

ABSTRACT OF THESIS

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THE INFLUENCE OF  
MECHANIZATION ON FARMING PRACTICES  
IN THE RED RIVER VALLEY

Submitted by  
Arthur Clay Hale

In partial fulfillment for the requirements for the  
Degree Master of Education  
Colorado

Agricultural and Mechanical College

For

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## ABSTRACT OF THESIS

This study was made to find The influence of mechanization on farming practices in the Red River Valley, near Foreman, Arkansas, during the period from 1932 through 1946, and from the findings recommend necessary adjustments to be made in the program of vocational agriculture.

After the introduction of mechanized power and equipment there were a number of conditions that point to a general breaking up of the old plantation system of farming. Vacant tenant houses, a decrease in the number of mules, a smaller acreage of cotton, the appearance of new crops, and a change in methods of planting, cultivation, and harvesting are indicative of a change.

### The problem

How has the introduction of mechanized power and equipment affected farming practices, cropping systems, and labor requirements in the Red River Valley?

What changes should be made in the local program for vocational agriculture as a result of tractor farming and increased mechanization in the Red River Valley?

Problem analysis.--Answers to the following questions have been sought for a solution to the problem:

1. What changes in labor requirements have taken place on these plantations during the period of this study?

2. What has been the acre increase per family during this study?

3. What has been the change in cropping systems and practices during the period of this study?

4. What changes have taken place in the source of farm power?

5. What change in number of farm families has taken place on these plantations?

6. What change in the vocational agriculture program will be necessary to meet the need of these changed farming conditions?

In order to record the changes brought about by the introduction of mechanized power and equipment a data sheet was formulated that included many changes in labor, cropping systems and practice, equipment and livestock that might be affected by introduction of mechanized equipment. This data sheet was arranged in parts so as to record what crops, land, equipment, livestock, and tenants were found on the plantations before the introduction of the tractor. In another column data was collected relative to what was found after the introduction of the tractor in 1932.

The findings were based on an interpretation of tabulations of 13 plantation data sheets.

It was found that:

The plantations as an average were operated with less than one third the families as previously required.

The owner and his sons took an active part in the

operation of the plantation in 1946.

The average number of acres cultivated per family before mechanization was 32.6. After mechanization each family cultivated on an average of 120 acres, for an increase of 89.4 acres.

The average of cotton declined 54 per cent, alfalfa 20 per cent and corn acreage decrease was the greatest with 58 per cent.

The total acreage devoted to new crops exceeded the total acreage reduction of the old crops. In 1946 1934 acres were devoted to growing soybeans; oats were raised on 865 acres, Singletary peas were grown on 320 acres, and sudan grass plantings occupied 140 acres.

The size of the plantations increased and the number of crop acres increased during this period.

There was an increasing tendency toward crop diversification as mechanization practices advanced. The new crops required less man hours and lent themselves more to mechanized equipment in all phases of production.

Beef cattle increased from 99 head to 887 head or approximately 900 per cent.

Hogs decreased from 232 head to 38 head during this period.

There was an increase in the size and the number of pastures.

The number of work mules declined from 298 to 38 head or a change of 264 head.

Each tractor replaced 7.3 mules.



Tractors increased from five in 1932 to 36 in 1946. Each tractor on an average replaced 3.1 tenant families.

Tenant family requirement changed from 163 to 50 families, a reduction of 113 families. The average reduction per plantation was from 12.5 to 3.8 or a decrease of 8.7 families per plantation.

A review of the foregoing conclusions is sufficient basis to justify suggested modifications in the program of vocational agriculture.

#### Recommendations

Farm mechanics.--1. That a unit be taught in selection, use, care, operation, and maintenance of mechanized power and equipment.

2. That farm carpentry be taught.

Farm crops.--1. That instruction be given in planting, cultivating, and harvesting of new crops.

2. That instruction be given in approved practices of harvesting, curing, and storing alfalfa.

3. That units be taught in rotation and diversification of crops.

4. That the advantages of double cropping be taught.

5. That a unit be taught in the use of green manure and cover crops as a soil building factor.

6. That a unit in pasture management as related to beef production be taught.

Livestock.--1. That a unit be taught in beef production, including selecting, feeding, care, and management.

2. That test poultry raising program be encouraged among farmers.

Cooperative programs.--1. That variety tests in cotton and soybeans be demonstrated.

2. That the value of cooperative selling of seed be taught.

By a practical use of the suggested recommendations in the program of vocational agriculture it is reasonable to expect that many improvements can be made in the agriculture program of this community. The school program should continue to adjust to the new needs that are brought about by changes in labor requirement, diversified farming, new cropping systems and practices, and introduction of different kinds of livestock. Mechanized equipment will have a continued effect on this farm community and the school should play a vital role in helping meet the conditions of the new era.

T H E S I S

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Alfred Clay Hale

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY  
SUPERVISION BY ALFRED CLAY HALE  
ENTITLED THE INFLUENCE OF MECHANIZATION ON  
FARMING PRACTICES IN THE RED RIVER VALLEY  
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DEGREE OF MASTER OF EDUCATION  
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## TABLE OF CONTENTS

Chapter		Page
I	INTRODUCTION . . . . .	6
II	REVIEW OF LITERATURE . . . . .	12
III	METHODS AND MATERIALS. . . . .	27
IV	FINDINGS . . . . .	30
V	DISCUSSION . . . . .	45
VI	SUMMARY. . . . .	54
	APPENDIX . . . . .	60
	BIBLIOGRAPHY . . . . .	66

## LIST OF TABLES

Table		Page
1	ACRE INCREASE PER FAMILY FROM THE INTRODUCTION OF THE TRACTOR THROUGH 1946 ON THE 13 PLANTATIONS . . . . .	31
2	CHANGES IN CROPPING PRACTICES ON THE 13 PLANTATIONS FROM INTRODUCTION OF TRACTOR THROUGH 1946	32
3	CHANGE IN LIVESTOCK PRODUCTION ON THE 13 PLANTATIONS BEFORE THE INTRODUCTION OF THE TRACTOR THROUGH 1946. . . . .	37
4	CHANGES IN FARM MACHINERY USED ON THE 13 PLANTATIONS COINCIDING WITH THE INTRODUCTION OF THE TRACTOR . . . . .	38
4a	SUMMARY OF TABLE 4 SHOWING CHANGES IN TYPES OF FARM MACHINERY. . . . .	39
5	CHANGES IN SOURCE OF FARM POWER ON THE 13 PLANTATIONS FROM THE INTRODUCTION OF THE TRACTOR TO 1946 . . . .	41
6	NUMBER OF TRACTORS INTRODUCED BY YEARS ON THE 13 PLANTATIONS . . . . .	43

## Chapter I

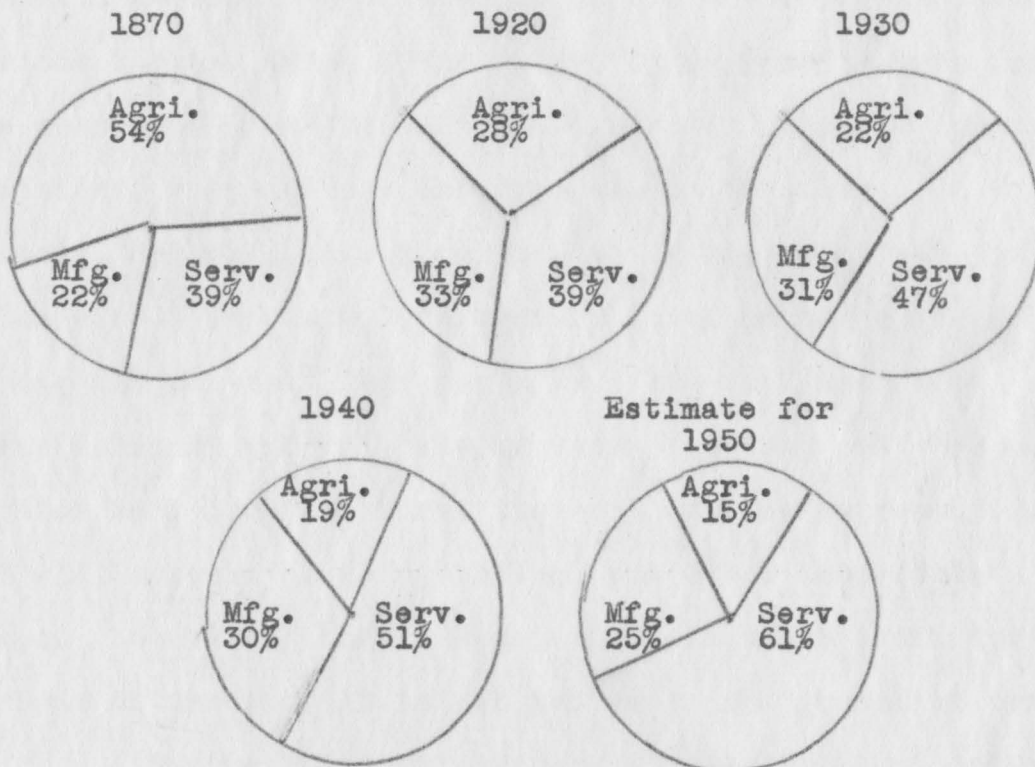
### INTRODUCTION

During the past 15 year period the tractor and mechanized farm equipment have come into the Red River valley near Foreman, Arkansas, causing significant changes in the farming methods and systems. The tractor did not influence farming practices in the community until 1932 when the general-purpose type tractor was introduced.

This change to mechanized farming brought about as a national trend a general shifting of population away from the farm. These occupational changes are shown for the periods of 1870, 1920, 1930, 1940, and include services, manufacturing, and agriculture. In 1870, 54 per cent of the people were engaged in agricultural pursuits, while in 1950 it is estimated that only 15 per cent will be earning a living in farming. This is graphically shown below 1/.

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1/ Adapted from material presented by Glen L. Weaver, Director of Vocational Education of Oregon, at the Northwest Regional Meeting of State Directors of Vocational Education held at Bozeman, Montana.



Although farm population decreased rapidly from 1870 to 1920 and gradually thereafter, production of farm crops increased so that in 1945 farm production exceeded that of 1940 by 35 per cent. The farming business had felt the severe impact of the violent changes brought about by mechanization and migration of labor into other lines of work. Foreman, Arkansas, is not an exception to these facts.

Foreman, Arkansas, an agricultural community of 1,200 population, is located in the southwest corner of Arkansas near the delta land of the Red River. The upland is rolling and generally regarded as land of poor quality, while the bottom-land soil is made up of rich



alluvial materials deposited along the river during flood periods in past ages. This river bottom land extends for the most part from the western edge of Oklahoma to eastern Louisiana, varying in width from two to 25 miles. At Foreman, Arkansas, the river bottom is approximately six miles wide. The land is extremely level having a slope of one and one-half feet per mile. The soil near the river is sandy and will support corn, cotton, and soybeans. Farther back from the river the soil becomes extremely fine and will support alfalfa, cotton, and other deep-rooted crops. Because of the tendency of the soil to crack during periods of drought, it is not suited to the growth of corn.

During the early history of this country, cotton, the primary crop, was supplemented with enough grain and pasture to meet the limited needs. With the high price of cotton during World War I the tendency was to plant all the land in cotton and ship in corn for feed purposes.

The trend since the introduction of the tractor has been toward a more diversified crop and livestock system. Farm mechanization, along with crop and livestock diversification, has resulted in higher productivity per farm family.

This area along the Red River is truly a part of the old South's cotton country. The size of the original plantations is not known, but at present the average is about 460 acres of crop land per plantation.



Because of soil and climatic conditions this area is best suited to the growing of cotton, alfalfa, oats, soybeans, and corn on the sandy portion of the area. Before the introduction of the tractor, approximately 60 per cent of the tillable land was planted to cotton; about 10 per cent, to alfalfa; and 12 per cent, to corn. The balance of the acreage was planted to miscellaneous crops. Since the introduction of the tractor there has been a revolution in cropping systems in this area. At one time 60 per cent of the total crop land was planted in cotton, while at the present about one half of this land is planted in oats and soybeans. Alfalfa and corn have decreased in acreage.

Livestock on these plantations before the time of the tractor consisted mainly of work mules. There were few beef cattle and hogs, and these were found on plantations near the river. Mechanization has practically eliminated work mules for use as farm power. Beef cattle increased on these plantations during this period. Most of the changes have come about because of an increase in forage and grain crops.

The tenant system, which is an outgrowth of the old slave system, was used as the means of farm labor up to early 1930. Over a brief period of 15 years this tenant system has practically passed out of existence. During tenant days the son of the owner was seldom seen on the plantation. He had few of the skills and knowledge

essential to the successful operation of the plantation. With the introduction of mechanized farm equipment the owner found himself in a new atmosphere. Many of the old practices essential to the success of tenant farming passed out with the mule and the tenant family, leaving his knowledge of soil crop management and equipment to be adjusted to a new day of diversified mechanized farming. New and pressing problems confronted operators of plantations as tractors replaced horse power. It is the responsibility of the department of vocational agriculture of the Foreman High School to train both all-day students and adult farmers in skills and practices essential to good farming.

Because of the foregoing statement the writer finds the problem under study divided into two main questions.

#### The problem

1. How has the introduction of the tractor affected the farming practices, cropping systems, and labor requirements in the Red River valley?
2. What changes should be made in the local program for vocational agriculture as a result of tractor farming and increased mechanization in the Red River valley?

A solution of the problem can best be solved by further breaking it down into subordinate questions and

then answering each separately through a review of literature and an interpretation of data collected.

Analysis of the problem.--1. What changes in labor requirement have taken place on these plantations during the period of this study?

2. What has been the acre increase per family during this period?

3. What have been the changes in cropping systems and practices during the period of this study?

4. What changes have taken place in the source of farm power?

5. What changes in number of farm families have taken place on these farms?

6. What changes in the vocational agricultural program will be necessary to meet the need of this changed condition?

The writer will endeavor to arrive at a partial solution of the problem by answering or partially answering the subordinate questions of the problem through a review of literature in the chapter that follows.

## Chapter II

### REVIEW OF LITERATURE

During the last 15 years the area in Red River bottom near Foreman, Arkansas, has been gradually mechanized. Transition has taken place as evidenced by large numbers of tractors and trucks. This makes it necessary to examine the growing needs of an educational program for both the vocational agricultural student and the adult farmer.

A review of the literature was made to find information that had a bearing on the subordinate problems of this study and will be presented in this chapter.

#### Changes in labor requirement

Slusher and Wilson (14) in a study in 1945 of schedules taken from farms in the delta land of eastern Arkansas found that in the eight-year period, 1934-1942, less man-hours were required to produce a given unit of crop when tractors replaced teams. The man-hours and the horse-hours required per acre under delta conditions are:



Crop	Man hours Horse drawn Equipment	Man hours Tractor drawn Equipment
Cotton	140	119
Corn	39	23
Alfalfa	34	15
Oats for grain	18	5
Soy beans--beans	17	7

Crop	Horse hours Horse drawn Equipment	Mechanized Tractor hours	Truck hours
Cotton	56	8	2
Corn	48	6	0
Alfalfa	35	6	1
Oats for grain	25-1 truck	3-5	1
Soy beans--beans	28-1 truck	5	1

The amount of time required to feed and care for work stock varies according to the number kept on the farm. If eight or more head were kept to the farm only 35 man-hours each were required to feed and care for them annually. The requirement rose to 100 man-hours each when as few as one or two head were kept on the farm. The labor requirement was less for beef cattle than any livestock studied. This was brought about by making all sales at the end of the pasture growing season. By using this system 20 hours per head were all the man labor required to feed and care for beef stock kept on the farm the year round. Most of this time came during the fall and winter. A sow when her pigs were fed out required 130 man-hours annually.

A study of 161 plantations located in the Yagoo, Mississippi, and Arkansas river bottoms by Reynoldson,



Humphries, Spellman, McComas, and Youngman (12) in 1935 showed that, among other things, the time required to haul by teams was far out of proportion to the time required to haul by trucks. The annual distance hauled by teams was 2,219 miles, while the total for trucks was 3,871 miles. When teams were used, an average of 2.3 hours per mile was consumed as compared to 11 minutes per mile for motor trucks. The study was further summarized as follows: (a) 100 acres of cotton, equivalent worked by six tenants, was produced by one tractor. (b) The average cost using a general-purpose tractor was about one half that of the ordinary-type tractor, excluding the operator's labor. (c) The average age of 6,659 mules was 9.5 years. (d) The average value per mule was \$115.80. (e) Tractors using four-row equipment cultivated 25 to 30 acres per 10 hour day, at a cost of 20 cents per acre.

In 1946 Barlow (1) used farms of the same size, farmed under different systems, to determine the total days of man labor per year required for each system. He selected farms with 230 acres in cultivation in the Louisiana Delta. When mules were used as power on a typical cotton plantation, 2,054 man-days were used while on typical diversified mechanized farms only about half as many man-days were required.

Barlow and Fenske (2:17)

USUAL AMOUNT OF MAN LABOR REQUIRED ANNUALLY  
PER UNIT OF LIVESTOCK IN DELTA COTTON AREA OF LOUISIANA

Kind of livestock	Unit	Hours required annually
Work stock	1 head	80
Dairy cow	1 head	145
Beef cow	cow and calf	8
Brood sow	1 head	36
Sow and litter	1 sow 5-6 pigs	130
Butcher hog	1 head	16
Farm flock	50 to 100	225

The Interbureau Committee on Technology on the Farm, of the United States Department of Agriculture (16), reported in August, 1940, that of 418 families living on 10,000 acres of crop land, 67 families were displaced by the introduction of 36 tractors. In 1932 when a tractor was introduced on a non-mechanized farm the displacement was four families for each tractor introduced. From 1915 to 1939 motor equipment displaced 10,000,000 work horses and mules. As a result of this the 30,000,000 acres of crop land, used to produce feed for work stock and the 15,000,000 acres used to pasture them were free for production of other crops and livestock.

A study of mechanized and non-mechanized farms by Goodsell (7) in 1939 was based on the return of 2,261

records kept during the years 1936 and 1937. On the mechanized farms only 4.9 hours of man-labor were required to produce an acre of corn up to the time of harvest while 9.4 man hours were required on the non-mechanized farms. He further found that tractors mounted on rubber tires last 34 per cent longer and use 22 per cent less fuel than those with the solid steel wheels.

Implications.--1. It appears that the amount of man labor requirements, per acre, is reduced for all crops when mechanization is substituted for mule power.

2. Cotton lends itself less to mechanization than do other farm crops.

3. It appears that beef cattle require less time than work stock for care and feeding.

#### Acre increase per family

To get a fair sample of the acre increase per family Barlow (1) used farms averaging 230 acres in size representing three systems of farming: (a) The non-mechanized specialized cotton farm, (b) the mechanized specialized cotton farm, and (c) the mechanized diversified farm. His findings showed 10 families were required to handle a non-mechanized specialized cotton farm, six families for the mechanized specialized cotton farm, and only four families for mechanized diversified farm.

The House Agricultural Subcommittee requested the

National Cotton Council to sponsor a study in the South, searching for facts that would aid in making "production adjustments to improve farming opportunities in the South" (2:1). The National Cotton Council called a meeting May, 1945, at Memphis, Tennessee. At this meeting it was agreed "The work would be carried on cooperatively with the experiment stations in the South and the United States Department of Agriculture" (2:1). Barlow and Fenske (2) were designated to head the study of the Delta Cotton Areas of Louisiana. One of the specific objectives of the project agreed upon before beginning follows:

1. To assemble for each production area pertinent information, available, or readily available, which will describe the present situation and furnish a base for indicating the nature and extent of needed production adjustments (2:1).

Under farm mechanization they found the first tractors were used in the Delta about 1915; however, the number did not increase rapidly until during the late 1920s when the general-purpose type tractor was introduced. By 1943 there were 3.7 tractors to 1000 acres of crop land, 9.7 combines to 1000 acres in small grain, and 14.8 tractor mowers to 1000 acres in tame hay. Some of the changes found are recorded in table form (2:11).

Up to 1943 each family farmed on an average of 24 acres; however, the budget analysis shows that the efficient use of labor and machinery requires a minimum of 60 acres per family be farmed. This then would result in a reduction of about 45 per cent in total farm population in



the area.

Implications.--1. That there has been a gradual decrease in the number of farm families.

2. That there has been a decrease in the number of farms but an increase in the total acreage.

3. That farming is more efficient when the size of the farm is increased up to a given point.

Changes in cropping systems and practices

The trend, as reported by Barlow and Fenske (2) 1945, is definitely toward diversification in the Delta cotton area of Louisiana since the early 1930s, "and the import of high wartime prices for certain crops, including cotton, have not reversed this trend." (2:24).

Diversification brings higher yields as evidenced by the following cotton yields: During the period 1937-1941, 288 pounds was the average yield; by 1943 this had increased to 395 pounds. By a fuller use of improvement practices the yield should approach 500 pounds per acre.

Barlow (1), 1946, showed that diversification was further advanced by the adoption of mechanized power which definitely stimulated the production of such crops as oats, soybeans, and hay crops which lend themselves to mechanization. The Agricultural Adjustment Administration program as well as the war food programs affected the



cropping systems. The adjustment program decreased the acreage of soil depleting crops and increased the acreage of soil building crops. The war food programs have had their influence in adjusting crops to national needs. During the war years this program was further accelerated by tremendous demand for crops that would permit the growth of livestock. That a change, for the United States as a whole, was taking place in acreage of crops grown, is shown by statistics reported by the United States Department of Agriculture (20), 1946, in which the greatest contrast was for cotton and soybeans. Cotton decreased from 43,329,000 acres in 1930 to 17,749,000 acres in 1945 while soybeans increased from 3,072,000 acres in 1930 to 13,413,000 acres in 1945.

Arkansas crop acreages during this period changed. Figures showing this change were reported by the United States Department of Agriculture (18), (19), (20).

Some of the crops and acreages are shown below.

Item	1930	1940	1945
Cotton, acreage	3,197,000	2,061,000	1,554,000
Soybeans     "	7,000	284,000	498,000
Hay           "	489,000	1,050,000	1,407,000
Oats          "	191,000	139,000	498,000

Hunt (9) 1923 found that perishable crops were being grown at a greater distance from market since the introduction of the motor truck.

Implications.--1. The yield of cotton per acre is increased with diversified systems of farming.

2. Controls during the war have affected cropping systems.

3. Diversification of farming systems was accelerated by benefit payments of the Agricultural Adjustment programs and special crop demands under war conditions.

4. The substitution of mechanical power for horse-power speeded up diversification in farming.

Changes which have  
taken place in source  
of farm power

Calvert (3), in 1929, found from a study of 541 Minnesota farms that the source of power was automobiles 30.9 per cent, horses 29.7 per cent, tractors 23.3 per cent, trucks 7.7 per cent, stationary gas engines 5.7 per cent, electric motors 1.5 per cent, and steam engines 1.2 per cent. The expansion of the gasoline engine resulted in lowering the price of horses since 1918. During the period 1918-1919 one colt was produced for each 15.5 work horses found on the farm. This about maintained the work horse requirement. In 1923-1924 Minnesota farms produced

only one colt for 34.4 work horses on the farm. This was less than one-half the colts needed to maintain the supply.

Tractors were not an important source of farm power until after 1915 as reported from 225 farms. Of this group of farmers only nine per cent of tractors were bought before 1916 but by 1925, 33 per cent were tractor owners. Even though mules were selling at a very low price and there was an abundance of inexpensive oats, corn, and hay this transition from horse to tractor power continued, indicating that the tractor was meeting a real need of many individuals.

The growth in the number of tractors per 100 farms is indicated in the partially complete table given below.

Number of tractors per 100 farms 1920 and 1925			
State or region	Tractors per 100 farms		Increase from 1920 to 1925
	1920	1925	
United States	3.8	7.9	208 per cent
West south central states	2.0	3.4	170 per cent
Arkansas	.8	1.6	200 per cent

Demaree and Bauman (5) in 1946 studied 966 returned questionnaires in an effort to determine the custom rate charged for the use of power operated equipment in Indiana in 1945, and the probable rate to be

charged in 1946. Forty per cent of the replies came from farmers who paid the charges and sixty per cent came from operators doing custom work. Reporting was done by counties. Average rates charged were determined for each county as well as averages for each of the twelve types of farming areas. The report deals briefly with the cost of operating farm machines before taking up custom rates. For example they found the cost of operating a two plow tractor to be \$1.00 per hour when used only 200 hours per year while if the equipment was used 600 hours annually the cost of operating would be lowered to 45 cents per hour. In like manner the cost of operating a small combine was \$2.35 per acre when used to combine 100 acres of small grain and \$1.25 an acre when used on 300 acres.

Some of the rates charged are given below. They represent the range in area wide averages which follow:

1. For combining small grain \$3.25 to \$3.80 per acre.
2. For combining soy beans \$3.40 to \$4.10 per acre.
3. Picking corn, loaded into wagon \$3.50 to \$4.50 per acre.
4. Baling hay, pick up baler \$3.50 to \$4.50 per ton or .14 to .15 per bale.
5. Plowing, spring and fall \$2.50 to \$3.50 per acre.
6. Disking, with tandem disc .85 to \$1.00 per acre.
7. Mowing hay .85 to \$1.05 per acre.
8. Cultivating corn .80 to \$1.20 per acre.

He estimated from returns that the custom rate for 1946



would be five per cent higher than for 1945.

According to the United States census (16) 1940 there was a progressive decrease in the number of work stock as the number of tractors increased for the country as a whole. From 1930 to 1940 there were a decrease of 7.1 head of work stock for each tractor introduced. Between 1925 and 1930 the decrease was 7.3 to 1 and from 1920 to 1925 the decrease was 4.9 head of work stock for each tractor. In 1940, 1,567,430 tractors were reported, 920,021 for 1930, 505,933 for 1925, and 246,083 in 1920. The estimate is another 500,000 by 1950.

The number of tractors and the number of work horses and mules as reported by the United States Department of Agriculture (19) 1946 shows a progressive contrast in change during the period 1930 to 1946. The figures in the report, representing this change follow:

Item	1930	1940	Jan.1, 1946
Tractors, number	920,000	1,545,000	2,585,000
Work horses and mules, number	17,981,000	13,005,000	10,765,000

Implications.--1. That the tractor is an increasing source of mechanical power on the farm.

2. That as the number of tractors increase the number of work stock decreases on the farm.

3. That custom work with power machines is a source of farm power.

Changes in number  
of farm families

The United States Department of Agriculture (16), 1940, reported on a basis of 418 families, on 10,000 acres of crop land, a displacement of 67 families by the introduction of 36 tractors. In 1932 four families were displaced by each tractor introduced. The United States Department of Agriculture estimates an ultimate displacement of 300,000 farm families by tractors.

Young (22) found in a study at Cornell University in 1921 that the movement of population was from the farm to cities. He obtained data from Jefferson, Tioga, Tompkins, and Livingston counties, New York, and from the Federal census reports, 1840 to 1920, and mortality and birth statistics of the United States Bureau of Census. He also used the Census of Agricultural Resources of New York 1917-1918.

Those gainfully employed in agriculture in 1820 represented 87 per cent of the total population. This percentage had decreased to 35 per cent by 1900. In 1920 only 26 per cent of the population was reported on the farm. He reported the movement of population from the farm to

cities due, largely, to increased efficiency in farm labor. This increase in efficiency shows 88 per cent for the United States during the period from 1870 to 1920 as compared to 59 per cent for New York state from 1865 to 1917. He further reported that the movement increases very rapidly when cities are prosperous and expanding. From 1917 to 1920 the movement in New York was two and one-half times the rate being produced.

Edward (6), 1945, showed in comparative occupation statistics in 1943 that agricultural population was about 54 per cent of the total population of the United States in 1870. The trend continued downward until it reached a low of 22 per cent in 1930.

Implications.--1. As the number of tractors on the farm increases, the number of farm families decreases.

2. As the efficiency of farm labor increases the number on the farm decreases.

3. The movement of population is from the farm to the city.

A review of the literature on the influence of mechanization of farming practices revealed the trend of various sections of the United States toward complete mechanization of farming units of family size or larger. The available literature also tends to accentuate the fact that the introduction of mechanized farming causes changes in cropping practices, reduction of labor, and a resulting

increase in size of farming units.

The review of available literature also gives a partial answer to minor problems one, two, three, four, and five by revealing the influence of mechanization on the labor requirements, size of farms, cropping systems and sources of farm power under farming conditions and in areas similar to those of the Red River Valley.

The methods and procedures followed in collecting these data are presented in the chapter which follows.



### Chapter III

#### METHODS AND MATERIALS

Additional data were needed to provide answers to the questions in the problem analysis.

1. What changes in labor requirement have taken place on these farms during the period of this study?
2. What has been the acre increase per family during this period?
3. What have been the changes in cropping systems and practices during the period of this study?
4. What changes have taken place in the source of farm power?
5. What change in number of farm families has taken place?
6. What change in the vocational agricultural program will be necessary to meet the need of this changed farming condition?

These questions were only partially answered by a review of literature within the field. Therefore, it became necessary to collect certain farm data from the plantation owners and operators of Foreman, Arkansas.

Since it was possible to interview all the plantation owners and operators in the area involved it

was decided that the information could be secured by personal interview. In order that the interview be complete in each detail it was decided that a check sheet be developed and used as each farmer was visited. This check sheet was formulated and discussed by 20 teachers of vocational agriculture who were attending Colorado Agricultural and Mechanical College during the summer of 1937. The suggestions made by this group were incorporated in a revised form which was checked by the professor in charge of agricultural education 1/. The suggestions made by the professor were incorporated into the final form. The check sheet was then mimeographed for use.

Through the winter of 1937 personal interviews were made with the 19 plantation owners and operators included in this study. The check sheets were filled out completely during the interviews.

In 1946 the check sheet was again reviewed by the professor of agricultural education 2/ and an additional column was added so that the same type of information could be secured from the farm owners and operators and conveniently recorded for comparative purposes.

During the winter of 1946, 13 of the original 19

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1/ Dr. G.A. Schmidt, Professor of Agricultural Education, Colorado Agricultural and Mechanical College, Fort Collins, Colorado.

2/ Professor R.W. Canada, Head Agricultural Education, Colorado Agricultural and Mechanical College, Fort Collins, Colorado.

plantation owners and operators were re-interviewed and the information secured was recorded in the second column of the check sheet. Of the six plantation owners and operators who were not interviewed the second time, three had sold their property and moved elsewhere, and three could not be contacted. The data from the check sheets were tabulated and will be presented in the following chapter.

## Chapter IV

### FINDINGS

The data presented in this chapter were collected to determine what changes had been made in farming systems and practices that had been brought about by the introduction of mechanized equipment in Red River valley near Foreman, Arkansas. The information is to be used in recommending changes that might be made in the vocational agricultural program of the local high school.

#### Changes in labor requirement

The changes in labor requirement are clearly shown in Table 1. In 1937, 163 families were required to furnish the labor necessary to operate the 13 plantations. In 1946 the same plantations were operated by only 50 families. Plantation number 10 consisting of 95 acres had required three families to do the work in 1937, but with the introduction of mechanized equipment it was found that the plantation was being operated by the owner without the assistance of any families.

Plantation numbers five and 12 each required 15 families for their operation. The interview in 1946 showed that each plantation required only two families.



Table 1.--ACRE INCREASE PER FAMILY FROM THE INTRODUCTION OF THE TRACTOR THROUGH 1946 ON THE 13 PLANTATIONS.

Plan- ta- tion Num- ber	Year trac- tor intro- duced	Before mechanization				After mechanization			
		Num- bers of fami- lies	Crop acres in plan- ta- tion	Size plan- ta- tion	Pas- ture	Num- bers of fami- lies	Crop acres in plan- ta- tion	Size plan- ta- tion	Pas- ture
1	1932	10	450	713	45	3	450	713	45
2	1933	16	540	830	123	9	455	830	200
3	1932	14	460	530	70	7	460	530	70
4	1937	12	435	602	0	5	538	722	120
5	1934	15	640	640	0	2	640	800	160
6	1936	12	560	640	0	2	585	640	160
7	1932	3	80	100	0	3	265	370	80
8	1936	10	413	430	0	7	413	710	160
9	1935	22	661	960	400	2	561	1160	500
10	1936	3	95	95	0		95	95	0
11	1937	5	95	95	0	1	96	120	24
12	1934	15	650	760	0	2	410	600	0
13	1936	16	225	640	0	7	945	2440	1495
-----									
TOTAL		163	5304	7035	638	50	5914	9630	3014
AVERAGE		12.5	408	541	49	3.8	455	740	232

Average acres per family

Before mechanization 32.6  
After mechanization 120.0

Table 2.--CHANGES IN CROPPING PRACTICES ON THE 13 PLANTATIONS FROM INTRODUCTION OF TRACTOR THROUGH 1946.

Number of plantation	Year tractor introduced	Before mechanization				After mechanization						
		Crops grown and acreage				Crops grown and acreage						
		Cotton acres	Alfalfa acres	Corn acres	Misc. acres	Cotton acres	Alfalfa acres	Corn acres	Soybeans acres	Oats acres	Cover crop acres	Misc. acres
1	1932	350	100			120	36		75	150		69 idle
2	1933	400	40	200		200		55	140	60		
3	1932	325	20		115 idle	270				150		40 idle
4	1937	250	65	120		200	25	100	214		100	50 idle
5	1934	400	50	190					450			140 sudan
6	1936	250			260 idle	200	45		100			
7	1932	80				40			225	100		
8	1936	350			43 idle		200	23	150	40	120	
9	1935	481	100	100		110	20	30	120	50		231
10	1936	70	25	25					25		70 seed	
11	1937	80	100			20		15	35	15	6	5 milo idle
12	1934	400		150		110		100	100	100		

*Continued on next page*

Table 2.--CHANGES IN CROPPING PRACTICES ON THE 13 PLANTATIONS FROM INTRODUCTION OF TRACTOR THROUGH 1946.--continued.

Number of plantation	Year tractor introduced	Before mechanization				After mechanization						
		Crops grown and acreage				Crops grown and acreage						
		Cot- ton acres	Alf- alfa acres	Corn acres	Misc. acres.	Cot- ton acres	Alf- alfa acres	Corn acres	Soy- beans acres	Oats acres	Cover crop acres	Misc. acres
13	1936		75	150		300	125	20	200	300	100	
-----												
TOTAL		3436	565	835	468	1570	451	343	1834	865	76	775
AVERAGE PER PLANTATION		264	43	64	36	120	34	26	141	66	58	59
AVERAGE PER FAMILY		21.1	3.4	5.1	2.8	31.5	8.9	6.8	37.1	17.3	1.5	15.5

1/

1/ Table 1 shows an average of 12.5 families per plantation before mechanization and 3.8 families in 1946.

With the introduction of six tractors on these two plantations 26 families were displaced.

Acre increase  
per family

Table 1 shows the 13 plantations required 163 families to cultivate the 5,304 acres before the introduction of the tractor, or an average of 32.6 acres per family. In 1946, 50 families cultivated 5,938 acres, or an average of 120 acres per family. This is an increase of 89.4 acres per family.

Plantation number nine required 22 families to care for the 661 acres. This is an average of 30 acres per family. Nine years later the same plantations had reduced the crop land to 561 acres. This reduced crop land acreage is being cared for by two families, or a total reduction of 90 per cent in labor. While the acreage was reduced by 15 per cent, this means that each family now has the responsibility for farming 280 acres.

Plantation number seven had 80 acres of crop land in 1937. This acreage required three families for its operation. In 1946 the plantation still had three families but the number of acres had been increased from 80 to 265. This shows the number of acres handled per family had increased from 26.6 to 88.3 or an increase of 61.7 acres per family.



Changes in cropping  
systems and practices

Table 2 reveals that the 163 families, who were on the 13 plantations before mechanized power was introduced, cultivated 3,436 acres of cotton, 561 acres of alfalfa, and 835 acres of corn. A total of 468 acres was fallow, accounting for a total of 5,304 acres. In 1946, 50 families were producing 1,570 acres of cotton, 451 acres of alfalfa, 343 acres of corn, 1,834 acres of soybeans, 820 acres of oats, 76 acres of cover crops, 371 acres in hay, five acres in milo maize, and 444 fallow acres for a total of 5,914 acres. The biggest change in cropping system was reported for plantation five. Before the introduction of the tractor, 15 families produced 400 acres of cotton, 50 acres of alfalfa, and 190 acres of corn. By 1946 there was a 100 per cent change in crops grown. In the new cropping system 450 acres of soybeans, 140 acres of Sudan grass, and 50 fallow acres were reported. During the nine years 260 acres of land were purchased and added as pasture land to plantation number five. For the study as a whole all plantations showed a sharp decline in cotton acreage. Plantation number 13 increased its acreage of cotton from nothing to 300 acres. The original land in plantation 13 was not suited to cotton production. During this period approximately 1,800 acres of land were acquired. Of this acquisition the land most suited to the production of cotton was then planted and

reflects this increase.

Table 3 shows that only four of the 13 plantations kept beef cattle. These four plantations reported a total of 99 head. By 1946, the 13 plantations reported a total of 887 head of beef cattle. Plantations three, 11, and 12 had not acquired any beef cattle, while plantation 13 had 300 head.

Before the introduction of the tractor the 13 plantations owned 232 head of hogs. By 1946 this number had declined to 38. Plantation number nine originally had 10 head. In the last interview they reported 12 head. This is the only plantation where an increase of hogs is shown. Five of the plantations that had owned hogs reported that none were being produced.

The increase in the number of beef cattle and the decrease in the number of hogs apparently is in direct relation to the changes in cropping systems shown in Table 2.

Some significant changes were revealed in equipment as mechanized power replaced the horse. Before the tractor was introduced, according to Table 4, there were 47 single-row horse-drawn stalk cutters. In 1946 there were only two horse-drawn and three tractor-drawn stalk cutters. During the same period the number of middle busters declined from 78 to nine. Both the stalk cutter and middle buster were virtually eliminated as the tractor power permitted the introduction of the bedder and the

Table 3.--CHANGE IN LIVESTOCK PRODUCTION ON THE 13  
PLANTATIONS BEFORE THE INTRODUCTION OF THE TRACTOR  
THROUGH 1946.

Plan- ta- tion num- ber	Year trac- tor intro- duced	Before mechanization		After mechanization	
		Beef cattle number pro- duced	Hogs number pro- duced	Beef cattle number pro- duced	Hogs number pro- duced
1	1932		10	56	
2	1933		20	2	
3	1932		2		
4	1937	50	25	71	8
5	1934	3	50	148	
6	1936	6	8	3	7
7	1932			117	
8	1936		75	60	5
9	1935	40	10	100	12
10	1936			30	
11	1937				
12	1938		20		6
13	1936		12	300	
-----					
TOTAL PER PLANTATION		99	232	887	38
AVERAGE PER PLANTATION		7.6	17.8	68.2	3.0



Table 4.--CHANGES IN FARM MACHINERY USED ON THE 13 PLANTATIONS COINCIDING WITH THE INTRODUCTION OF THE TRACTOR

Before the introduction of the tractor													After the introduction of the tractor																								
Horse drawn equipment													Horse drawn equipment						Mechanized equipment																		
Plantation Number	Year Tractor Introduced	Stalk Cutter	Middle Buster	Cultivator	Planter, W. Single	Single Stock	Disc	Harrow, Section	Wagon	Mower	Hay Rake	Bailer, Hay	Stalk Cutter	Middle Buster	Cultivator	Planter, W. Single	Single Stock	Disc	Harrow, Section	Wagon	Mower	Rake	Bailer	Stock Cutter	Bedder	Cultivator	Planter	Disc	Harrow	Truck	Mower	Hay Rake	Power Pickup Baler	Combine	Grain Drill	Wheatland Plow	
1	32	3	4	2	2	6	3	2	4	1	1	1													3	3	3	2	1	1	1	1	1	1			
2	33	4	10	15	12	6	4	4	4	1	1	1									1	1			2	2	2	2	1	1			1	1			
3	32	4	6	12	12	14	2	4	3	1	1	1													3	3	3	2	1				2	1			
4	37	4	6	10	8	8	2	7	4	1	1	1									1	1	1		1	4	4	4	1	1				1	1		
5	34	5	4	13	6	8	3	3	5	1	1	1								1		1			3	3	3	2	1	1	1		1	1			
6	36	6	5	12	8	8	0	0	3	1	1	1	1	1	3	3	2	2	2	3	1	1	1		1	1	1	1	1								
7	32	1	3	3	2	1			2																1	2	2	3	1	1	1	1	1	1	1		
8	36	4	4	6	10	9		2	4	1	1	1		4	10	2	3	3		1					2	2	2	2	1	1	1	1	2	1			
9	35	5	15	20	14	30	4	8	5	1	1	1	1	1	1	1	3	3		2	1	1	1		2	2	2	2	1	1	1		1	1			
10	36	1	2	4	3	6	0	0	2																1	1	1	1	1				1	1			
11	37	2	3	5	3	5			2					1	1	1	1	1							1	1	1	1	1				1	1			
12	34	4	9	15	13	8	4	3	5	1	1	1		3	2		1		1	1	1	1			2	2	2	2	1	1	1		1	1			
13	36	4	7	16	12		2	1	2	2	2	1								1					2	3	3	3	3	2	2	2	1	2	3	2	
Total	47	8	43	115	109	243	45	11	11	1	1	10	2	9	8	8	9	10	0	9	5	5	5		3	25	29	26	24	11	15	9	8	4	14	14	3



Table 4a.--SUMMARY OF TABLE 4 SHOWING CHANGES IN TYPES OF FARM MACHINERY.

Item	Types of equipment on plantations				
	Before tractor introduction		After tractor introduction		
	Mule drawn number	Tractor drawn number	Mule drawn		Tractor drawn number
			Still in use number	Change decrease number	
Stalk cutters	47	0	2	45	3
Middle buster	78	0	9	69	25
Cultivator	143	0	18	125	29
Planters	115	0	8	107	26
Single stock	109	0	9	100	0
Disc	24	0	10	14	24
Section harrow	34	0	0	34	1
Wagon	45	0	9	36	15 truck
Mower	11	0	5	6	9
Hay rake	11	0	5	6	8
Hay bailer	10	0	5	5	4 pick up
Combines	0	0	0	0	14
Grain drills	0	0	0	0	14
Wheeland plow	0	0	0	0	3

disc.

Prior to the introduction of the tractor there were 143 horse-drawn, one-row cultivators. Nine years later there were 18 one-row cultivators and 29 four-row, tractor-drawn cultivators and there were no wheatland plows, grain drills, or combines. While in 1946 it was reported that 14 combines, 14 grain drills, and 3 wheatland plows were in use in the area.

Under the old system 45 harrows were in operation. In 1946 only one tractor-drawn harrow had been introduced. The horse-drawn harrows had completely disappeared from service. Of the original 10 horse-powered hay bailers, only five remained, while four mechanized pick-up bailers had been introduced.

In 1946 the crops were being planted with 26 tractor-drawn four-row and eight horse-drawn single-row planters. Originally it required 115 horse-drawn single-row planters to take care of this area during the planting season.

Changes in source  
of farm power

Table 5 shows that 298 head of mules were in use on the 13 plantations before the introduction of the tractor. Nine years later 34 mules were reported, or a reduction of 264 head. They were replaced by 36 tractors. Each tractor introduced replaced 7.3 mules. The owner of

Table 5.--CHANGES IN SOURCE OF FARM POWER ON THE 13  
PLANTATIONS FROM THE INTRODUCTION OF THE TRACTOR TO  
1946.

Plan- tation Number	Year tractor intro- duced	Before mechanization		After mechanization	
		Number of workstock	Number of tractors	Number of workstock	Number of tractors
1	1932	25	0	0	3
2	1933	38	0	0	4
3	1932	22	0	2	5
4	1937	25	0	2	4
5	1934	28	0	4	4
6	1936	28	0	6	1
7	1932	6	0	0	2
8	1936	20	0	8	2
9	1935	24	0	6	2
10	1936	5	0	0	1
11	1937	8	0	0	1
12	1934	35	0	6	2
13	1936	34	0	0	5
-----					
TOTAL		298	0	34	36
AVERAGE		23.0	0.0	2.6	2.9

plantation number two reported 38 mules before the tractor was introduced while in 1946 no mules were required. Other plantation owners reported no mules in 1946.

Changes in number  
of farm families

Table 1 shows a range of three to 22 tenant families required to operate the various 13 plantations before the introduction of mechanized farming. After mechanization a range of one to nine tenant families operated the same plantations.

Plantation number nine, for example, required 22 families to handle 661 acres of crops before the tractor was introduced. After mechanization two families handled 561 acres in crops on the same place, and 100 acres of crop land were added to the pasture. The family requirement was reduced by 20 in this case.

By reducing the farm family requirements on the 13 plantations to averages, 12.5 tenant families were required to handle 408 acres of crop land before the advent of the tractors on the plantations. By 1946, 3.8 tenant families took care of 455 acres of crop land. This means 8.7 less families were required to operate a plantation.

Table 6 shows 21 tractors in use on plantations in 1937. The first all-purpose tractor was introduced in 1932 when five tractors were purchased for use on three of



Table 6.--NUMBER OF TRACTORS INTRODUCED BY YEARS ON THE  
13 PLANTATIONS.

Planta- tion number	Year First tractor bought	Number tractors in use in 1937	Number tractors in use in 1946
1	1932	2	3
2	1933	2	4
3	1932	2	5
4	1937	1	4
5	1934	2	4
6	1936	1	1
7	1932	1	2
8	1936	1	2
9	1935	3	2
10	1936	1	1
11	1937	1	1
12	1934	2	2
13	1936	2	5
-----			
TOTAL		21	36
AVERAGE		1 2/3	2.7

the 13 plantations studied. In 1933 two more tractors were purchased for another plantation. By 1935 a total of seven plantations had purchased 14 tractors. In 1946 the check sheets showed a total of 36 tractors on 13 plantations. The frequency table that follows shows how the tractors were introduced by years.

Year	Number of plantations	Number of tractors
1932	3	5
1933	1	2
1934	2	4
1935	1	3
1936	4	5
1937	2	2
-----		
TOTAL	13	21

From the foregoing analysis it is evident that the cropping systems and farming practices have changed and further analysis should be made so that recommendations can be made for changes in the vocational agriculture program. In Chapter 5 these recommendations will be summarized.

## Chapter V

### DISCUSSION

In order to solve the problem of the study--the influence of mechanization on farming practices in the Red River valley answers to the minor questions were found from an analysis of the findings of the study of the 13 plantations and were given in the preceding chapter.

The findings indicate that significant changes have been made in all phases of the farming program in the Foreman, Arkansas, area.

#### Trends in farm labor

The number of tenant farmers declined on an average of 8.7 families per plantation. The work that was formerly done by these families with one or two mules and a limited amount of horse-drawn equipment has been taken over by the tractor and other mechanized equipment. These farm families have been released and have sought work elsewhere. The remaining tenant farmers continue on a changed cropping system with the aid of the owner operator and his family. It is interesting to note that eight of the 13 plantations increased their acreage under mechanized farming although the number of tenant families

per plantation was considerably reduced. The study by Goodsell (7) shows that 4.5 man-hours can be saved when mechanized equipment is used to produce a given acre of crop.

#### Trends in cropping systems and practices

With the introduction of mechanized equipment the number of acres that can be handled efficiently per man has been increased. In the period of this study the 13 plantations increased their crop land by a total of 610 crop acres, while the total plantation acreage increased 2,595 acres, most of which is in pasture land. It is evident that the owner operator and his tenants assume the responsibility for farming the increased acreage. This condition was substantiated by Barlow and Fenske (2) who found that in Louisiana the number of farms decreased more than 10,000, while the remaining farms increased by more than 135,000 acres.

As revealed by this study, the number of acres of cotton showed a sharp decline. Farm mechanization is largely responsible for this condition, in that cotton is not easily harvested by machinery. Two other factors have influenced a reduction in the cotton acreage. The Agricultural Adjustment Act soil building program, along with parity payments on cotton, caused the plantation owner operator to eliminate many acres of land that had been given over for the growing of cotton. In its place



soil building crops such as the Singletary pea and soybeans were planted. These new crops lend themselves to mechanized planting and harvesting. It is important to note that during the harvesting of Singletary peas and soybeans with the combine the vines are spread back on the ground. With the tractor and disc this material is incorporated back into the land as a soil builder.

Through this soil enrichment program of rotation and diversification an increase in crop yields per acre can be expected. Barlow (1) showed that a bale of cotton can be grown on 60 per cent of the land formerly required if the soil is improved through the use of recommended practices.

The second factor that influenced a significant change in cropping systems and farm practices was World War II. During this period the nation's manpower was drawn upon heavily by the armed forces and war production plants. At the same time farmers were urged to increase their production of food and oil-bearing crops. These two conditions caused the farmer to make every adjustment in labor needs and cropping systems that were found to be practical.

The Agricultural Adjustment Act through benefit payments and acreage allotments also aided in bringing about diversified farming programs as evidenced by the changes in cropping systems. It was shown that there has

been an increase in the pasture acreage. This pasture provides supplementary feed that is vital to the new livestock program.

### Trends in livestock production

The data have shown a decrease in cotton acreage and an increase in the number of Singletary peas, soybeans, and grass hay. With a decline in the number of mules and hogs, other livestock has been introduced to consume these farm crops. In the past nine years the number of beef cattle increased approximately 900 per cent. The labor requirement for raising beef cattle is far less than that required by any other farm animals. This was borne out by Barlow and Fenske (2) who found that it required as much labor to care for one mule as it does to raise 10 beef cows with their 10 calves. It is interesting to note that plantation number five reduced the number of mules by 85 per cent and the number of families from 15 to two, yet they increased the number of beef cattle by 143 head. The reduction in labor in plantation number five is in direct relation to the new labor needs.

The increase in the number of beef cattle has come at the time when the number of mules has decreased from 298 to 34, and the number of hogs decreased from 232 to 38. The apparent tendency is to eliminate livestock that requires a great deal of attention and care throughout the year and replace it with livestock that requires

less farm labor. Beef cattle have a lower labor requirement; therefore, their increase is a natural consequence.

The reduction in the number of mules can be explained by the decrease in the number of acres of cotton and the number of tenants who have left the plantation as mechanized equipment was introduced. The fact that the number of hogs decreased from 232 to 38 seems to be a result of a number of factors including an epidemic of cholera and creation of a livestock district in which all interior fences were removed. In the absence of substantiating data it would be unwise to relate this decrease of hog stock to any condition brought about by the introduction of mechanical power.

Beef cattle was the predominating livestock enterprise followed by a relatively small number of hogs. Dairy cattle, poultry, and sheep were never introduced into this community because of prejudices against having barn and cow lot and poultry house at each tenant house. Sheep have a tendency to foot rot in wet grounds during winter.

#### Trends in farm power and machinery

With the introduction of mechanized power and equipment, single row horse-drawn equipment virtually disappeared from the plantations. In its place this was also true of the mule population. Manpower was saved in this process. Reynoldson and others (12) found that

hauling cotton to the gin by team required an average of 2.3 hours per mile. The same work could be done by truck in 11 minutes. A part of the cotton acreage reduction can certainly be attributed to the desire of farmers to produce crops that lend themselves to mechanized planting and harvesting. This is especially true of soybeans and Singletary peas. In the case of these crops, the planting can be done with mechanized planting equipment and the harvesting of both crops can be done with the same combine. Tractor mowers have been found to decrease the time required to cut forage crops. In the case of Sudan grass the side delivery rake is used to roll the cured hay into windrows so that the mechanized equipment can pick up the hay and put it into bales in one operation. These mechanized farm operations tend to eliminate the need for a large supply of manpower. It has been clearly shown in this study that every tractor introduced to a plantation displaced an average of 3.1 families. A careful study of the introduction of other mechanized equipment might be shown to have its effect on dislocating farm families.

Suggested changes in the  
local program for  
vocational agriculture

During this period of change from horse-drawn equipment to mechanized power, from cotton to soil improvement crops and from regular tenant farming to owner operator farming, the local program of vocational



agriculture attempted to meet the farming needs of this community. Plantation owners called upon the instructor for information about the kind of tractor and equipment that would best meet his needs. Information was furnished on the types of crops best suited to the soil. Questions were answered regarding the selection, care, and feeding of beef cattle. Interest was shown by the adult farmers in practical diversification of crops and the method of planting and harvesting.

All these things indicated an apparent weakness in the total agricultural program. The farm shop program included horseshoeing, blacksmithing, elementary woodwork, and some horse-drawn equipment repair. Little opportunity was provided for adults to participate in evening classes to learn about care and maintenance of farm equipment.

The day-school program emphasized all phases of cotton, alfalfa, and corn. Special training was given in the selection of seed, preparing the seed bed, cultivation and methods of harvesting. Little time was given to other types of forage crops.

Because of the small number of beef cattle little time was given in the school program to the selection and care of beef cattle and the problems of feeding and pasturing. A minimum amount of time was spent in discussing the problems that relate to the raising of sheep, poultry, and dairy cattle. Less emphasis was given to the

instruction on raising of hogs because of the decline in the number retained on the plantations.

All the above conditions indicated that the present vocational agricultural program was not meeting the conditions involved in the new mechanized farming program. In the light of these findings the following changes are suggested that would strengthen the present program for vocational agriculture.

### Recommendations

Because of the increase in tractors, trucks, and other mechanized farm equipment the present shop program should be modified to include an extension course in the selection, care, and maintenance of mechanized farm equipment. This program should be available to all-day and evening students. To meet the new emphasis given to soil building and forage crops the present program should devote more time to the selection and testing of seed, the preparation of seed beds, and the harvesting of these crops.

With the introduction of large numbers of beef cattle and the increasing acreage devoted to pasture the school program should include additional time that could be devoted to the selection, care, and fattening of beef cattle. The study of crops should include the development and care of temporary and permanent pastures.

Because of the increased number of state and

federal agencies that participate and aid in the farm control and parity programs there is a growing need for elementary farm bookkeeping. It is suggested that this type of program be developed and made available to all-day and evening-school students.

Recommendations for  
further studies

During this study a number of problems have arisen that were not a distinct part of this problem. It is recommended that consideration and further study be given to the following:

1. The harvesting, curing, and storing of alfalfa.
2. Suitable types of barns and farm buildings.
3. Organization of groups to promote improved production and marketing methods.
4. The selection, introduction, and care of dairy cattle.
5. Methods and systems of drainage.
6. A study of the effect of displaced tenant farmers on attendance of boys in school.

## Chapter VI

### SUMMARY

Plantations in the Red River Valley near Foreman, Arkansas, for the most part, have substituted mechanical power and equipment for mules and the one-row implements. This study was undertaken to secure facts from 13 of these plantations to be used as a basis for broadening the services rendered by the department of vocational agriculture of the Foreman High School. The 13 plantations selected for this study were typical of the area.

That there was a need for the study was evidenced by plantation owners calling on the instructor of vocational agriculture for information in regard to mechanized power and equipment, crops suited to mechanized equipment with soil building qualities, and meeting diversified needs, beef cattle and their possibilities, and new cash crops suited to the area.

Therefore, it was felt that a study of typical plantations in the area would aid in defining the problem and offer some direction to its solution. The study--The influence of mechanization on farming practices in the Red River valley--was set forth in two major questions:



## The problem

How has the introduction of mechanized power and equipment affected farming practices, cropping systems, and labor requirements in the Red River valley?

What changes should be made in the local program for vocational agriculture as a result of tractor farming and increased mechanization in the Red River valley?

Problem analysis.--An analysis of the major problem resulted in the following subordinate questions:

1. What changes in labor requirement have taken place on these farms during the period of this study?
2. What has been the acre increase per family during this period?
3. What has been the change in cropping systems and practices during the period of this study?
4. What changes have taken place in source of farm power?
5. What change in number of farm families has taken place on these plantations?
6. What change in the vocational agricultural program will be necessary to meet the need of these changed farming conditions?

A personal data sheet was used to record information as gathered from plantation owners and operators. The tabulated data from the 13 data sheets reveal changes closely paralleling that of the United States as a whole, as shown in a review of the literature.

## Findings

The analysis of the findings revealed many changes in farming as brought about by the introduction of mechanized power and equipment.

Changes in labor requirement.--1. The plantation as an average was operated with less than one third the tenant families used before mechanization.

2. The owner and his sons took an active part in the operation of the plantation.

Acre increase per family.--1. The average number of acres cultivated before mechanization was 32.6.

2. The average acreage cultivated after mechanization was 120.

3. The increase per family cultivated was 89.4 acres.

### Changes in cropping systems and practices.--

1. Cotton acreage was reduced 54 per cent.

2. Alfalfa acreage was reduced 20 per cent.

3. Corn acreage was reduced 58 per cent.

4. The total acreage of new crops introduced exceeded the acreage reduction of the above crops.

The new crops introduced and grown were: Oats, soybeans, Singletary peas, and Sudan grass.

5. The size of the plantation and the crop acres increased.

6. A diversification of crops was practical.

7. The new crops required less man labor and lend themselves more to mechanized equipment in all phases of production.

8. Labor to care for beef cow and calf requires 1/10 time as for a work mule.

9. An increase in size of pastures was found.

Changes in livestock production.--1. Beef production increased from 99 to 887 head or approximately 900 per cent.

2. The number of hogs decreased from 232 to 38 head.

Changes in source of farm power.--1. Work mules declined from 298 to 34 head for a change of 264 head.

2. Each tractor replaced 7.3 mules.

3. Tractors increased from three in 1932 to 36 in 1946.

4. Each tractor replaced an average of 3.1 tenant families.

Changes in number of farm families.--1. Tenant family requirement changed from 163 families to 50 families, a reduction of 113 families. The average reduction per plantation was from 12.5 to 3.8, or a decrease of 8.7 families.

A review of the foregoing data justifies suggested modifications in the program of vocational agriculture.

Recommendations

## 1. Farm mechanics.

- a. That a unit be taught in selection, use, care, operation, and maintenance of mechanized power and equipment.
- b. That the installation of electric fences be taught.
- c. That farm carpentry be taught.
- d. That farm fencing as applied to electric fencing be taught.

## 2. Farm crops.

- a. That instruction be given in production of new crops introduced.
- b. That instruction be given in approved practices of harvesting, curing, and storing alfalfa.
- c. That units be taught in rotations and diversified systems of crops.
- d. That the advantages of double cropping be taught.
- e. That a unit be taught in the use of green manure and cover crops as a soil building factor.
- f. That a unit in pasture management as related to beef production be taught.



### 3. Livestock.

- a. That a unit be taught in beef production including feeding, care, management, and selection.
- b. That a pasture program be incorporated into the instructional program.
- c. That test poultry raising programs be encouraged among farmers.

### 4. Cooperative programs.

- a. That variety test demonstration in cotton and soybeans be taught.
- b. That the value of cooperative selling of seeds be taught.

As a result of this change in the teaching program of the department of vocational agriculture it may be reasonable to expect that the future trends in agricultural production will be developed around diversified cropping systems, more livestock production, and mechanized farming.

## A P P E N D I X

## APPENDIX TABLE OF CONTENTS

Appendix	Page
A NAMES AND ADDRESSES OF PLANTATION OWNERS AND OPERATORS. . . . .	62
B PERSONAL DATA SHEET . . . . .	64

Appendix A.--NAMES AND ADDRESSES  
OF PLANTATION OWNERS AND  
OPERATORS



Names and addresses of plantation  
owners and operators.

- |  |                   |
|--|-------------------|
| 1. Grover Milford                        | Foreman, Arkansas |
| 2. S. D. Matteson                        | Foreman, Arkansas |
| 3. Worth Matteson                        | Foreman, Arkansas |
| 4. Elder Butler                          | Foreman, Arkansas |
| 5. I. S. Cates                           | Foreman, Arkansas |
| 6. Hawkins Ellis                         | Foreman, Arkansas |
| 7. Otis Gillelan                         | Foreman, Arkansas |
| 8. Talbert Bowman                        | Foreman, Arkansas |
| 9. Ed Cannon                             | Foreman, Arkansas |
| 10. Jimmie Taffee                        | Foreman, Arkansas |
| 11. Jim Anderson                         | Foreman, Arkansas |
| 12. George Taffee                        | Foreman, Arkansas |
| 13. Lavoice Brothers<br>(Elmer and Earl) | Foreman, Arkansas |

Appendix B.--PERSONAL  
DATA SHEET.

Plantation Owner \_\_\_\_\_ Settled

65

When taken over by present operator \_\_\_\_\_

Acres in farm \_\_\_\_\_ Cultivation \_\_\_\_\_ Pasture \_\_\_\_\_ Woods \_\_\_\_\_  
 Year first tractbought \_\_\_\_\_ Kind \_\_\_\_\_ H.P. Cost \_\_\_\_\_

How many different tractors owned \_\_\_\_\_ No. at present \_\_\_\_\_

Average age of mules when 1st tractor bought \_\_\_\_\_ Value of good team \_\_\_\_\_

Amount of land cleared by present owner \_\_\_\_\_ When \_\_\_\_\_

Prevailing kind of soil on place \_\_\_\_\_

Acres devoted to crops before and after introduction of tractor

Units for comparison	Before introduction of Tractors	After Introduction of Tractors
Cotton		
Alfalfa (introduced _____)		
Corn		
Soy beans		
Other crops		
Livestock:		
Work Mules		
Work Horses		
Cattle		
Hogs		
Miscellaneous		
Pasture		
Families (F-4 etc)		
Day Labor		
Division of crops		
Amount seasonal labor		
Source of seasonal labor		
Horse Machinery:		
Stalk Cutters		
Miscellaneous		
cultivators		
Planters		
single plows		
Disc		
Harrows		
Method hauling cotton, gin		
<i>COTTON</i> Amount hauled per day		
Team		

Types of work done by:

	Cutting stalks	Bedding	Disking	Planting	Cultivating	Ditch Work
Tractors						
Mules and Horses						

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