 cents to 15 cents and the same cash costs would mean decline in income of approximately $4500 for the 320 acre Beef Cattle system. If drought or other causes resulted in higher cash costs at the time of decline in the beef prices, the income adjustment would be even more severe.

The calculation of returns with lowered cash costs (cotton harvesting for the Cotton system, and total cash expenses for the Grade A Dairy and Beef Cattle systems) point up the obvious fact that farm returns would be greater at the same product price with lower costs than indicated and that income declines with lower product prices would be less severe with lower costs. However, returns from farming have been characterized by favorable periods of rapidly rising product prices and less slowly rising costs and unfavorable periods of rapidly falling product prices and almost constant costs. The year 1947 was a standout in the recent favorable war and postwar period while the depressed years of the 1930's represented an unfavorable period of price-cost relationships. For beef cattle producers and feeders 1953 may be remembered as a year of very unfavorable price-cost relationships.

SOME IMPLICATIONS AND CONCLUSIONS

Considerable opportunity for increasing efficiency in the production of crop and livestock enterprises through improvements in production practices exists on Prairie soils of eastern Oklahoma. Present research appears to indicate practical possibilities of doubling per acre yields of cotton and feed crops. Legumes, sweet clover in particular, would be grown in rotation with row crops. Production of beef per acre of pasture land could be increased more than 100 percent over the present production level with an improved pasture program of seeding, liming, and fertilizing. As many present pastures have received some improvement, the increase in production above the level of unimproved pasture would be even greater. An improved pasture and general management program on dairy farms could result in average annual milk production per cow of 6000 pounds of 4 percent milk with a relatively low rate of concentrate feeding to milk produced (1 pound of concentrates to 4.6 pounds of milk).

For purposes of budgeting alternative farming systems reported in this study, the 1946-50 price level was used for estimating prices received for farm products and prices paid for items used in production. These prices reflect a period of high economic activity, generally full employment, and active demand for farm products.

Accurate measurement of the income opportunities afforded by alternative farming systems can be made only within a framework of basically similar soil and other physical farm resources. Therefore, the basic similarities of physical resources have been the underlying assumption of the study of alternative farming systems reported in this bulletin. Also, all these systems have been considered on the basis of the land being owned and farmed by the operator. Differences in

labor requirements, investment demands, and incomes associated with the several alternative farming systems have been stressed in detail in preceding sections.

Within this framework of analysis, cotton appears to be the most profitable enterprise. Farming systems that emphasize the more efficient production of cotton appear to afford opportunities for greatest farm incomes on 160 acre tractor farms with typical Prairie soils. The problem of harvesting cotton with hired labor or by using mechanization, must be met and solved if large per farm acreages of cotton are to be grown. But it appears that as many cotton production problems in eastern Oklahoma have been caused by low yields and too little cotton as by high yields and too much cotton for the available labor supply. Even with reductions in prices of seed cotton below 12 cents per pound (32 cents per pound of lint), cotton systems of farming would compare favorably with most other systems even if prices received for products of these other systems were maintained at the 1946-50 price level. Therefore, it appears that farmers would maximize profits by growing as much cotton as maintenance of soil fertility and production control programs would permit Use of improved practices to increase per acre yields would improve their efficiency in cotton production. The acreage of cotton that any individual farmer on Prairie soils actually should grow will be conditioned by the expected labor supply, or feasibility of mechanical harvesting, managerial aptitudes (likes and dislikes), and other factors.

On farms with Prairie soils, a Cotton-Cash Grain system offers income opportunities second only to a specialized Cotton system. This system also has the additional advantage of requiring very little hired labor (for cotton harvesting). It would actually return more per hour of operator and family labor (with 1946-50 prices) than would the Improved Cotton system, $1.75 compared with $1.63 per hour, because it requires fewer hours of man labor. The time not needed for home farm work might be utilized in doing custom combining for neighboring farmers; and, therefore, the Cotton-Cash Grain system would have more attractions than the Cotton system to some farmers. Thus, the next best alternative to cotton, in terms of money returns, and one which might be the best alternative in periods when production control programs limit the acreage of cotton, would be the production of small grains and grain sorghum for sale in addition to cotton.

Where conservation requires a substantial acreage in sod or close growing crops, the 160 acre Grade A Dairy would provide an income greater than a 160 acre Cotton-Beef Cattle farm and a 320 acre Beef Cattle farm. Returns per hour of operator's labor would be higher on the Cotton-Beef Cattle farm but more labor would be utilized by the Grade A Dairy system. The constant day-to-day attention demanded by the Grade A Dairy system would make it less attractive to some farmers as a production alternative. The 160 acre Grade C Dairy system and the 320 acre Beef Cattle system would return the least to operator and family labor. The returns per hour of labor are higher on the Beef Cattle system than on the Grade C Dairy system.

Higher prices for livestock and milk and the same or lower prices for cotton and grain sorghum would improve the relative position of the livestock systems of farming. Also, the application of future research findings and the increasing experience of farmers in livestock production may improve the relative position of livestock enterprises in comparison with cash crops on Prairie soils. In addition the trend toward larger farms and the increasing recognition of conservation needs would tend to continue the trend toward more livestock production. Production of beef cattle is also well adapted

to part-time farmers. Off-farm income would enable more rapid accumulation of capital and would reduce the effects of extreme price fluctuations. For these and other managerial reasons, production of beef cattle appears to have more possibilities of significant future increases than does dairy production. However, expanding markets for Grade A milk would result in less advantage to beef production.

Rough approximations appear to indicate that *about 2 sections (1280 acres) of prairie land devoted to production of beef cattle (20 cents for beef calves) would be needed to equal returns to labor and management from a 160 acre farm devoted to specialized improved cotton production (12 cent seed cotton), when there is no restriction on the acreage of cotton which can be grown. If this were carried out, 8 cotton farms and their operators would need to be replaced for each 1 beef cattle farm and its operator. If we assume 100 percent equity in investment for both owner-operators on cotton* and beef cattle farms, returns to capital, labor, and management would be equal from about 5 quarters (800 acres) in beef cattle production and 1 quarter in specialized improved cotton production.

The importance of significant educational, credit, and cash assistance to producers which have facilitated adjustments in recent years to livestock systems of farming should not be overlooked. Governmental payments for pasture establishment, fertilizing and liming, etc. have not been considered as sources of farm income in the alternative system of farming discussed but these expenses were charged as farm expenses at market prices. Many adjustments to livestock farming systems were needed because of the type and condition of soil and farm resources.

Problems of tenure arrangements are considered in the analysis. But, these problems would be as great, or even more severe, in livestock systems of farming as in crop production. A stated proportion of crop production (a fourth of cotton and a third of the grain crops) apparently has been of considerable importance in reducing the ability of tenants to continue production of cotton and other crops during years of low yields and high fixed costs of production. In recent years, a sure pay check in off-farm employment has been a great deal more attractive to some farmers, particularly those on small or medium-sized units, than complete dependence on farm incomes affected by the vagaries of weather and prices.

The above judgments refer directly only to farmers with typical Prairie soils. In a different setting of soil and farm resources the results would be expected to differ from those presented here. The results of this study should improve the basis for considering the economic aspects of selecting alternative farm enterprises and for improving farm planning in general. The major purpose of this economic evaluation has been to provide a basis for reducing the magnitude of possible errors in farm production planning and thereby to increase efficiency in the use of farm resources and improve incomes of farm operators.

Appendix I

METHOD OF PROCEDURE

The 1945 and 1950 agricultural Census for the counties within the area were analyzed to provide a general description of the farming in the area and to provide a basis for sampling. In cooperation with the Bureau of the Census a sample, using a differential sampling rate[1], of each important farm type was drawn. A complete listing of crop and livestock information was made from Census records for each of these farms. The data which were placed on separate cards for each farm were used in classifying the farms by type (farm management) and size.

Farm types originally selected for further study were cotton, cotton-cattle, cattle, dairy, and vegetable farms. These farms were further subdivided into two size groups with very small and overly large farms not included for study (Appendix Table 1). The type of farms chosen for study accounted for almost 70 percent of commercial farms in 1945.

A subsample of farms was drawn from the Census sample to determine the physical classification of the two size groups of cotton, cotton-cattle, cattle, dairy, and vegetable farms. This original subsample included half of the Census sample of small and medium cotton farms, two-thirds of the cotton-cattle farms, and all of the Census sample of cattle, dairy, and vegetable farms selected for further study. The geographic location and legal description of the farms in the physical classification sample were obtained by checking the names of the farm operator and landlord, if any, together with land use, etc. against the 1944 AAA worksheets in the various county PMA offices.

The detailed legal descriptions for the farm sample was used as the basis for securing Soil Conservation Survey maps containing soils, slopes, erosion, and land use conditions mapped on aerial photographs, scale of 4 inches to 1 mile, by the State Soil Scientist, Soil Conservation Service. With the active participation of the State Soil Scientist, the farm unit was located and outlined on the base map; and the acreage and proportion of major soil groupings, soil depth, slope, and erosion conditions were listed in detail on worksheets. This information was used as the basis for physical classification of the sample farms.

Examination of the physical data for farms with predominantly Prairie soils (at least 90 percent of cropland and 80 percent of total land) revealed that more than 75 percent of these farms had deep prairie soils (generally 20 inches or more which can be readily penetrated by plant roots) with slopes of less than 3 percent with little or moderate sheet erosion. The percentage of cotton farms on prairie land with deep soils was more than 80 percent while shallow and steeper Prairie soils were found to a greater, although relatively insignificant, extent on cattle and dairy farms. Therefore, the farms visited in the field work were those with typical Prairie soil resources.

Further inspection of the 1950 Census information appears to indicate that the farm types chosen for study of commercial farms are of more importance at present than they were in 1945. Apparently the farm types used for economic evaluation accounted for about 80 percent of all commercial farms in 1950 compared with

[1] A higher percentage of some type groups than others was drawn in order to have a sufficient number of farms represented in each selected type group for physical classification and field visits.

about 70 percent in 1945. The 1950 Census data also indicates that Prairie soils are of greater relative importance to the commercial agriculture of the area than in 1945. Counties with a high proportion of Prairie soils, Muskogee and McIntosh, had smaller reductions in harvested cropland, numbers of commercial farms, and numbers of farms reporting cotton, for example, than did counties such as LeFlore and Sequoyah which have small proportions of prairie land. In addition, a considerable acreage of Ozark Highland and bottomland soils in eastern Wagoner county was taken out of farms and removed from cultivation by the construction of the Fort Gibson dam and reservoir. Comparison of 1945 and 1950 Census figures also indicate the increasing importance of the 160 acre (quarter section) farm as the modal, or most numerous, size of commercial farms.

About 150 farmers in the area were visited to obtain detailed information on their farm organization, production requirements, and normal yields and production rates for the major crop and livestock enterprises, and overhead and general information. About 10 or 12 farms from each important class were selected for field study. Farms visited were not limited to groups of farms of most statistical importance (relatively most numerous) but included other farm groups such as dairy farms which, although relatively few in number, offered alternatives to presently important farming systems.

From a careful analysis of field records and experience gained from field contacts, one or more case farms were selected for important size-type groups of farms for "down to earth" study of current developments and desirable changes for the particular group of farms. Farm account records were set up to provide a continuing record of farm performance and to observe future results of the application of new farming methods and combination of enterprises.

The adjustments in farm organization and changes in farm practices were based upon experimental results, judgment of technical production specialists and other agricultural workers, and data obtained from farmers. The process of developing and appraising alternative farming systems included the following:

1. Consideration of the suitability of soils for various crops, including pasture.
2. Changes in crop and livestock production practices which would maintain and increase soil fertility and improve production efficiency.
3. Comparison of labor requirements and relative yields and production rates of various crops and livestock enterprises expected with improved production practices and with prevailing or present practices.
4. Determining the cost of operating farm power and machinery and types of machines adapted to several production situations.
5. Evaluating alternative farming systems containing various combinations of crop and livestock enterprises which are presently important or are expected to have possibilities of future importance in the agriculture of the area by:
   a. Comparison of labor requirements for the selected alternative farming systems with the available family labor.
   b. Comparison of investment required for the alternative farming systems.
   c. Comparison of income and sources of income for the alternative farming systems with 1946-50 level of farm product prices and production costs.

Appendix II

PRICES RECEIVED, PRICES PAID, AND COST OF FARM POWER AND MACHINERY

Prices Received For Products And Paid For Materials And Services

(Appendix Table 2)

In the process of establishing incomes and expenses from alternative farming systems reported in this study, the 1946-50 price level was used for estimating prices received for farm products and paid for items used in production. They are *not forecasts* of future prices, but they represent prices during a period of high economic activity, full employment, and active demand for farm products.

Oklahoma State prices were adjusted, when necessary, to eastern Oklahoma conditions. The prices for different kinds of cattle sold are based on usual relationships during 1946-50, within an average of about $18 per hundredweight for all cattle. The price for veal calves represents lower quality animals, mixed dairy and beef breeds, than does the price for feeder beef calves.

COST OF OPERATING FARM POWER AND MACHINERY

The present-day tractor farmer is much more aware of cost of farm power than his counterpart of earlier years, who produced on the farm most of the feed (fuel) for his mule or horse power. Fuel bills must be met regularly and both tractors and equipment kept in good repair and adjustment for effective use. Also, the investment in tractors and machinery is now a significant proportion of the total farm investment.

Tractor Costs

(Appendix Table 3)

Estimated costs of operating a 2-row tractor, based on a 1946-50 price level, amount to operating costs of $4.05 per 10-hour day and overhead costs of $156.71 per year. As overhead costs are relatively stable, total cost per hour of tractor power will tend to decrease with an increase in total annual use. On the basis of 500 hours of annual use, total tractor costs would amount to $7.18 per 10-hour day or 72 cents per hour. The average life of tractors was 14 years which accounts for the high proportion of repairs in operating costs. Some farmers reduce tractor operating costs by more frequent replacement of tractors and thereby have fewer repairs. In general, this practice results in higher depreciation cost.

Tractor and machinery operating costs for alternative farming systems were varied according to the amount of annual use while overhead costs were the same for each tractor or machinery item for all systems.

Combine Costs
(Appendix Table 4)

The small combine harvester has increased in importance on farms in eastern Oklahoma. It can be used to advantage on farms with sizeable acreage of small grains or grain sorghum. Operating costs amount to $4.40 per 10-hour day and overhead costs to $132 per year for a 6-foot combine operated with power take-off. Based on an annual use of 100 hours, the total combine cost would amount to $1.76 per hour but this does not include tractor and labor costs required for the complete harvesting operation. All costs need to be considered in a decision to own a combine or hire the work done by custom operators. The opportunity to custom harvest for neighboring farmers and the availability of custom operators also need consideration. Usually, it would be cheaper to pay up to $3.25 per acre for custom harvesting including the cost of the tractor and operator if annual use of the combine was expected to be less than 100 hours or about 100 acres harvested.

Farm Machinery Costs
(Appendix Table 5)

Overhead costs are a major proportion of total costs in the operation of most items of farm machinery. This is particularly true of grain drills, side delivery rakes, tandem disc harrows, and trailers. In contrast, repairs usually would exceed overhead costs for breaking plows and mowing machines. The high costs per hour of use for some machinery items is off-set by savings in labor, the rotary hoe for example, and their contribution to more efficient farming systems.

Appendix Table 1.—Size-Type Groups of Commercial Farms Selected for Physical Classification and Economic Evaluation.[1]

Size-type of farms[2]	Number of farms: In census sample	Number of farms: Total in area	Percentage of commercial farms	Estimated number of farms with Prairie soils
Cotton				
Small	213	2816	24.0	1315
Medium	110	1454	12.4	700
Other	56	740	6.4	XX
Cotton-cattle				
Small	60	543	4.6	178
Medium	68	697	6.0	296
Other	13	145	1.2	XX
Cattle				
Small	65	444	3.8	179
Large	34	233	2.0	105
Sub-small	52	355	3.0	XX
Dairy				
Small	72	232	2.0	149
Large	43	138	1.2	114
Sub-small	28	90	0.7	XX
Vegetable				
Small	34	77	0.7	17
Medium	37	84	0.7	0
Other	54	123	1.0	XX
All other types	319	3542	30.3	XX
Total commercial farms	1258	11713	100.0	XX

[1] Estimates based on detailed examination of 1945 Census materials and basis for physical classification of farms provided by Soil Conservation Service. Type based on major income source or sources.

[2] Size-breakdown as follows: Small Cotton, 20.0 to 59.9 acres of cropland; Medium Cotton 60.0 to 139.9 acres of cropland; Small Cotton-Cattle 1.0 to 9.9 acres of cotton; Medium Cotton-Cattle 10.0 to 29.9 acres of cotton and with at least 30 percent of cash income from cotton and at least 30 percent from cattle sales: Small Cattle, 10 to 39 head; Large Cattle, 40 head and over; Small Dairy, 5 to 14 cows milked; Large Dairy, 15 or more cows milked; Small Vegetable, 5 to 14.9 acres of vegetables; and Large Vegetables, 30.0 to 74.9 acres of vegetables for sale.

Appendix Table 2.—Estimated Prices Received For Farm Products and Paid For Items Used in Production, 1946-50 Price Level, Eastern Oklahoma.[1]

Item	Unit	Price (dollars)	Item	Unit	Price (dollars)
		Prices received for farm products sold			
Cotton (in seed)[2]	lb.	0.12	Feeder beef calves	cwt.	20.00
Oats	bu.	0.85	Cull beef cows	cwt.	13.00
Grain sorghum	bu.	1.40	Cull dairy cows	cwt.	11.00
Sweet clover seed	lb.	0.10	Veal calves (mixed dairy)	cwt.	17.00
Corn	bu.	1.50	Week old calf	No.	12.00
Butterfat	lb.	0.61	Grade A milk	cwt.	5.00
Eggs	doz.	0.37	Grade C milk	cwt.	3.65
Poultry meat	lb.	0.23			
		Prices paid for items used in production			
Seed:			Contract work:		
Cotton	lb.	0.10	Cotton picking	cwt.	3.25
Oats	bu.	1.75	Combining	acre	3.25
Grain sorghum	lb.	0.10	Baling hay	ton	6.00
Corn	lb.	0.17	Hauling oats	bu.	0.04
Lespedeza	lb.	0.16	Hauling grain sorghum	bu.	0.07
Vetch	lb.	0.16	Sodding bermuda	acre	8.00
Rye	bu.	2.25	(cleaning and sacking		
Sudan	lb.	0.12	sweet clover seed)	cwt.	0.50
Hop clover	lb.	0.50	Feed grinding	cwt.	0.25
			Hauling milk	cwt.	0.50
Ladino clover	lb.	1.25	Grain drill rental	acre	1.00
Fertilizer:			Cotton dusting mach. rental	acre	.10
5-10-5	ton	42.00	Feed:		
4-12-4	ton	40.00	Prairie hay	ton	10.00
33-0-0	ton	76.00	Cottonseed meal	ton	80.00
0-20-0	ton	30.00	Hog supplement	cwt.	6.00

Appendix Table 2.—Continued.

Item	Unit	Price (dollars)	Item	Unit	Price (dollars)
Lime (spread)	ton	3.50	Laying mash	cwt.	4.50
Insecticides:			Chick starter	cwt.	5.00
3-5-40	lb.	0.11	Hoeing labor	hour	0.40
3-10-40	lb.	0.14	Tractor driving	hour	0.60

[1] Oklahoma State prices adjusted, where necessary, to eastern Oklahoma conditions. See other Appendix tables and individual crops and livestock tables in text for other cost items.

[2] Equivalent to about 32 cents a pound for lint and $70 a ton for cottonseed if cotton were ginned. Most cotton is sold in the seed by farmers in eastern Oklahoma.

Appendix Table 3.—Estimated Cost of Operating a 2-row Tractor,[1] 1946-50 Price Level.

Item	Unit	Quan.	Price	Cost
Operating costs (Per 10-hour day)				
Gasoline	gal.	12.0	$ 0.16	$ 1.92
Oil	qts.	1.0	0.24	.24
Grease	lbs.	1.5	0.16	.24
Repairs	---	---	---	1.65
Total[2]	---	---	---	$ 4.05
Overhead costs (Per year)				
Present cost (new)	---	---	$1450.00	---
Depreciation[3]	---	---	---	93.21
Tire replacement	---	---	---	20.00
Interest on investment[4]	---	---	---	43.50
Total	---	---	---	$156.71

[1] See Appendix Table 4 for estimated costs of operating tractor-drawn machinery.
[2] Does not include value of 30 minutes of farm operator's time per 10 hours of use for servicing tractor.
[3] Straight line depreciation, 14-year life, 10 percent salvage value.
[4] 6% on one-half new value.

Appendix Table 4.—Estimated Cost of Operating a 6-Foot Combine, 1946-50 Price Level.

Item	Unit	Quan.	Price	Cost
Operating costs (Per 10-hour day)				
Grease	lbs.	2.5	$ 0.16	$ .40
Repairs	---	---	---	4.00
Total	---	---	---	$ 4.40
Overhead costs (Per year)				
Present cost (new)	---	---	$1100.00	---
Depreciation[1]	---	---	---	99.00
Interest[2]	---	---	---	33.00
Total	---	---	---	$132.00

[1] Straight line depreciation, 10 year life, 10% salvage value.
[2] 6% interest on ½ new value.

Appendix Table 5.—Estimated Annual Cost of Operating Specified Items of Farm Machinery, 1946-50 Price Level

Item	Size	Value new	Estimated life	Repairs[1]	Overhead costs		Hours used	Cost per hour used	
					depreciation[2]	interest[3]		repairs	overhead
		dollars	years	dollars	dollars	dollars	hours	cents	[illegible]
Breaking plow	2-14″	220	14	25	14	7	115	22	18
Tandem disc harrow	6-7′	200	15	10	12	6	55	18	33
Section harrow	2-sect.	55	17	5	3	2	40	12	12
Planter	2-row	165	14	12	11	5	30	40	53
Cultivator	2-row	210	12	17	16	6	135	13	16
Rotary hoe[4]	2-row	50	5	2	9	2	20	10	55
Mowing machine	7 ft.	230	20	20	10	7	100	20	17
Side delivery rake	—	250	10	10	22	8	100	10	30
Grain drill	12-7″	400	20	8	18	12	35	23	86
Pasture seeder[5]	—	60	20	2	3	2	20	10	25
Wagon-trailer	—	210	20	5	10	6	75	7	21

[1] Includes grease and oil.
[2] Straight line depreciation 10 percent salvage value.
[3] 6 percent interest on ½ new value.
[4] Estimates supplied by agricultural engineer. In form of attachment for 2-row cultivator.
[5] Grain drill attachment.

APPENDIX III

ADDITIONAL TABLES

Appendix Table 6.—Estimated Hours of Man Labor Required by Months by Specified Farming Systems.

Item	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
					Present System								
Crop													
Cotton	13	28	9	6	25	409	130	---	78	313	319	93	1423
Corn	29	26	16	16	83	115	6	---	115	77	---	---	483
Oats	43	22	9										74
Total	85	76	34	22	108	524	136	---	193	390	319	93	1980
Livestock													
Milk cows	40	36	40	44	46	46	44	42	40	42	40	40	500
Hens	17	17	16	19	17	15	12	12	14	12	14	15	180
Pigs	3	4	4		2	2	1	1	4	5	5	5	36
Total	60	57	60	63	65	63	57	55	58	59	59	60	716
Overhead	44	40	28	26	52	28	58	16	25	22	19	46	404
Total all labor	189	173	122	111	225	615	251	71	276	471	397	199	3100
Available family labor	280	280	320	320	360	400	400	320	360	380	320	280	4020
Hired labor needed	---	---	---	---	---	215	---	---	---	91	77	---	383
					Cotton								
Crop													
Cotton	22	43	22	14	58	302	346	22	360	1454	1497	446	4586
Oats & sweet clover	34	19	14	10									77
Total	56	62	36	24	58	302	346	22	360	1454	1497	446	4663
Livestock													
Milk cows	20	18	20	22	23	23	22	21	20	21	20	20	250
Hens	17	17	16	19	17	15	12	12	14	12	14	15	180
Pigs	3	4	4		2	2	1	1	4	5	5	5	36
Total	40	39	40	41	42	40	35	34	38	38	39	40	466
Overhead	101	107	80	69	106	34	19	59	20	75	77	24	771
Total all labor	197	208	156	134	206	376	400	115	418	1567	1613	510	5900
Available family labor	280	280	320	320	360	400	400	320	360	380	320	280	4020
Hired labor needed	---	---	---	---	---	---	---	---	58	1187	1293	230	2768

Appendix Table 6 (Continued.)

Item	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	—
						Cotton-Cash Grain							
Crop													
Cotton	5	11	5	4	14	76	86	6	90	364	374	112	1147
Grain sorghum	---	32	38	49	27	21	---	54	---	---	11	11	243
Oats & sweet clover	34	19	14	10	---	14	10	---	---	---	---	---	101
Sweet clover							31						31
Total	39	62	57	63	41	111	127	60	90	364	385	123	1522
Livestock													
Milk cows	20	18	20	22	23	23	22	21	20	21	20	20	250
Hens	17	17	16	19	17	15	12	12	14	12	14	15	180
Pigs	3	4	4		2	2	1	1	4	5	5	5	36
Total	40	39	40	41	42	40	35	34	38	38	39	40	466
Overhead	19	25	24	26	20	37	40	23	31	20	21	16	302
Total all labor	98	126	121	130	103	188	202	117	159	422	445	179	2290
Available family labor	280	280	320	320	360	400	400	320	360	380	320	280	4020
Hired labor needed	---	---	---	---	---	---	---	---	---	42	125	---	167
						Cotton-Beef Cattle							
Crop													
Cotton	5	11	5	4	14	76	86	6	90	364	374	112	1147
Oats & sweet clover	8	5	4	2	---	---	---	---	---	---	---	---	19
Oat & lespedeza hay	34	19	14	10	---	48	48	---	---	---	---	---	173
Permanent pasture	---	---	28	---	---	18	9	---	---	27	18	---	100
Total	47	35	51	16	14	142	143	6	90	391	392	112	1439
Livestock													
Beef cattle	52	52	50	40	35	28	25	25	25	35	38	45	450
Milk cows	20	18	20	22	23	23	22	21	20	21	20	20	250
Hens	17	17	16	19	17	15	12	12	14	12	14	15	180
Pigs	3	4	4		2	2	1	1	4	5	5	5	36
Total	92	91	90	81	77	68	60	59	63	73	77	85	916
Overhead	33	30	33	23	21	50	48	15	36	23	23	20	355
Total all labor	172	156	174	120	112	260	251	80	189	487	492	217	2710
Available family labor	280	280	320	320	360	400	400	320	360	380	320	280	4020
Hired labor needed	---	---	---	---	---	---	---	---	---	107	172	---	279

Appendix Table 6 (Continued.)

Item	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
						Dairy System							
Crop													
Corn	7	9	6	5	9	10	2	---	65	43	2	2	160
Oats & sweet clover	6	3	2	2	---	---	---	---	---	---	---	---	13
Oats & lespedeza hay	41	23	17	12	---	58	58	---	---	---	---	---	209
Vetch & rye pasture	---	---	---	---	---	---	14	18	37	---	---	---	69
Sudan pasture	---	---	---	14	12	4	---	---	---	---	---	---	30
Permanent pasture	---	---	19	---	---	12	6	---	---	18	12	---	67
Total	54	35	44	33	21	84	80	18	102	61	14	2	548
Livestock													
Dairy cattle	223	203	226	217	214	209	214	214	206	209	205	215	2555
Hens	17	17	16	19	17	15	12	12	14	12	14	15	180
Pigs	3	4	4	---	2	2	1	1	4	5	5	5	36
Total	243	224	246	236	233	226	227	227	224	226	224	235	2771
Overhead	15	13	15	13	63	76	76	60	16	71	59	24	501
Total all labor	312	272	305	282	317	386	383	305	342	358	297	261	3820
Available family labor	280	280	320	320	360	400	400	320	360	380	320	280	4020
						Beef Cattle System							
Crop													
Oats & lespedeza hay	83	47	35	24	---	118	118	---	---	---	---	---	425
Permanent pasture	---	---	70	---	---	47	23	---	---	70	47	---	257
Total	83	47	105	24	---	165	141	---	---	70	47	---	682
Livestock													
Beef cattle	132	132	126	101	88	69	63	63	63	88	95	114	1134
Milk cows	20	18	20	22	23	23	22	21	20	21	20	20	250
Hens	17	17	16	19	17	15	12	12	14	12	14	15	180
Pigs	3	4	4	---	2	2	1	1	4	5	5	5	36
Total	172	171	166	142	130	109	98	97	101	126	134	154	1600
Overhead	13	22	14	40	31	27	24	24	24	48	44	37	348
Total all labor	268	240	285	206	161	301	263	121	125	244	225	191	2630
Available family labor	280	280	320	320	360	400	400	320	360	380	320	280	4020

Appendix Table 7.—Estimated Hours of Tractor Power Required by Months by Specified Farming Systems.

Item	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
						Present System							
Crop													
Cotton	12	28	9	6	25	37	37	---	---	16	19	6	195
Corn	29	26	16	16	19	19	6	---	48	32	---	---	211
Oats	44	22	9	---	---	---	---	---	---	---	---	---	75
Total	85	76	34	22	44	56	43	---	48	48	19	6	481
Overhead	5	5	3	3	6	4	7	2	3	3	2	6	49
Total all power	90	81	37	25	50	60	50	2	51	51	21	12	530
						Cotton							
Crop													
Cotton	21	43	22	14	58	86	130	22	---	72	101	43	612
Oats & sweet clover	34	19	14	10		---	---	---	---	---	---	---	77
Total	55	62	36	24	58	86	130	22	---	72	101	43	689
Overhead	9	10	7	6	10	3	2	6	2	7	7	2	71
Total all power	64	72	43	30	68	89	132	28	2	79	108	45	760
						Cotton-Cash Grain							
Crop													
Cotton	6	11	5	4	14	22	32	5	---	18	25	11	153
Grain sorghum	---	32	38	49	27	21	---	54	---	---	11	11	243
Oats & sweet clover	34	19	15	10	---	14	7	---	---	---	---	---	99
Sweet clover	---	---	---	---	---	---	26	---	---	---	---	---	26
Total	40	62	58	63	41	57	65	59	---	18	36	22	521
Overhead	3	4	4	4	3	6	7	4	5	3	3	3	49
Total all power	43	66	62	67	44	63	72	63	5	21	39	25	570
						Cotton-Beef Cattle							
Crop													
Cotton	6	11	5	4	14	22	32	5	---	18	25	11	153
Oats & sweet clover	8	5	4	2	---	---	---	---	---	---	---	---	19
Oat & lespedeza hay	34	19	14	10	---	36	36	---	---	---	---	---	149
Permanent pasture	---	---	28	---	---	18	9	---	---	27	18	---	100
Total	48	35	51	16	14	76	77	5	---	45	43	11	421
Overhead	4	4	5	3	3	7	7	2	5	3	3	3	49
Total all power	52	39	56	19	17	83	84	7	5	48	46	14	470

Appendix Table 7 (Continued.)

Item	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
						Dairy System							
Crop													
Corn	7	9	6	5	8	10	2	---	28	18	2	2	97
Oats & swt. clover	6	3	2	2	---	---	---	---	---	---	---	---	13
Oat & lesp. hay	40	23	17	12	---	44	44	---	---	---	---	---	180
Vetch & rye past.	---	---	---	---	---	---	14	18	37	---	---	---	69
Sudan pasture	---	---	---	14	12	4	---	---	---	---	---	---	30
Permanent pasture	---	---	18	---	---	12	6	---	---	19	12	---	67
Total	53	35	43	33	20	70	66	18	65	37	14	2	456
Overhead	2	1	2	1	7	8	8	6	2	8	6	3	54
Total all power	55	36	45	34	27	78	74	24	67	45	20	5	510
						Beef Cattle System							
Crop													
Oats & lesp. hay	83	47	35	24	---	88	89	---	---	---	---	---	366
Permanent pasture	---	---	70	---	---	47	23	---	---	70	47	---	257
Total	83	47	105	24	---	135	112	---	---	70	47	---	623
Overhead	3	4	3	8	6	5	5	4	5	9	8	7	67
Total all power	86	51	108	32	6	140	117	4	5	79	55	7	690

Appendix Table 8.—Estimated Investment Associated With Alternative Farming Systems.*

Item	Present system and practices	Cotton	Cotton-cash grain	Cotton-beef cattle	Dairy		beef cattle[4]
					grade A	grade C	
			Dollars				
Land[1]	4,000	4,000	4,000	4,000	4,000	4,000	8,000
Buildings:[2]							
Combination barn	350	350	350	200	---	---	200
Corral system	---	---	---	75	---	---	150
Dairy barn	---	---	---	---	700	225	---
Loafing shed, hay storage, etc.	---	---	---	150	300	300	400
Bull shed & yard	---	---	---	---	88	88	---
Chicken & brooder houses	150	150	150	150	150	150	150
Fencing	200	125	125	435	410	410	600
TOTAL LAND & BUILDINGS	4,700	4,625	4,625	5,010	5,648	5,173	9,500
Farm power & machinery[3]							
Tractor	725	725	725	725	725	725	725
Combine	---	---	550	---	---	---	---
Plowing & harrowing mach.	238	238	238	238	238	238	238
Planting & culti. mach.	188	212	212	212	212	212	---
Grain drill	---	200	200	230	230	230	230
Mowing & raking machinery	---	---	---	240	240	240	240
Wagon-trailer	105	105	105	105	105	105	105
Miscellaneous	25	40	40	50	50	50	40
TOTAL FARM POWER & MACHINERY	1,281	1,520	2,070	1,800	1,800	1,800	1,578
Special equipment:[3]							
Milk cooler and cans	---	---	---	---	325	130	---
Milking machine	---	---	---	---	95	95	---
Miscellaneous dairy	---	---	---	---	100	27	---
Hay rack	---	---	---	30	---	---	50
TOTAL SPECIAL EQUIPMENT	---	---	---	30	520	252	50

Appendix Table 8.—Continued.

Item	Present system and practices	Alternative systems (improved production practices)					
		Cotton	Cotton-cash grain	Cotton-beef cattle	Dairy grade A	Dairy grade C	320 Acres beef cattle
Livestock:							
Dairy cattle							
Cows (2 yrs. & over)	480	240	240	240	3,680	3,680	240
Heifers (1-2 years)	---	---	---	---	400	400	---
Heifer calves	---	---	---	---	200	200	---
Bull	---	---	---	---	210	210	---
Beef cattle							
Cows (2 yrs. & over)	---	---	---	3,375	---	---	8,505
Heifers (1-2 years)	---	---	---	400	---	---	1,000
Heifer calves	---	---	---	320	---	---	800
Bull	---	---	---	220	---	---	660
Hens	50	50	50	50	50	50	50
TOTAL LIVESTOCK	530	290	290	4,605	4,540	4,540	11,255
TOTAL INVESTMENT	6,511	6,435	6,985	11,445	12,508	11,765	22,383

* 1946-50 prices.
1 Includes only surface value of land.
2 Value of buildings, farm machinery and equipment based on ½ new cost.

Appendix Table 9.—Production and Disposition of Crops and Livestock Products by Systems of Farming.*

Product	Unit	Production	Seed or replacement	Fed	Home use		Sales	
					quantity	value	quantity	value
			Present System					
Cotton (in seed)	cwt.	146	---	---	---	---	146	$1748
Oats	bu.	682	31	100	---	---	551	468
Corn	bu.	640	---	100	15	$ 22	525	788
Garden	dol.	75	---	---	---	75	---	---
Milk	cwt.	112	---	34	53	130	(25	---
Butterfat	lb.	100	---	---	---	---	(100	61
Beef and veal	cwt.	16	---	---	---	---	16	249
Pork	cwt.	4	---	---	4	80	---	---
Eggs	doz.	500	---	---	200	74	300	111
Poultry meat	lb.	200	---	---	140	32	60	14
Permanent pasture	AUM	25	---	25	---	---	---	---
Total		---	---	---	---	$413	---	$3439
			Cotton					
Cotton (in seed)	cwt.	677	---	---	---	---	677	$8121
Oats	bu.	960	24	200	---	---	736	626
Sweet clover seed	cwt.	48	4	---	---	---	44	444
Permanent pasture	AUM	15	---	15	---	---	---	---
Garden	dol.	75	---	---	---	$ 75	---	---
Milk	cwt.	56	---	3	53	130	---	---
Beef and veal	cwt.	8	---	---	---	---	8	124
Pork	cwt.	4	---	---	4	80	---	---
[illegible]	doz.	500	---	---	200	74	300	111
[illegible]	lb.	200	---	---	140	32	60	14
[illegible]		---	---	---	---	$391	---	$9440

Appendix Table 9 (Continued.)

Product	Unit	Production	Seed or replacement		Home Use quantity	Home Use value	Sales quantity	Sales value
			Cotton-Cash Grain					
Cotton (in seed)	cwt.	169	---	---	---	---	169	$2030
Oats	bu.	960	24	200	---	---	736	626
Grain sorghum	bu.	1890	---	---	---	---	1890	2646
Sweet clover seed	cwt.	48	4	---	---	---	44	444
Perm. pasture	AUM	15	---	15	---	---	---	---
Garden	dol.	75	---	---	---	$ 75	---	---
Milk	cwt.	56	---	3	53	130	---	---
Beef and veal	cwt.	8	---	---	---	---	8	124
Pork	cwt.	4	---	---	4	80	---	---
Eggs	doz.	500	---	---	200	74	300	111
Poultry meat	lb.	200	---	---	140	32	60	14
Total		---	---	---	---	$391	---	$5995
			Cotton-Beef Cattle					
Cotton (in seed)	cwt.	169	---	---	---	---	169	$2030
Oats	bu.	240	30	210	---	---	---	---
Sweet clover seed	cwt.	12	1	---	---	---	11	111
Oat & lespedeza hay	ton	48	---	48	---	---	---	---
Sweet clover pasture	AUM	14	---	14	---	---	---	---
Permanent pasture	AUM	212	---	212	---	---	---	---
Garden	dol.	75	---	---	---	$ 75	---	---
			Cotton-Beef Cattle (Continued)					
Beef and veal	cwt.	156	20	---	---	---	136	$2513
Cull beef bull	dol.	28	---	---	---	---	---	28
Milk	cwt.	56	---	3	53	$130	---	---
Pork	cwt.	4	---	---	4	80	---	---
Eggs	doz.	500	---	---	200	74	300	111
Poultry meat	lb.	200	---	---	140	32	60	14
Total		---	---	---	---	$391	---	$4907

Appendix Table 9 (Continued.)

Product	Unit	Production	Seed or replacement	Fed	Home use		Sale	
					quantity	value	quantity	
			Dairy					
Corn	bu.	480	---	480	---	---	---	---
Oats	bu.	160	33	127	---	---	---	---
Sweet clover seed	cwt.	8	1	---	---	---	7	$ 74
Oat & lespedeza hay	ton	58	---	58	---	---	---	---
Vetch & rye pasture	AUM	69	---	69	---	---	---	---
Sudan pasture	AUM	24	---	24	---	---	---	---
Sweet clover pasture	AUM	9	---	9	---	---	---	---
Permanent pasture	AUM	142	---	142	---	---	---	---
Garden	dol.	75	---	---	---	$ 75	---	---
Milk grade A	cwt.	1380	---	22	53	130	1305	6525
Milk grade C	cwt.	1380	---	22	53	130	1305	4763
Cull dairy cows	cwt.	33	---	---	---	---	33	359
Week old calves	no.	22	4	---	---	---	18	213
Cull dairy bull	dol.	24	---	---	---	---	---	24
Pork	cwt.	4	---	---	4	80	---	---
Eggs	doz.	500	---	---	200	74	300	111
Poultry meat	lb.	200	---	---	140	32	60	14
Total (grade A)		---	---	---	---	$391	---	$7320
Total (grade C)		---	---	---	---	$391	---	$5558
			Beef Cattle					
Oat & lespedeza hay	ton	118	---	118	---	---	---	---
Permanent pasture	AUM	546	---	546	---	---	---	---
Garden	dol.	75	---	---	---	$ 75	---	---
Beef and veal	cwt.	376	47	---	---	---	329	$6056
Cull beef bull	dol.	84	---	---	---	---	---	84
Milk	cwt.	56	---	3	53	130	---	---
Pork	cwt.	4	---	---	4	80	---	---
Eggs	doz.	500	---	---	200	74	300	111
Poultry meat	lb.	200	---	---	140	32	60	14
Total		---	---	---	---	$391	---	$6265

* At 1946-50 prices.

Appendix Table 10.—Feed Needs Associated With Alternative Systems of Farming.

Kind of livestock	Grain (pounds)	Protein supplement (pounds)	Hay (tons)	Other* (pounds)
		Present System		
Milk cows	4800	1000	4.0	----
Pigs	1000	----	--	200
Poultry	3000	----	--	1500
Total needed	8800	1000	4.0	1700
Available from farm Production	8800	----	--	----
Purchased		1000	4.0	1700
		Cotton		
Milk cows	2400	500	2.0	----
Pigs	1000	----	--	200
Poultry	3000	----	--	1500
Total needed	6400	500	2.0	1700
Available from farm production	6400	----	--	----
Purchased		500	2.0	1700
		Cotton-Cash Grain		
Milk cows	2400	500	2.0	----
Pigs	1000	----	--	200
Poultry	3000	----	--	1500
Total needed	6400	500	2.0	1700
Available from farm production	6400	----	--	----
Purchased		500	2.0	1700
		Cotton-Beef Cattle		
Beef cattle	320	----	45.0	----
Milk cows	2400	500	3.0	----
Pigs	1000	----	--	200
Poultry	3000	----	--	1500
Total needed	6720	500	48.0	1700
Available from farm production	6720	----	48.0	----
Purchased	----	500	--	1700
		Dairy		
Milk cows	25300	4600	47.0	----
Other dairy cattle	6690	1410	11.0	----
Pigs	1000	----	--	200
Poultry	3000	----	--	1500
Total needed	35990	6010	58.0	1700
Available from farm production	30944	----	58.0	----
Purchased	5046	6010	--	1700
		Beef Cattle		
Beef cattle	----	----	115.0	----
Milk cows	2400	500	3.0	----
Pigs	1000	----	--	200
Poultry	3000	----	--	1500
Total needed	6400	500	118.0	1700
Available from farm production	----	----	118.0	----
Purchased	6400	500	--	1700

* Hog supplement and poultry growing and laying mash. Milk fed not included in this table.

Appendix Table 11.—Operating and Overhead Costs for Specialized Dairy Enterprise 23 Cow Commercial Dairy Herd.

Item	Operating costs: repairs[1] (dollars)	Operating costs: other[1] (dollars)	Value new[1] (dollars)	Life (years)	Depreciation[2] (dollars)
		Grade A			
Milk cooler	9	—	450	12	33.75
18 cans	9	—	200	10	20.00
Milking machine	11	—	190	9	19.00
Water heater	1	—	75	9	7.50
Wash vat	1	—	35	20	1.75
Can & utensil rack	—	—	30	10	3.00
Wash basin	—	—	23	10	2.30
Cabinet	—	—	12	10	1.20
Milking pails	—	—	12	10	1.20
Scales	—	—	8	10	.80
Strainer	—	—	3	3	1.00
Disinfectant	—	26	—	—	----
Strainer pads	—	13	—	—	----
Washing powder	—	13	—	—	----
Fuel, elect., etc.	—	132	—	—	----
Hauling milk	—	652	—	—	----
Total	31	836	1038	—	91.50
		Grade C-Milk for manufacturing			
Milk cooler	1	—	60	10	6.00
18 cans	9	—	200	10	20.00
Milking machine	11	—	190	9	19.00
Can & utensil rack	—	—	30	10	3.00
Wash bowl	—	—	2	10	.20
Cabinet	—	—	7	10	.70
Milking pails	—	—	12	10	1.20
Strainer	—	—	3	3	1.00
Disinfectant	—	26	—	—	----
Strainer pads	—	13	—	—	----
Washing powder	—	13	—	—	----
Fuel, elect., etc.	—	70	—	—	----
Hauling milk	—	652	—	—	----
Total	21	774	504	—	51.10

[1] At 1946-50 prices.
[2] Straight line depreciation-10 percent salvage value for milk cooler, milking machine, and water heater for Grade A, milking machine for Grade C.

Appendix Table 12.—Overhead Costs Associated With Alternative Farming Systems.[1]

Item	Present system and practices	Alternative systems (improved production practices)					
		Cotton	Cotton-cash grain	Cotton-beef cattle	Dairy grade A	Dairy grade C	320 Acre beef cattle
		Dollars					
Building repairs*	16	16	16	17	60	27	25
Fence repairs*	10	6	6	23	22	22	30
Taxes	50	50	55	100	110	103	210
Insurance	5	5	5	6	12	8	9
Farm use auto	180	210	210	210	240	240	210
Interest on operating capital	45	121	57	65	108	104	114
Other overhead					132	70	
Depreciation							
Building	41	41	41	48	102	64	76
Fencing	20	12	12	45	43	43	60
Tractor	113	113	113	113	113	113	113
Farm machinery	66	93	192	128	128	128	92
Special equipment	--	--	--	3	92	51	5

[1] At 1946-50 prices.
* Excluding labor.