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To the Graduate Council:

I am submitting herewith a thesis written by Bobby Eugene Phillips entitled "Income Possibilities of Farm Families in the Hills of North Western Tennessee." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

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INCOME POSSIBILITIES OF FARM FAMILIES IN THE HILLS
OF NORTH WESTERN TENNESSEE

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science

by

Bobby Eugene Phillips

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CHAPTER I

INTRODUCTION

Low incomes resulting from inadequate farm size and improper combination of available resources are typical problems found in southern agriculture.¹ This study was focused upon one of the problem areas located on the river bluff area (Memphis, Minnich and Loring Soil Association) of Obion County, Tennessee (Figure 1).

In this area, the majority of the farms are small as noted later in this thesis. In an area where there are large numbers of small farms, it is not uncommon to find low incomes and considerably more labor than is required to carry on the farm operations. The common production practices and enterprise combinations on these small farms tend to further aggravate the problem of a lack of land and other capital resources to efficiently employ the labor of the farm operators and their families.

According to the population figures in the 1950 U. S. Bureau of Census the total population in Obion County had decreased 6.2 per cent from 1940 to 1950, while the farm population had decreased 13.7 per cent during the same period. This current trend of migration from the area's farms should open new income opportunities for the residual farming families, opportunities to expand their operations on the land abandoned by those leaving agriculture.

Under present conditions, if adequate land and capital resources do not become available to these farmers it may be difficult to obtain

¹United States Department of Agriculture, "Development of Agriculture's Human Resources," (Washington, D. C.: U. S. Government Printing Office, April 1955), p. 2.

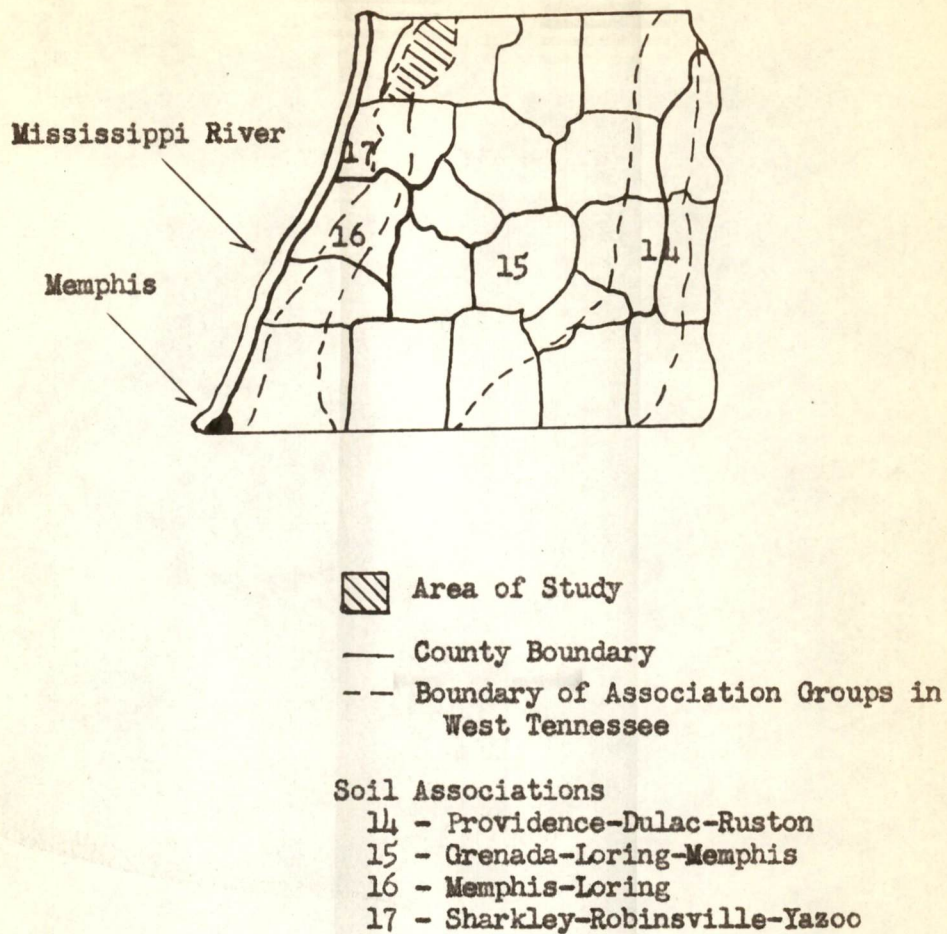


Figure 1. Location of Bluff Area (Memphis, Minnich, and Loring Soil Association) Obion County, Tennessee.

incomes comparable with workers in other fields.

Purpose of Study

Farmers in the area need information on which to base their decisions in making farming adjustments. Also, the agricultural agencies need information of this nature in order to better advise the farmers in making necessary changes.

Richard G. Wheeler stated, "The farm management worker cannot hope to provide ready-made solutions for even the most important problems on each individual farm. But extensive analysis in terms of representative operating units will demonstrate appropriate ways of attacking particular problems; moreover, the solution can be adjusted slightly to fit many situations similar to the ones actually analyzed."² An analysis of this type will help the operators in developing various alternative farming systems to alleviate the problems found within the small inefficient operating unit.

The general objective of this study was to analyze alternative systems of farming in view of the current economic conditions and known agricultural technologies. Special attention has been given to the economies of acreage expansion, assuming that the current trend in farm depopulation will be continued. The specific objectives were to analyze:

- (1) the income potentials of alternative farming systems and production methods on a typical small farm

²Richard G. Wheeler, "New England Dairy Farm Management Project as an Example of the operating unit approach to Farm Management Analysis," (Journal of Farm Economics, August 1950), p. 211.

- (2) the income potentials associated with the use of increased amounts of land

Method and Procedure

To analyze the opportunities for profitable farming adjustment in the bluff area, a survey was taken to get a description of the resources and operations of individual farms. Some additional data was obtained from production specialists and secondary sources.

Sampling Procedure

A county highway map was marked off into one-half mile square blocks. Schedules were taken from every family located in every fifth one-half mile square block over the county. This survey was conducted from June through September 1954. Schedules used in this analysis were limited to the Memphis, Minnich, and Loring Soil Association, because of the similar physiographic condition throughout the area and also because this area has the greatest income problem of the county which appears to be somewhat unique. These schedules were used to determine the characteristics of the representative farm units. The Memphis, Minnich, and Loring Soil Association or the "bluff" area is shown in Figure 1. According to Mr. B. H. Luebke, in the bluffs south of Obion County, cotton is the predominant farm product. However, in the Obion County bluffs cotton and livestock are about equally important.³

After the farm characteristics of the area were determined from

³B. H. Luebke, et. al., Types of Farming in Tennessee, Bulletin No. 169, (Knoxville: Tennessee Agricultural Experiment Station, University of Tennessee, Reprinted 1947), p. 49.

the surveys and other sources, purposive sampling was used to select representative farms for further study.

Source and Type of Data Collected

The surveys of each farm included acres owned and rented, acreages of crops and pasture, the number of livestock, gross farm sales and costs, and the ages and educations of the farm family members. Three representative small farms were selected from the area and were studied in considerable detail. Each was mapped by a soil conservation technician to show soil type, degree of slope and erosion, and land use capabilities. In addition, detailed information was collected concerning the farm operations and incomes of these three families in 1954.

Budgeting as a Method of Analysis

The budget is a plan for the possible use of land, labor, power, equipment and other resources of the farmer. It is a device for setting down the different crops or livestock which can be produced and in deciding which alternative is most profitable. The farm budget is to the farmer or farm manager what the blueprint of a house is to the building contractor. It shows what may be done and how to do it.

Heady and Jensen state that the real objective of budgeting "is to compare alternative plans for prospective profitability".⁴ Thus, the

⁴Earl O. Heady and Harold R. Jensen, Farm Management Economics, (New York: Prentice-Hall Inc., 1954), p. 96.

goal is not to set down a single plan to be followed without deviation but to figure out two or more systems of farm organization, compare incomes, and select the most desirable one.

A large number of possible alternative organizations or combinations exist for most farms. However, the number that are relevant for consideration may be considerably reduced by the use of theory and practical judgment. There may be cases in which several plans appear to have about the same income potential. In such cases the farm operator may select one of such plans, based upon his personal preferences, without sacrifice of income. At this point he must make a decision which still involves much economic consideration. The decision that the operator makes may be influenced by several factors such as the amount of investment involved, income stability, amounts and types of work involved, the flexibility of the plan, etc. After the plan has been put into operation it is often difficult to make major changes without considerable loss on fixed investments.

In farm budgeting, there are certain economic principles that are very useful such as the diminishing returns, marginal costs and returns, substitution costs, competing crops, and opportunity costs. To obtain the most profitable plan it is important that one allocate his resources to competing uses so as to receive equal marginal returns from all possible uses. This means that each unit of investment and labor will be put to its most profitable use.

The real objective of most farm operators "is to get the maximum return in satisfaction and net profits from a minimum expenditure of

resources."⁵ This cannot be gained unless the productive resources are properly balanced. To get this balance the operator or planner may use the budgeting analysis approach to guide his decision.

To prepare a farm budget there are certain steps that are set up to follow as well as certain types of information that must be obtained. A farm budget is no better than the information upon which it is based.

The first step is to decide which productive agents (and in what quantities) will be regarded as fixed, fixed in the sense that certain costs will accrue to the operator whether these agents are used or not. Here we have treated the labor resource as if it were fixed to that of the farm family members, except for that used in the custom harvesting of soybeans and hay. At the various stages of the analysis we have been concerned with the use of specific tracts of land, such lands having particular physical traits and being associated with a particular climate. Although, in certain income computations investment in land has been treated as a variable cost in that interest has been charged. Other capital agents have been treated as completely variable in that the use of additional quantities could be considered so long as interest and depreciation were charged against the farming operations. Regarding certain of these variable agents (say fertilizer) no interest has been charged because the investment would be fixed for only a brief period, i.e., annual depreciation equals the purchase price of the agents. To get a more refined income estimate than is provided here one would need to charge interest in a certain "pool" of liquid or operating capital.

⁵Andrew Boss and George A. Pond, Modern Farm Management, (Saint Paul: The Webb Publishing Company, 1951), p. 225.

Such further refinement is judged irrelevant since the available knowledge of production relations, future prices, etc., is at best rather crude.

The second step is to assemble information concerning production relations. In other words one must make some judgment as to the probable outputs of corn, cotton, beef, milk, etc., that will result when specific productive agents in specific quantities are combined in specific ways. (See Appendix A for potential crop yields and potential feed and labor requirements for crops and livestock.)

The third step is to make some judgment as to the probable prices the farmer will receive for produce of his efforts and the prices he will have to pay for the purchase, rent, or hire of productive agents. The 1954 prices have been used in analyzing present and alternative systems of farming. (See Appendix B for prices paid by farmers and prices received for products used and produced for sale on the farm.) However, certain exceptions were made for a few items with prices which appeared to be out of line with the common pattern.



CHAPTER II

PHYSICAL AND ECONOMIC RESOURCES

Description of Area

Location

Obion County is situated near the northwest corner of West Tennessee. The State of Kentucky forms the northern boundary. The other boundaries consist of the following counties: Weakley on the east, Gibson on the south, and Lake on the west, in which the Reelfoot Lake is a part of that boundary. The location of the Memphis, Minnich and Loring soil association area was shown in Figure 1.

Climate

According to the weather bureau station at the Samburg Wildlife Refuge the average annual precipitation is (for the period records have been kept) 49.9 inches. The temperature has ranged from 80°F. to 104°F. with an average of 59.9°F.¹

The average date at which the last killing frost has occurred in the spring is April 10, and the average date of the first killing frost in the fall is October 25, giving an average growing season of 198 days.²

A climate of this nature is suited to production of cotton, corn,

¹United States Department of Commerce, "Annual Summary, 1953," Climatological Data, Vol. LVIII, No. 13 (Chattanooga, Tennessee, 1954).

²J. F. Voorhees, The Relation of the Weather Service to the Farmers of Tennessee, Bulletin No. 87 (Knoxville: Tennessee Agricultural Experiment Station, University of Tennessee, 1910), pp. 4-8.

soybeans, small grain, clover, alfalfa and pastures. Bermuda grass and lespedeza make luxuriant growths on both uplands and stream bottoms.

Soils

The soils in the area sampled are of the Memphis, Minnich and Loring soil association, which covers 45.5 per cent of total land in farms in Obion County. These soils are made up of loessial material, which was deposited by eastward-blowing winds that picked up the fine glacial silt and deposited it as a mantle of fine dust over the courser sands and gravels underneath. In this bluff area along the east side of the Mississippi River bottom, this mantle of wind-blown material is very deep. These deep loessial silt and clay loams are considered to be very productive.

Drainage is satisfactory except for a few of the first bottom lands that are subject to occasional overflow. External drainage is by the many small streams that have cut their way to the Obion River and the Reelfoot drainage canal, which empties into the Mississippi River. The rough or rolling topography and texture of the soil is such that the soils are very susceptible to erosion. The frequent downpour of rain on the inertilled crops common to the area has led to general sheet erosion and many gullies over the area. Due to this severe erosion much of the land should be taken out of cultivation and seeded to permanent cover according to the Soil Conservation Service Classification.

The soils are described and classified in more detail in Appendix C.

Markets and Transportation

Farmers of the area have available markets for cotton, livestock, grain, some vegetables for canning, and a limited amount of unclassified milk, also a limited market for grade A milk is available in the outer edges of the area.

Livestock may be sold through local markets or shipped to St. Louis, Louisville and Cincinnati by rail from Union City. Some are trucked to Memphis and Nashville.

Cotton is marketed primarily through the local ginner, but some is sold at the shipping point in Memphis.

A small amount of grain is sold in Union City, Ridgely, and a few other adjoining areas.

Types of Farming

The average size of all farms in this area in 1950 was 106 acres (Table I), compared to 111 acres for the remainder of the county. However, in this area there was only about 66 per cent of the total acreage in cropland compared to 78 per cent in the remainder of the county. The average acreage per farm from which crops were harvested was 39 acres in comparison with 56 acres for the remainder of the county. On a per farm basis there were more than twice the average acreage in woods in this area of the county as compared to the remainder of the county. This area had 47 per cent of the total farms in the county and 46 per cent of the total land in farms. Sixty-four per cent of the operators

TABLE I

LAND USE PATTERN OF FARMS IN BLUFF AREA, OBION COUNTY, TENNESSEE,
AS COMPARED TO THE REMAINDER OF THE COUNTY^a

Item	Bluff Area ^b			Remainder of County ^c		
	:Average:Percentage:			:Average:Percentage:		
	: Area	: per	: of	: Area	: per	: of
	: total	: farm	: total	: total	: farm	: total
Land:						
Cropland harvested	50,968	38.9	36.6	83,434	55.7	50.0
Cropland used only for pasture	34,310	26.2	24.6	38,526	25.7	23.1
Idle cropland	6,391	4.9	4.6	7,810	5.2	4.7
Total cropland	91,669	70.0	65.8	129,770	86.6	77.8
Woodland pastured	15,968	12.2	11.5	7,977	5.3	4.8
Other pasture	6,641	5.1	4.8	9,290	6.2	5.5
Other land	7,056	5.4	5.1	8,465	5.7	5.1
Woodland not pastured	17,796	13.6	12.8	11,310	7.6	6.8
Total land in farms	139,130	106.3	100.0	166,812	111.4	100.0

^aSource: Bureau of Census: United States Census of Agriculture, Minor Civil Division Data, 1950.

^bTotal number of farms (1309).

^cTotal number of farms (1497).

were either owners or part-owners.³

The average numbers of various classes of livestock per farm were as follows: 11.8 head of all cattle and calves, 5.2 head of cows including heifers that had calved, 8.2 head of hogs, 2.2 head of sows and gilts, 2.2 head of sheep and lambs, 1.2 head of workstock and 31 chickens (Table II).

The value of products sold in 1950 was \$2,688 per farm compared to \$4,973 for the remainder of the county (Table III). These receipts were distributed among the principal sources as follows: cotton, 33.0 per cent; soybeans, 7.4 per cent; other crops, 3.4 per cent; cattle and calves, 25.4 per cent; hogs, 23.3 per cent; and other livestock and livestock products, 7.5 per cent.

The average acreage per farm of the five most important crops were as follows: corn harvested for all purposes, 18.8 acres; cotton, 7.2 acres; soybeans, 6.6 acres; all hay, 5.5 acres; and wheat and oats next with .6 acres.

Characteristics of the Farms in the Area

Acreage of Land

The farms in the "bluff" area are organized around the production of both crops and livestock which means that the acreage in pasture and crops was of much importance. Farms in the sample were classified according to total acres used for crops and pasture. On this basis the 113

³United States Bureau of the Census, U. S. Census of Agriculture, Minor Civil Division Data, (Washington, D. C.; U. S. Government Printing Office, 1950).

TABLE II

AVERAGE NUMBER OF LIVESTOCK PER FARM IN THE BLUFF AREA AS COMPARED
TO THE REMAINDER OF OBION COUNTY, TENNESSEE, 1950^a

Item	Bluff Area		Remainder of County	
	:Average:		:Average:	
	Total number	per farm	Total number	per farm
Livestock:				
All cattle and calves	15,407	11.8	22,244	14.9
Cows including halvers that have calved	6,825	5.2	8,257	5.5
All hogs and pigs	10,746	8.2	54,141	36.2
Sows and gilts	2,993	2.2	7,682	5.2
Chickens	40,402	31.0	60,266	40.2
Sheep and lambs	2,900	2.2	5,693	3.8
Horses and colts including ponies	727	.55	781	.5
Mules	1,626	1.24	1,561	1.0

^aSource: Bureau of Census: United States Census of Agriculture,
Minor Civil Division Data, 1950.

TABLE III

VALUE OF CROPS, LIVESTOCK AND LIVESTOCK PRODUCTS SOLD FROM THE BLUFF
AREA, OBION COUNTY, TENNESSEE, AS COMPARED TO THE
REMAINDER OF THE COUNTY, 1950^a

Item	Bluff Area ^b	Remainder of County ^c
	Total dollars	Total dollars
Value of sales:		
Crops	1,529,007	2,055,114
Livestock and livestock products	<u>1,990,017</u>	<u>5,390,038</u>
Total	3,519,024	7,445,152
Average value of crops sold per farm	1,168	1,372
Average value of livestock and livestock products sold per farm	1,520	3,600
Average of all crops and livestock and livestock products sold per farm	2,688	4,973

^aSource: Bureau of Census: United States Census of Agriculture,
Minor Civil Division Data, 1950.

^bNumber of farms (1309) in Civil Districts 3, 5, 6, 9, 10 and 12
or the Memphis, Minnich, and Loring soil association.

^cNumber of farms (1497).

farms in the sample (see page 5) were grouped into three groups: small, 4 to 64 acres; medium, 65 to 99 acres; and large, 100 or more acres (Figure 2).

Classified on this basis, 53.2 per cent were small; 21.2 per cent, medium; and 25.6 per cent, large. However, the large farms accounted for 55 per cent of the land used for crops and pasture, while the small farms accounted for only 23 per cent. This means that a large proportion of the farmers are trying to obtain a living on a smaller percentage of the land area.

Family Characteristics

About 40 per cent of the operators were sixty years of age or above, while only 19.6 per cent were less than forty years old (Table IV). A larger percentage of the operators on small farms were over sixty years of age, than on the larger farms.

The advanced ages of present operators plus the fact that many young people have left the area indicates that land will be available for younger operators to obtain and consolidate with present holdings. It will therefore be important that operators have knowledge of how to reorganize farms to take advantage of the opportunities that are likely to exist.

Among the owner operated farms larger families were living on the small farms than on the medium and large farms. Among the renters the reverse was true (Table V).

Education of the operator was substantially related to farm size

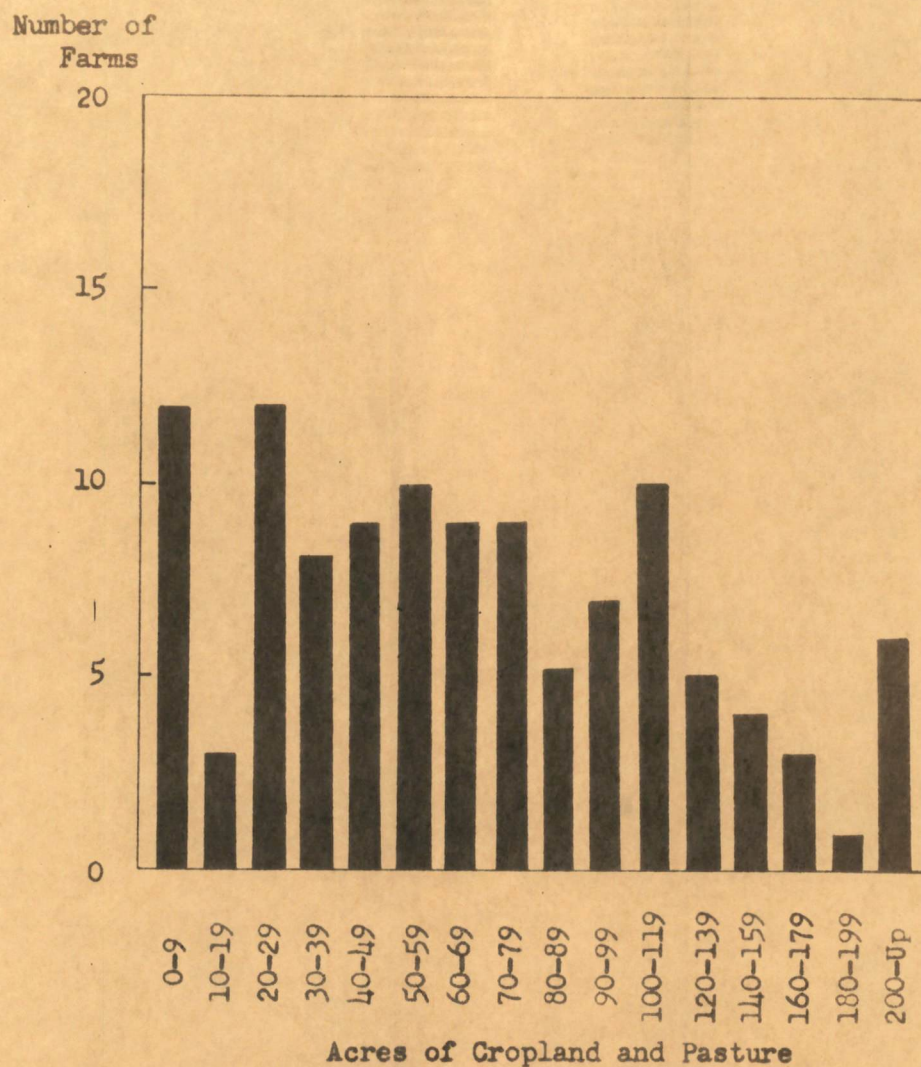


Figure 2. Distribution of farms by size, 113 farms, Bluff Area, Obion County, Tennessee.

TABLE IV

AGE DISTRIBUTION OF OPERATORS BY SIZE OF FARM, 113 FARMS,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Years	Small Farms		Medium Farms		Large Farms	
	No.	% of	No.	% of	No.	% of
	operators	total	operators	total	operators	total
20-29	5	8.4	1	4.2	5	17.2
30-39	5	8.4	4	16.6	2	6.9
40-49	10	16.6	7	29.2	8	27.6
50-59	13	21.6	2	8.3	6	20.6
60-69	16	26.6	5	20.8	5	17.3
70-79	9	15.0	4	16.7	2	6.9
80-over	2	3.4	1	4.2	1	3.5
Total	60	100.0	24	100.0	29	100.0

TABLE V

POPULATION BY SIZE OF FARMS, 113 FARMS, BLUFF AREA,
OBION COUNTY, TENNESSEE, 1954

Item	Small Farms		Medium Farms		Large Farms	
	:Average:		:Average:		:Average:	
	: Number	: per	: Number	: per	: Number	: per
	:operators:	: farm	:operators:	: farm	:operators:	: farm
Population on farms:						
Members in owner- operator's family	46	3.91	17	3.0	23	3.6
Members in renter's family	14	4.07	7	3.8	6	4.83
Total	60	3.18	24	3.25	29	3.86

(Table VI). As compared with operators on medium and large sized farms, a greater percentage of the operators on the small farms had finished less than the fourth grade. More than twice as large a percentage of the operators of large farms had completed high school than was true for the operators of small farms.

TABLE VI

EDUCATION OF FARM OPERATORS, 113 FARMS, BLUFF AREA,
OBION COUNTY, TENNESSEE, 1954

Years reached in school	: Small Farms		: Medium Farms		: Large Farms	
	: Number	: % of	: Number	: % of	: Number	: % of
	: operators	: total	: operators	: total	: operators	: total
Less than 4th grade	10	16.6	2	8.3	1	3.5
4th to 8th grade	33	55.0	14	58.3	17	58.6
Entered high school but did not graduate	11	18.4	5	20.8	5	17.2
Graduated from high school	4	6.6	3	12.6	5	17.2
College one year or more	<u>2</u>	<u>3.4</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>3.5</u>
Total	60	100.0	24	100.0	29	100.0

CHAPTER III

PRESENT AND ALTERNATIVE FARMING SYSTEMS

Procedure Used for Analyzing the Representative Units

The three small farms (see page 5) which are assumed to be representative of a large proportion of the farms in the area have been used to analyze means of improving the incomes of the families in the area. To begin this analysis case studies were used to show the incomes that result from the farming systems and practices which are currently used on these farms. The potential productivity of the area's soils is much greater than indicated by the present yields produced on the representative units. There seems to be significant opportunities for improving present farming systems and farm incomes by incorporating improved practices and adjusting the present enterprise combinations for more effective utilization of labor, machinery and other resources with additional land. However, in an area of this nature one must start with the existing situation if progress is to be attained.

First, a brief summary of the present operations and incomes on these three farms has been presented. Additional analysis has been carried forward in three phases. In the first phase the income potentials for various systems of farming were analyzed in the framework of limitations imposed by a family attempting to earn a living on a 48 acre farm. Currently, a family, using 1.6 man equivalents of labor,¹ is

¹A man-equivalent is the amount of work that can be done by one fully able-bodied man in 250 ten-hour days. (See Appendix D for conversion rates).

farming on the specific tract of land with which the analysis is concerned. Their situation is thought to be similar to situations faced by numerous farmers now in the area.

In the second phase the income potentials for various systems of farming were analyzed within the limitations imposed by 106 acres of land. The specific 106 acres considered are composed of the 48 acre farm used in the first phase plus a 58 acre tract that is now operated by another family.

In the third phase the land limitation is further relaxed by inclusion of an 80 acre tract which is now being farmed by still another family.

In all three phases the labor force is limited to that of the family which is currently located on the first 48 acre farm.² Hence, we have attempted to analyze the income opportunities that would be created for this family if neighboring families would take jobs out of agriculture and rent out or sell their farms.

In combining the three units of land, it was assumed that the farms adjoined each other so as to facilitate the use of the resources as one unit. It was assumed that additional land could be added to the 48 acre tract by purchasing only the land (not the buildings located on the additional land). It is thought that in the long run such buildings would not be used and hence would lose their exchange value. When the farming systems being considered required building or improvements not already available on the 48 acre tract interest was charged on one-

²Except that it was assumed that soybeans and hay could be custom harvested at the going rate.

half of the estimated new value of such improvements. The same was true for the investments in additional equipment.

Summary budgets of all alternative farming systems considered are given in the body of the thesis. A more detailed budget of Alternative VII is presented in Appendix E. These details are included to give some idea of the various expenses, cash outlay for various items and the procedures which were followed in analyzing each alternative.

Present Operation on the 58 Acre Farm

This 58 acre farm does not have much land suited for the production of row crops. It has about 7.5 acres of highly productive Collins soil and a few very small narrow hollows of Briensburg soil located in areas suited only for permanent pasture or woodland. There are about 5.5 acres of Memphis soil, which is class III and IV and varies from gently sloping to strongly sloping, with severe erosion problems.³ According to the Soil Conservation Service land use classification, this Memphis soil is best suited for hay production and permanent cover, such as permanent pasture.

About 14.7 acres of the land on this farm are in corn and cotton plus a small garden. The remaining acres consist of 39 acres in unimproved pasture of which about 14 acres are in woods and 4.3 acres in the farmstead, roads, etc.

The cotton produced on this farm was located on 4.2 acres of

³See Appendix C for definitions of land class capabilities.

Collins soil. The 10 acres of corn were located on the remaining 1.8 acres of Collins and on Memphis uplands where the slope is moderately steep and has very severe erosion. In 1954, cotton on this farm was fertilized at the rate of 400 pounds of 6-12-12 per acre and yielded about 1.1 bale per acre. No nitrogen was used to sidedress the cotton, which might account for yield not reaching the 1.25 bale per acre potential yield. (Appendix A for potential yields used for all alternatives)

The corn did not receive any kind of fertilizer and the 10 acres produced only 20 bushels per acre. The pasture was not fertilized, but furnished some feed for 2 mules and 6 beef cows with calves. The other livestock consists of 3 brood sows producing 30 hogs, and 50 hens kept primarily for home use.

The total labor force available on this farm consists of the 51-year-old operator and his 48-year-old wife. They make a total of .96 man-equivalents (Appendix D). Under the present system the operator hires a part of the chopping and picking of the cotton.

The investment for this farm is \$13,391 of which \$10,300 consist of land and buildings. The remainder is almost equally divided between machinery and livestock. This farm operator has a medium sized tractor with plow, disc and cultivator, along with the usual horse drawn equipment found on most farms.

The net farm earnings to this operator was about \$1463 in 1954. The net labor earnings to this operator and his family was about \$893. This includes the value of farm products used in the home (estimated at \$367). The crops and livestock require about 1110 hours of labor, yet

there are about 2400 hours available for use. The labor earnings per hour of labor used was 80 cents and 37 cents per hour of labor available for use. Excluding the value of the products used in the home, the operator realized 31 cents per hour for his labor used under the present farming operations. Our income estimate does not include the value of living in the farm house.

Present Operation on the 80 Acre Farm

This farm contains a total of 80 acres which range from Class I to Class VII. The upland soils on this farm are Memphis and Loring. The bottomland soils, which consist of Vicksburg, Collins and Falaya,⁴ make up only about 8 per cent of the land area, but are considered to be very productive. About 38 per cent of the land area in this farm is class VII and the slopes range from steep to very steep with very severe erosion problems.

The present organization on this farm is built around the production of corn, a few beef cows and five brood sows. This operator grows about 30 acres of corn with soybeans intercropped in about 18 acres. Neither the corn nor the soybeans received any fertilizer. The corn averaged only about 17 bushels per acre. The remainder of the farm was used as follows: pasture (33 acres), woods (16 acres), and the farmstead (1 acre). The corn was planted on 9 acres of Collins, Briensburg and Falaya, and 21 acres of upland which consisted of some

⁴Department of Agricultural Education, Land Use Planning. Subject Matter Mimeo. No. 25, (Knoxville, Tennessee: Department of Agricultural Education, University of Tennessee, January 1950), p. 41.

Memphis which was gently sloping, but most was strongly sloping with very severe erosion. No hay was grown on this farm and in 1954 no cotton was grown, but the farm had produced cotton previously so it had a 3.5 acre allotment for 1955.

The net farm earnings to this operator and his wife was about \$573 in 1954. The net labor earnings was minus \$27. When the interest was charged on the investment the operator did not have anything left as a return on labor.

The investment for this farm is about \$12,017 of which about \$8500 is invested in land and buildings. He owns a tractor and a few necessary pieces of equipment.

Present Operations on the 48 Acre Farm

The 48 acre farm has about 22.5 acres of class II and class III soil (see Appendix C for land class capabilities). The soils are predominantly Memphis with some fields of Briensburg, Falaya, and Grenada. About 14.5 acres is class II land according to the Soil Conservation Service classification⁵ and is gently sloping with erosion varying from accumulations to moderate erosion. The potential yields per acre on this farm are relatively high, with the proper drainage of Falaya and Grenada soil series and the adoption of improved crop production practices, along with a few erosion control practices on the upland soil.

Under the present system about half of the land (23 acres) is

⁵Soil Conservation Service, The Measures of Our Soil, (Washington, D. C.: U. S. Government Printing Office, February 1951).

in crops of which approximately one-third are on steeply sloping and severely eroded fields. There are approximately 12 acres in unimproved pasture that produces enough grazing for two cows producing milk for home use. The present system on this farm consists of corn, cotton, two sows, two dairy cows and a few hens (Tables VII and VIII).

This family consists of the 61-year-old operator, his 47-year-old wife and their 19-year-old son, they make up a combined labor force of 1.6 man-equivalents (see Appendix D for conversion rates).

Many practices followed on this farm are not recommended by the Extension Service and other recognized agricultural agencies. Cotton received an application of 200 pounds of 6-12-12 fertilizer per acre. It did not receive any additional nitrogen as a sidedressing. The corn was not fertilized at all. The cotton yielded about .6 bale per acre and corn about 22.5 bushels per acre. No hay was grown on this farm, which is typical of many farms in the area. Many of the operators in the area have the entire farm fenced and allow the livestock to run in the fields after the harvest season.

The net farm earnings were \$346 in 1954. Net farm earnings include cash income from the sale of crops and livestock plus the estimated value of products used in the home by the operator's family minus the year's prorated share of direct cash costs, depreciation on buildings, fences, machinery and livestock. It does not include the value of living in the farm house. Net farm earnings is the amount the farm family realized from the use of its labor, capital and management.

The net labor earnings to the operator and his family was minus \$249 in 1954. In other words if interest (at 5 per cent) were charged

on the family's investment, nothing was left as a return on its labor. The costs deducted from the total farm earnings, which give the net labor earnings used here, are the direct cash costs, depreciation on buildings, fences, machinery and livestock and 5 per cent interest on the total investment.

The total investment for this farm is about \$11,900 which consists primarily of land and buildings. Under the present operations the operator used tractor power, with some tractor drawn equipment and some horse drawn equipment. The investment in livestock and equipment was about \$800 (Table IX; Tables VII, VIII and IX are listed after Figure 3).

The five acres of cotton produced on this farm account for about 54 per cent of the cash income from the farm. The labor used on the crops and livestock was about 1167 man hours, which was only about 29 per cent of the potential family labor supply.

Phase Number I--Analyses of Alternative Farming Systems With a Land Limitation of 48 Acres

The alternatives considered for this operator on this 48 acre farm were: Alternative I--Short-Run improvement; Alternative II--Cotton, hog, dairy and broilers; and Alternative III--Cotton, hog, dairy, and poultry. It was assumed that he would have available 1.6 man-equivalents of family labor which is the same as under the present system. The improvements considered include changes in land use, crop yields and livestock production. The objective of this phase is to examine the potential for income improvement without acreage expansion.

Alternative I--Short-Run Improvement⁶

This system would include the same enterprises as the present system, but it would require that improved practices be used and row crops be shifted to the good Memphis, Falaya, Briensburg, and Grenada soils to increase yields. By doing this the cotton yield could increase from .6 to 1.25 bales per acre. The corn yield could increase from an average of 22.5 bushels per acre to about 65.5 bushels per acre. The cotton and corn would be grown on the Class II and Class III soils.⁷ All crops would be fertilized according to tentative recommendations of The University of Tennessee Agronomy Department (See Appendix A for fertilizer recommendations for all crops). Vetch, as a cover crop, would be seeded in the row crops during the last cultivation to reduce erosion and to help maintain the organic matter. Lime would be applied on one-fifth of the row crop land each year at the rate of 2.5 tons per acre.

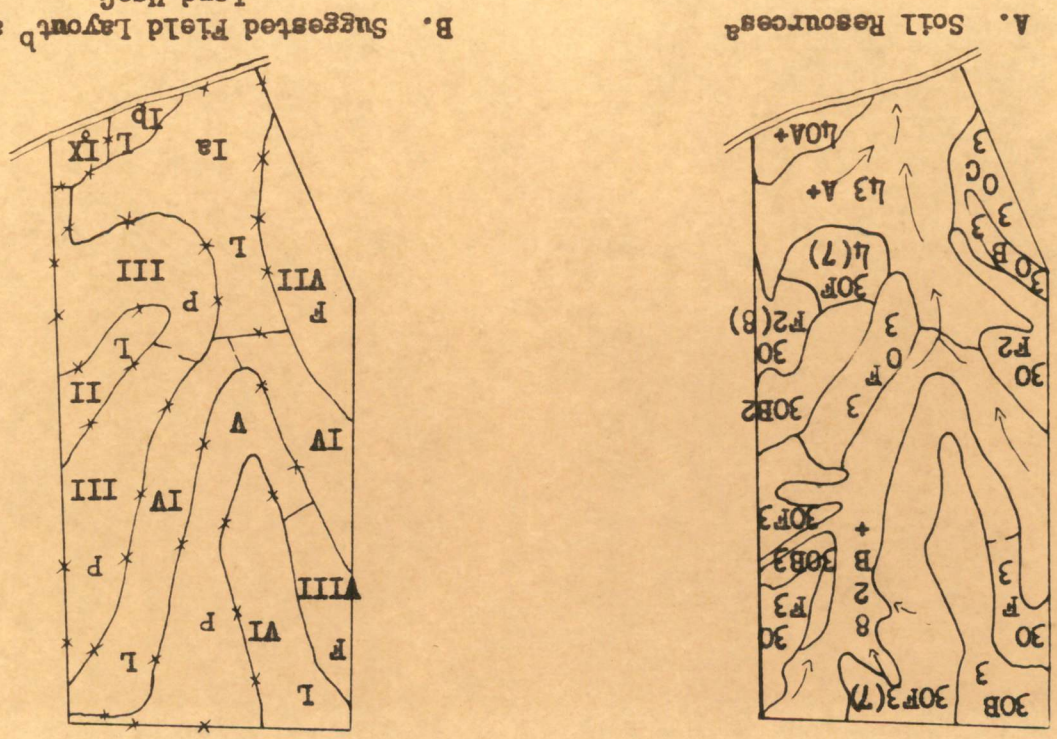
The unimproved pasture land now on the Falaya and Grenada soils (field Ia and Ib) would be taken out of pasture and planted to corn. Seven acres of fescue and ladino clover would be established on field III to furnish grazing for the two dairy cows kept for milk for home use. The pasture was assumed to last for six years and the cost of establishing was prorated for that period of time.

With better methods the two brood sows should produce 14 pigs per litter. With current methods only 8 are produced. With the above

⁶See Appendix F for field numbers, acreages and crops grown for all alternatives and Figure 3 for field layout and soil resources for Phase Number I.

⁷See Appendix C for soil resources.

Figure 3. Map of soil resources and suggested farm layout for the 48 acres.



Soil resources are described with regard to: (1) series, (2) slope, and (3) erosion. The numbers and letter appearing in each area layed off on the map define the soil characteristics of the area. The first number stands for the series; the letter stands for the degree of slope; and the last number stands for the degree of erosion.

- (1) Soil series
30 Memphis
40 Grenada
82 Brinsburg
43 Palaya
(2) Soil slope
A Nearly level
B Gently sloping
C Sloping
D Strongly sloping
E Moderately steep
F Steep
(3) Soil erosion
+ Accumulations
1 Slight
2 Moderate
3 Severe
4 Very severe
7 Occasional shallow gullies
8 Frequent shallow gullies
9 Gullied land
(7), (8), (9) Deep gullies

(4) The various soil areas on this farm may be fitted into the Soil Conservation Service land classes as follows:

- Class II - 30B2 Memphis
40A+ Grenada
82B+ Brinsburg
Class III - 30B3, C3 Memphis
43B+ Palaya
Class VI - 30E3, 4(7) Memphis
Class VII - 30F1, 2, 3, 3(7), 2(8)
4(7) Memphis

- Suggested land uses are indicated by the following:
o Farmstead
-x- Fences
L Cropland
P Pasture
F Woods
X Idle
IX 1.0
VIII 2.0
VII 4.0
VI 4.5
V 8.0
IV 8.0
III 10.5
II 2.0
Ib 1.0
Ia 7.0
The fields layed out on this map contain the following acres:

Suggested land uses are indicated by the following:

TABLE VII

PRESENT AND ALTERNATIVE FARMING SYSTEMS, PHASE NUMBER I,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Unit	Present Operation	Alternative Systems		
			I	II	III
			Short-Run Improvements	Cotton-Hog Dairy Broiler	Cotton-Dairy Hogs-Hens
<u>Crops:</u>					
Cotton	acre	5.0	5.0	3.5	3.5
yield	bale	.6	1.25	1.25	1.25
Corn	acre	18.0	-	-	-
yield	bu.	22.5	-	-	-
Corn, upland	acre	-	6.5	1.0	6.0
yield	bu.	-	65.0	65.0	65.0
Corn, bottom land	acre	-	3.0	6.0	6.5
yield	bu.	-	75.0	75.0	75.0
Corn, bottom land	acre	-	7.0	6.0	4.5
yield	bu.	-	65.0	65.0	75.0
Corn, bottom land	acre	-	1.0	-	-
yield	bu.	-	45.0	-	-
Vetch (G. M.)	acre	-	(22.5)	(16.5)	(20.5)
Garden	acre	.4	.4	.4	.4
Total Crops	acre	23.4	45.4	33.4	41.4
Double-cropped	acre	-	(22.5)	(16.9)	(20.5)
Used for crops	acre	23.4	22.9	16.5	20.9
Pasture, unim- proved	acre	12.0	3.0	-	3.5
Pasture, improved ^a	acre	-	7.0	19.5	18.0
Other land	acre	12.6	15.1	12.0	5.6
Total Land	acre	48.0	48.0	48.0	48.0

^aFescue and ladino clover.

TABLE VIII

ESTIMATED NUMBER OF LIVESTOCK FOR PRESENT AND ALTERNATIVE FARMING SYSTEMS,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Unit	Present Operation	Alternative Systems		
			I	II	III
			Short-Run Improvements	Cotton-Dairy Hog-Broiler	Cotton-Dairy Hogs-Hens
<u>Livestock:</u>					
Dairy cows	no.	2	2	5	5
Dairy calves	no.	2	2	3	3
Dairy heifers	no.	-	-	2	2
Brood sows	no.	2	2	4	3
Boars	no.	1	1	-	-
Hogs, raised	no.	14	28	56	42
Poultry (hens)	no.	20	20	-	600
Chicks	no.	-	-	-	700
Broilers	no.	-	-	12,000	-

TABLE IX

FINANCIAL SUMMARY OF PRESENT AND ALTERNATIVE FARMING SYSTEMS,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Present Operation	Alternative Systems		
		I Short-Run Improvement	II Cotton-Dairy Hogs-Broilers	III Cotton-Dairy Hogs-Hens
	Dollars	Dollars	Dollars	Dollars
Cash income:				
Crops	600	2,145	786	786
Livestock	495	1,200	11,607	2,497
Livestock products	-	75	896	5,351
Total cash receipts	1,095	3,420	13,289	8,634
Value of products used in home:	116	610	369	404
Total farm earnings	1,211	4,030	13,658	9,038
Cash expenses and depreciation:				
Crops	75	844	852	924
Livestock	250	430	8,725	3,677
Miscellaneous	426	465	548	483
Depreciation	104	104	159	106
Total expenses	865	1,843	10,284	5,229
Net farm income	230	1,577	3,005	3,405
Net farm earnings	346	2,187	3,374	3,809
Interest on investment	595	619	832	829
Net labor earnings	-249	1,568	2,542	2,980
Net labor income	-365	958	2,173	2,567
Available labor (M.E.)	1.6	1.6	1.6	1.6
Income per man-equivalent	-228	598	1,358	1,610
Hours labor	1,167	1,474	2,527	3,265
Labor income per hour				
labor	-.31	.64	.85	.78
Labor earnings per hour	-.21	1.06	1.00	.91
Average investment:				
Real estate	11,075	11,340	13,097	12,896
Machinery	513	725	1,775	1,795
Livestock	320	320	1,760	1,826
Total average investment	11,908	12,385	16,632	16,517

changes in crop practices and better selection of land for crops enough feed would be produced on the farm to feed the two dairy cows, two sows, 28 hogs, and 20 hens and still have 647 bushels of corn to sell.

It is estimated that the net farm earnings under this system would be about \$2187 as compared to the \$346 under the present system. It is estimated that the net labor earnings from this system would be about \$1568 compared with minus \$249 under the present operations. The net labor earnings per hour of labor used would be \$1.06 and \$0.39 per hour of labor available for use. This is considerable improvement over the present operations, where no return was made on labor. About 1474 hours of labor would be required; which is an increase of 307 hours from the present system of operating. About 2526 hours of the family's labor would be unused.

Alternative II--Cotton, Dairy, Hog and Broilers

In this system the cotton acreage would be reduced to 3.5 acres which is the 1955 allotment for the farm. To supplement the income from cotton, the operator would sell grade B milk from 5 cows and hogs raised from 4 sows. About 12,000 broilers would be added to increase the income and to better utilize and distribute the labor supply. The 17.5 acres of land (fields Ia, Ib, II, IIIa, V, and VII) available for permanent pasture will only furnish enough grazing for the five cows and replacements. About two acres of field I would be used for hog pasture (Figure 3). Thirteen acres of corn on fields Ia, IVa, and VIa (Appendix E) would produce (with recommended practices) enough grain for the small dairy herd and the hogs. Two acres of lespedeza would

be grown on field VI to provide for a part of the hay required for the cows. Additional hay (14 tons) would have to be purchased, unless conditions were favorable to cut some hay from the pasture land. The crop and livestock production practices would be about the same for this system as those indicated for "alternative I--short-run improvement".

The investment would be increased about \$7451 which would include a broiler house, brooder, four A-type farrowing houses for the sows and some additional fencing.⁸

This system would better utilize the family labor supply, but a labor shortage during September and October would require a delay in the harvesting of cotton and corn. The total labor used on the crops, livestock and pasture would be about 2527 man hours or 62 per cent of the potential labor supply, while the present system only used about 29 per cent.

The net farm earnings would be increased from \$346 under the present operation to \$3374, or \$3028 more than the present system. This would allow the operator and his family a considerable increase in the amount of money they would have to spend. For instance they could use about \$1800 as a payment on the additional investment that would be required. At this rate (ignoring interest charges) the debt would be retired in about five years under ideal conditions and the family would have approximately \$1200 each year to spend over the present system.

The net labor earnings per hour of family labor used would be

⁸An A-type hog house as referred to here is an individual farrowing house with guard rails and a sloping floor. Plans of the house may be obtained from the local extension agent or the local vocational agricultural department.

\$1.00, while the labor earnings per hour of labor available would be about \$0.63.

Alternative III--Cotton, Dairy, Hog, and Poultry (Layers)⁹

This system would not vary a great deal from Alternative II. The major difference would be in changing from broiler to layers and from 13 to 17 acres of corn. One less sow would be kept so that the corn could be used for the 600 hens. Oats would have to be purchased for the hens and hay for the cows. The cotton acreage would remain the same as in Alternative II (Table VII).

This system would require about \$7026 in additional investments over the present system. It is also estimated that the net farm earnings would be increased by \$3463 over the present system.

The total net labor earnings for this system would be \$2980. The net labor earnings per hour of labor used would be about 78 cents as compared with 85 cents per hour used in Alternative II. However, the net labor earnings per hour of labor available would be 74 cents under this system compared with 63 cents per hour under Alternative II. This system would require about 3265 hours of labor.

Phase Number II--Analyses of Alternative Farming Systems
With a Land Limitation of 106 Acres

The farm land considered here includes the 48 acres of land considered in Phase Number I plus an additional 58 acres which makes

⁹See Appendix F for field numbers, acreage and crops grown for all alternatives and Figure 3 for soil resources and suggested field layout.

a total of 106 acres of land available to this operator. The alternatives considered here include: Alternative IV--Cotton, hog, and sheep; Alternative V--Cotton, dairy, and hog; and Alternative VI--Cotton, beef, and poultry. We have assumed that both land tracts (106 acres, Figures 4 and 5) would be farmed by the family that is currently located on the 48 acre farm.

This additional land was assumed to adjoin the original 48 acre tract. The soils on the 58 acre tract are predominantly Memphis with slopes ranging from gentle to very steep and erosion ranging from moderate to deep gullies (see map, Figure 4). Out of approximately 76 acres of the Memphis soils on both of these tracts only about 6.5 acres are Class II with B slope and moderate erosion. The remainder consists mostly of Class VII land with a few acres of Class III and IV land. However, there are about 16 acres of Briensburg and Collins and 8 acres of Palaya and Grenada, which are suitable to heavy row-cropping with few limitations (Appendix C for soil capabilities).

In this phase of the analysis the production practices are assumed to be about the same as those introduced in Alternatives II and III. Cotton would receive about 300 pounds of 6-12-12 fertilizer per acre and 150 pounds of ammonium nitrate applied as a sidedressing, which should result in 1.25 bales per acre. Corn would receive 200 pounds of 6-12-12 fertilizer per acre and 200 pounds of ammonium nitrate applied as a sidedressing which should increase yields to an average of 68 bushels per acre. Lime would be applied at the rate of 2.5 tons per acre on one-fifth of the cropland each year. Vetch, as a green manure crop, would be seeded either during the last cultivation of the row

crops or after the harvesting of the crop.

Alternative IV--Cotton, hog and sheep¹⁰

Under this system the maximum (1955) cotton allotment of 7 acres for these two combined tracts of land would be grown (Table X). The cotton acreage would be grown on field IVa. Twenty-three acres of corn would be grown on fields Ia, Ib, II, IVb, VI and X to furnish grain for the livestock which would consist of a dairy cow, a boar, 7 sows, 98 hogs, a ram, 35 ewes, and 20 hens (Table XI). About 10 acres of improved pasture would be established on fields IIIa and VIIIa. On field XI, 5.5 acres of oats with lespedeza over seeded in the spring would be used to furnish some grain and some hay for the sheep and the one cow. However, additional hay (2.8 tons) would have to be purchased.

It is estimated that the family's net farm earnings would be about \$4725. This is about \$4379 more than the present system. However, this system would require an additional investment of about \$7988 over the present system.

The net labor earnings would be about \$3778 for this system (Table XII). The labor earnings per hour worked would be \$1.57 while the earnings per hour of labor available would be 92 cents. About 2399 hours of labor would be required (see Appendix G for labor required for all alternatives).

¹⁰See Appendix F for field numbers, acreages and crops grown on fields for all alternatives in Phase Number II, and Figures 4 and 5 for map of soil resources and suggested field layout.

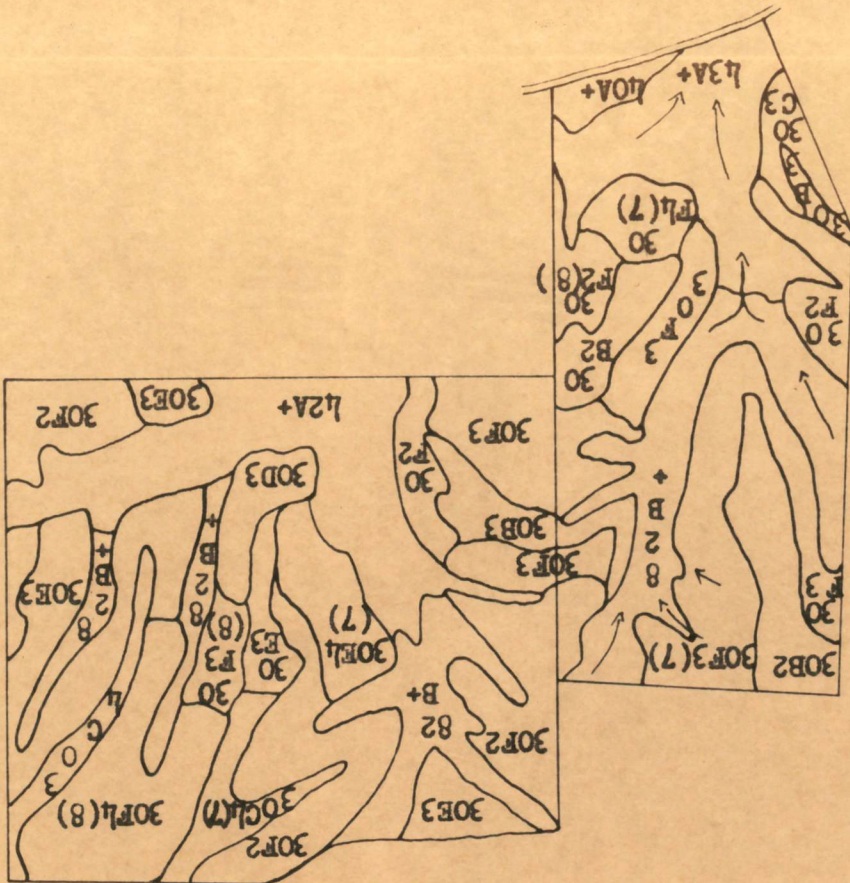


Figure 4. Map of soil resources^a for the 106 acres.

^aSoil resources are described with regard to: (1) series, (2) slope, and (3) erosion. The numbers and letters appearing in each area layed off on the map define the soil characteristic of the area. The first number stands for the series; the letter stands for the degree of slope; and the last number stands for the degree of erosion.

- (1) Soil series
30 Memphis
40 Grenada
42 Collins
43 Falaya
82 Brinsburg
(2) Soil slope
A Nearly level
B Gently sloping
C Sloping
D Strongly sloping
E Moderately steep
F Steep
(3) Soil erosion
+ Accumulations
1 Slight
2 Moderate
3 Severe
4 Very severe
7 Occasional shallow
8 Frequent shallow
gullies
(7), (8), (9) Deep
gullies

(4) The various soil areas on this farm may be fitted into the Soil Conservation Service land classes as follows:

- Class II - 30B2 Memphis
40A+ Grenada
42A+ Collins
82B+ Brinsburg
Class III - 30B3, C3 Memphis
43A+ Falaya
Class IV - 30C4, D3, D4(7) Memphis
Class VI - 30E3, E4(7) Memphis
Class VII - 30F1, 2, 3, 3(7), 2(8), 4(7), 4(8) Memphis

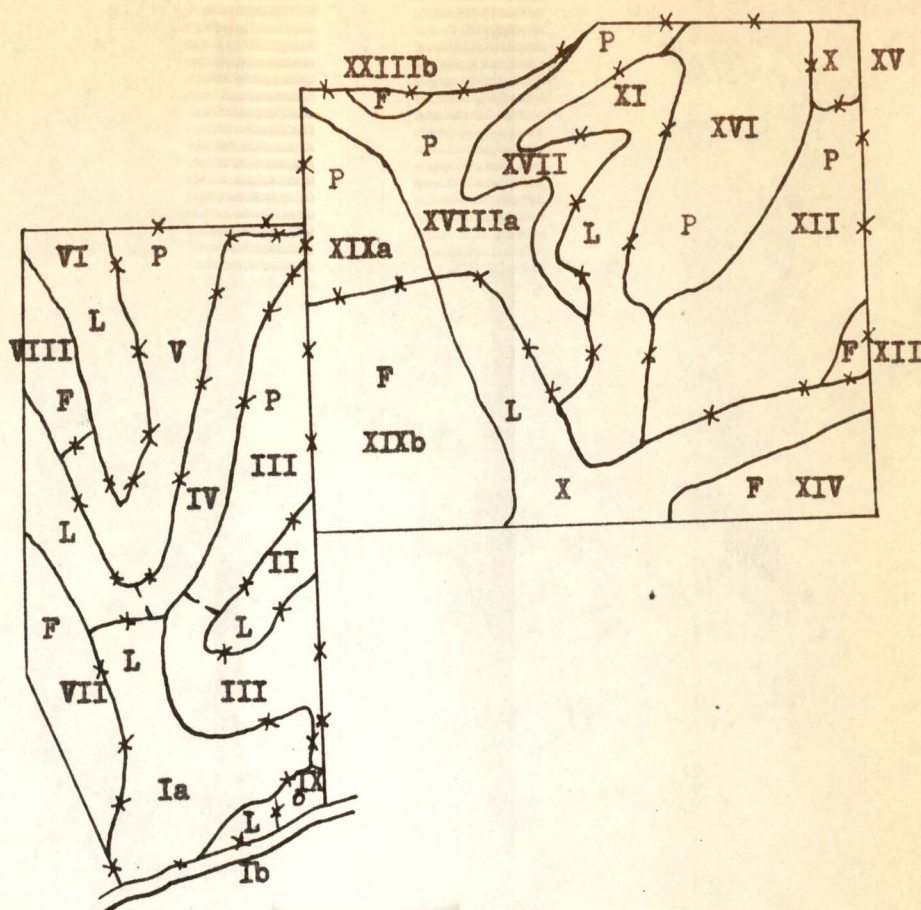


Figure 5. Map of suggested field layout^a and land use^b for the 106 acres.

^aThe fields layed out on this map contain the following acreages:

Ia	7.0	XI	5.5
Ib	1.0	XII	9.0
II	2.0	XIII	0.5
III	10.5	XIV	3.0
IV	8.0	XV	1.0
V	8.0	XVI	7.5
VI	4.5	XVII	5.5
VII	4.0	XVIIIa	6.0
VIII	2.0	XVIIIb	0.5
IX	1.0	XIXa	8.5
X	7.5	XIXb	4.0

^bSuggested land uses are indicated by the following:

==	Road	L	Cropland
o	Farmstead	P	Pasture
-x-	Fences	F	Woods
		X	Idle

TABLE X

ALTERNATIVE FARMING SYSTEMS, PHASE NUMBER II,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Unit	IV Cotton Hogs Sheep	V Cotton Dairy Hog	VI Cotton Beef Poultry
<u>Crops:</u>				
Cotton	acre	7.0	5.0	5.0
yield	bale	1.25	1.25	1.25
Corn, upland	acre	6.5	4.5	-
yield	bu.	65.0	65.0	-
Corn, bottom land	acre	1.0	10.5	3.0
yield	bu.	45.0	75.0	75.0
Corn, bottom land	acre	7.0	7.0	7.5
yield	bu.	65.0	65.0	65.0
Corn, bottom land	acre	8.5	-	5.0
yield	bu.	75.0	-	65.0
Oats	acre	(5.5)	-	-
Lesp. (o s) hay	acre	5.5	-	4.5
yield	ton	.5	-	.5
Lespedeza hay	acre	-	-	2.0
yield	ton	-	-	1.5
Lespedeza hay	acre	-	-	5.5
yield	ton	-	-	1.25
Alfalfa-og. hay	acre	-	2.0	-
yield	ton	-	3.5	-
Alfalfa-og. hay	acre	-	5.5	-
yield	ton	-	3.0	-
Vetch (G.M.)	acre	(30.0)	(27.0)	(20.5)
Garden	acre	.2	.2	.2
Oats	acre	-	-	(4.5)
yield	bu.	-	-	55.0
Total crops	acre	71.2	61.7	57.7
Double-cropped	acre	(35.5)	(27.0)	(25.0)
Used for crops	acre	35.7	34.7	32.7
Pasture, imp. ^a	acre	10.0	42.5	44.5
Pasture, unimp.	acre	33.0	9.5	9.5
Other land	acre	27.3	19.3	19.3
Total land	acre	106.0	106.0	106.0

^aPescue and ladino clover.

TABLE XI

ESTIMATED NUMBER OF LIVESTOCK FOR ALTERNATIVE FARMING SYSTEMS, PHASE
NUMBER II, BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

		IV	V	VI
		Cotton	Cotton	Cotton
		Hog	Dairy	Beef
Item	Unit	Sheep	Hog	Poultry
<u>Livestock:</u>				
Dairy cows	no.	1	15	-
Beef cows	no.	-	-	15
Beef heifers	no.	-	-	6
Sows	no.	7	5	3
Hogs raised	no.	98	70	42
Sheep	no.	35	-	-
Rams	no.	1	-	-
Lambs raised	no.	42	-	-
Bulls	no.	-	-	1
Boars	no.	1	1	-
Hens	no.	20	20	400
Dairy heifers	no.	-	6	-

TABLE XII

FINANCIAL SUMMARY OF ALTERNATIVE FARMING SYSTEMS, PHASE NUMBER II,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	IV Cotton Hog Sheep	V Cotton Dairy Hog	VI Cotton Beef Poultry
	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Cash income:			
Crops	1,559	1,142	1,142
Livestock	5,456	3,624	3,229
Livestock products	275	4,465	2,995
Total cash receipts	7,290	9,231	7,366
Value of products used in home:	395	385	359
Total farm earnings	7,685	9,616	7,725
Cash expenses and depreciation:			
Crops	1,013	1,251	1,467
Livestock	965	2,025	2,536
Miscellaneous	808	1,042	708
Depreciation	174	195	141
Total expenses	2,960	4,513	4,852
Net farm income	4,330	4,718	2,514
Net farm earnings	4,725	5,103	2,873
Int. on investment	947	1,223	1,136
Net labor earnings	3,778	3,880	1,737
Labor income	3,383	3,495	1,378
Available labor (M.E.)	1.6	1.6	1.6
Income per man-equivalent	2,114	2,184	861
Hours labor	2,399	3,251	2,595
Income per hour labor	1.41	1.07	.53
Labor earnings per hour	1.57	1.19	.67
Average investment:			
Real estate	16,509	19,095	17,354
Machinery	1,585	2,095	1,720
Livestock	839	3,280	3,640
Total average investment	18,933	24,470	22,714

Alternative V--Cotton, Dairy and Hog

Under this system 5 acres of cotton (field IVa) would be retained (Table X) and 15 dairy cows with replacements would be added to utilize the available pasture (Table XI). The swine herd would be reduced to 5 brood sows and the sheep herd removed. The corn would be reduced to 21 acres (fields Ia, IVb, VI and X) and (field XI) 7.5 acres of alfalfa and orchard grass (see map, Figure 5 and Appendix F) would be established on the Memphis soil (see map, Figure 4) to provide a part of the hay for the dairy herd. About 22 tons of hay would be purchased to supplement the alfalfa and orchard grass, unless conditions would be favorable to cut some hay from the improved pasture (42.5 acres).

The net farm earnings would be about \$5103 or an increase of \$4757 over the present system. An additional investment of about \$15,494 would be required for the additional land, barns, equipment, farrowing houses, and fences. The total average investment would be about \$24,470 (Table XII).

The net labor earnings would be about \$3880. This would give a labor earnings of \$1.19 per hour of labor used, which totals about 3251 hours. This is about 38 cents less than Alternative IV. It is estimated that labor earnings per hour of labor available for this system would be 95 cents.

Alternative VI--Cotton, Beef, and Poultry

This system would retain the 5 acres of cotton (field IVa) and some 15.5 acres of corn (fields Ia, IIIb and X) which would be produced and fed to the hogs raised from 3 brood sows and to a flock of 400 hens.

About 44.5 acres of improved pasture (see Figure 5 for suggested field layout and Appendix F for field numbers, acreages, and crops to be grown as located on the map) would be established for the 15 cow beef herd with replacements and the swine herd (Table XI). About 12 acres of lespedeza (fields II, VI and XI) would be provided to furnish part of the hay for the beef herd of which 4.5 acres would be seeded to oats each fall to furnish oats for the layers. The production practices followed under this system would be similar to those in the previous alternatives.

The net farm earnings would be about \$2873 or an increase over the present system of approximately \$2527. The additional investment over the present system would be around \$11,623.

This alternative would provide only \$1737 in net labor earnings to the operator and his family. The net labor earnings per hour of labor used would be only 67 cents and the net labor earnings per hour of available labor would be 42 cents. The total labor used for this system would be about 2595 hours (Table XII).

Phase Number III--Analyses of Alternative Farming Systems
With a Land Limitation of 186 Acres

The 186 acres of land combined for these alternatives consist of the 48 acre tract and the 58 acre tract used in the preceding alternative plus an additional 80 acres. Three alternatives considered here are: Alternative VII--Cotton, beef, poultry and soybeans; Alternative VIII--Cotton, dairy and soybeans; and Alternative IX--Cotton, hog, sheep

and soybeans. These alternatives are merely expansions of alternatives VI, V, and IV developed previously. The same 1.6 man-equivalents of labor was assumed to be available. An attempt was made to better utilize the available labor with additional land resources. It was thought that by combining these three farms that the land resources now available would provide a better opportunity to balance the other productive resources.

The soils on this farm are made up predominantly of Memphis, with a few acres of Briensburg, Collins, Grenada and Falaya. These are suitable to heavy cropping, assuming that adequate drainage was provided and a crop of organic matter was plowed under each year. Out of about 141 acres of Memphis only 12.5 acres are Class II with a B slope and moderate erosion. There are a few remaining acres in Classes III and IV. However, the majority fall in Classes VI and VII with slopes ranging from severe to deep gullies (see maps, Figures 6 and 7). There are about 20 acres of Briensburg and Collins and 13 acres of Falaya and Grenada suitable for cropping.

The crop and livestock production practices for these improved farming systems would be about the same as for those considered for the previous alternatives.

Alternative VII--Cotton, Beef, Poultry and Soybeans¹¹

The major difference between this alternative and Alternative VI would be the (25.5 acre) increase in the amount of lespedeza hay (Table

¹¹See Appendix F for field numbers, acreages, and crops grown for all alternatives for Phase Number III and Figures 6 and 7 for map of soil resources and suggested field layout.

XIII) produced for the beef cows and the addition of 17 acres of soybeans (fields IV and XXI). In order for the 1.6 man-equivalents of labor to do most of the work required by this system of farming it would be necessary to reduce the cotton to 4.5 acres (field VI) and have the soybeans custom harvested.

The livestock would consist of 15 beef cows with replacements, 3 brood sows, 42 hogs and a flock of 400 hens (Table XIV).

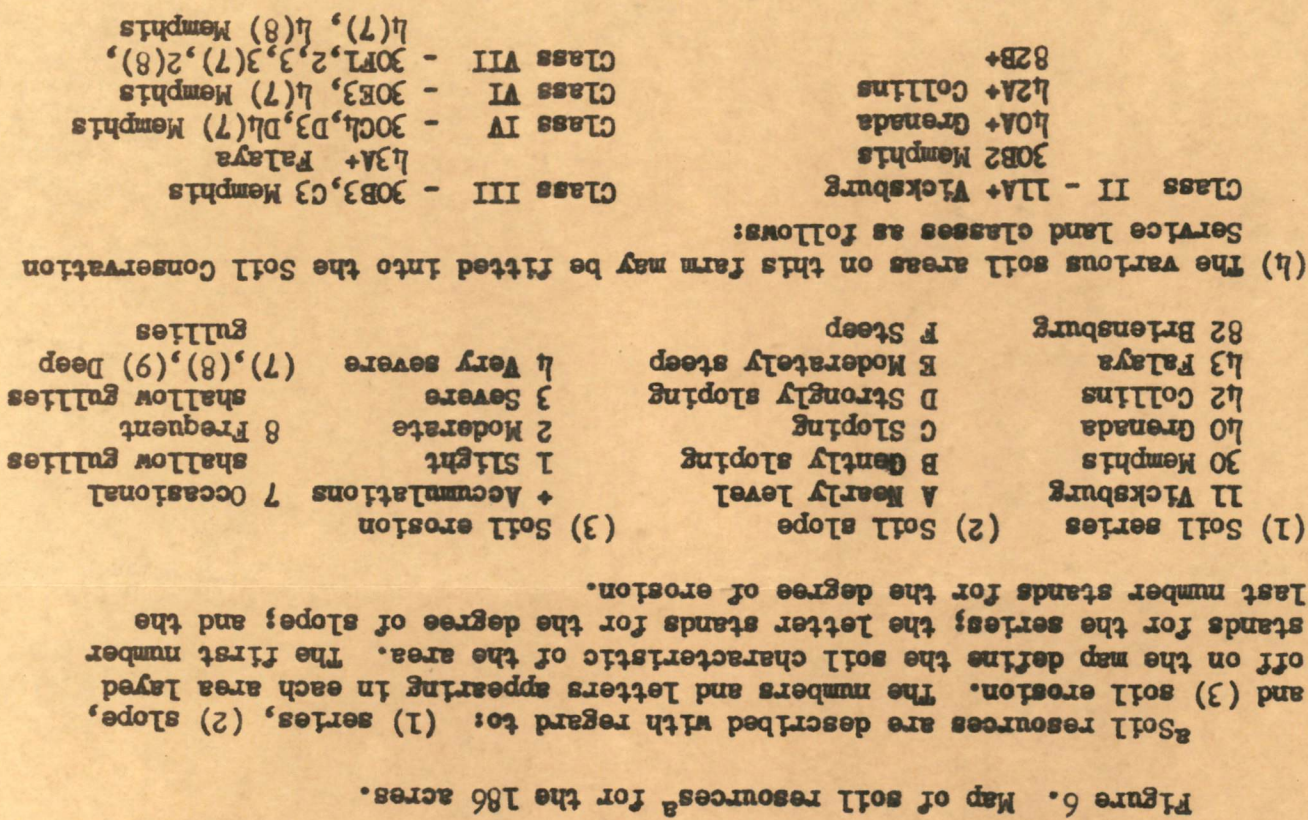
The net farm earnings for this alternative would be about \$3451 compared to \$2873 for Alternative VI (Table XV). This is an increase of \$3115 over the present system, but it would require an additional investment of approximately \$16,623.

About 2733 hours of labor would be used with a net labor earnings of 76 cents per hour, while the labor earnings per hour of labor available would be about 51 cents.

Alternative VIII--Cotton, Dairy and Soybeans

The cotton would be reduced to 3 acres (field VIa) in this alternative as compared to 5 acres for Alternative V (Table XIII). The swine enterprise would be dropped and the dairy herd would be increased to 22 cows (Table XIV). The corn would be reduced to 9 acres (field VIb and X) and 15 acres of soybeans (fields Ia and IV) would be added. With this much additional land enough hay could be produced for the cows. This would consist of 12.5 acres of alfalfa-orchardgrass (fields II, XI, XXIX and XXX) and 31.5 acres of lespedeza hay.¹²

¹²See Appendix F for field numbers, acreages, and crops grown for all alternatives in Phase Number III and Figures 6 and 7 for location of soil resources and field layouts.



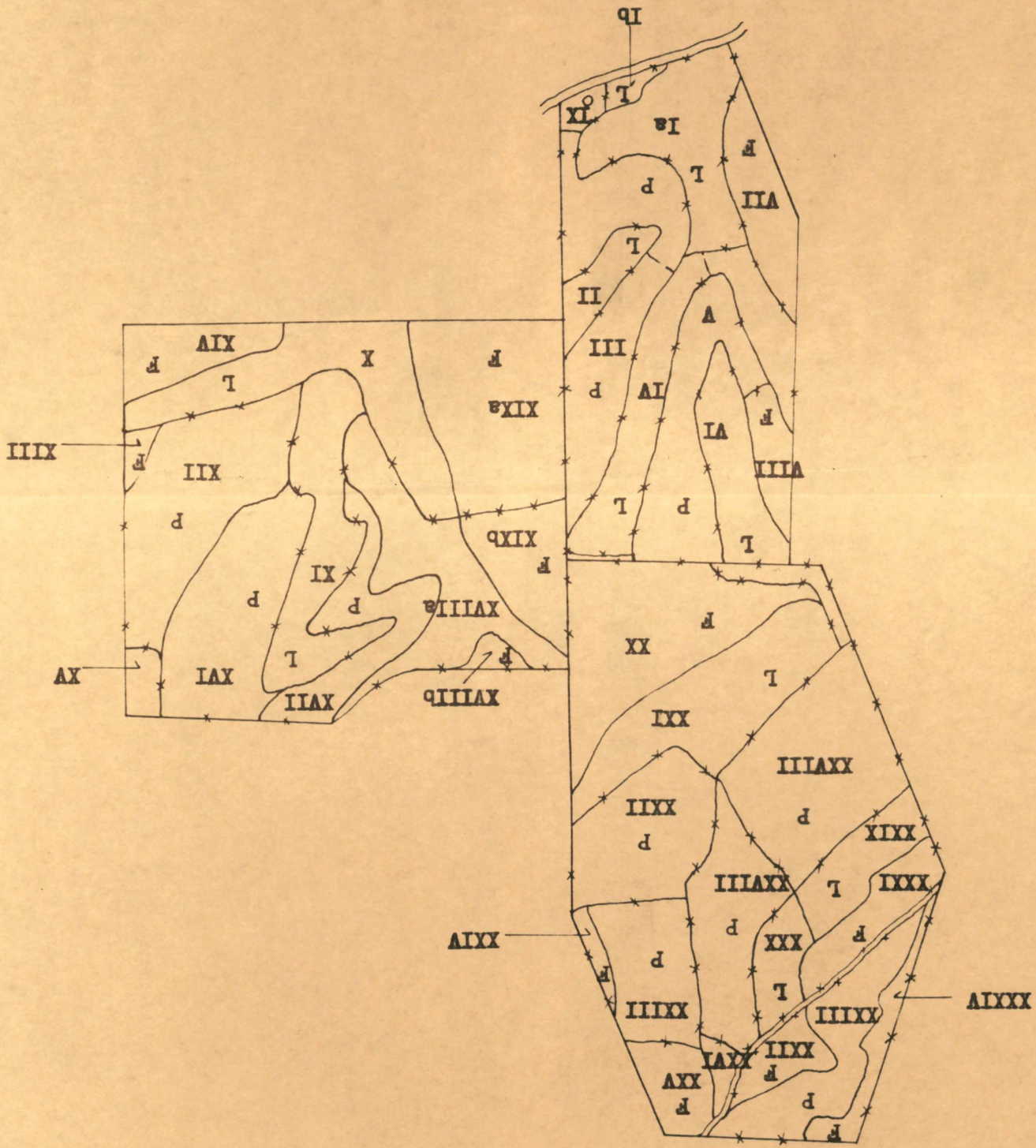


Figure 7. Map of suggested field layout^a and land use^b for the 106 acres.

^aThe fields layed out on this map contain the following acreages:

Ia	7.0	X	7.5	XVIIb	0.5	XXVI	1.0
Ib	1.0	XI	5.5	XIXa	8.5	XXVII	8.5
II	2.0	XII	9.0	XIXb	4.0	XXVIII	12.0
III	10.5	XIII	0.5	XX	13.0	XXIX	3.0
IV	8.0	XIV	3.0	XXI	9.0	XXX	2.0
V	8.0	XV	1.0	XXII	8.0	XXXI	4.0
VI	4.5	XVI	7.5	XXIII	6.0	XXXII	2.0
VII	4.0	XVII	5.0	XXIV	0.5	XXXIII	6.2
VIII	2.0	XVIIIa	6.0	XXV	3.0	XXXIV	1.8
IX	1.0						

^bSuggested land uses are indicated by the following:

o	Roads	L	Cropland	X	Idle
o	Buildings	P	Pasture	F	Woods
-x-	Fences				
—	Field Boundary				

TABLE XIII

ALTERNATIVE FARMING SYSTEMS, PHASE NUMBER III,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Unit	Alternative Systems		
		VII	VIII	IX
		Cotton, Beef, Poultry, Soybean	Cotton, Dairy, Soybean	Cotton, Hog, Sheep, Soybean
<u>Crops:</u>				
Cotton	acre	4.5	3.0	6.0
yield	bale	1.25	1.25	1.25
Corn, upland	acre	2.0	1.5	6.5
yield	bu.	65.0	65.0	65.0
Corn, bottom land	acre	5.0	7.5	8.5
yield	bu.	65.0	75.0	75.0
Corn, bottom land	acre	7.5	-	1.0
yield	bu.	75.0	-	45.0
Corn, bottom land	acre	-	-	7.0
yield	bu.	-	-	65.0
Soybeans	acre	17.0	15.0	10.0
yield	bu.	30.0	30.0	30.0
Soybeans	acre	-	-	5.0
yield	bu.	-	-	20.0
Oats	acre	(5.0)	-	(5.5)
yield	bu.	55.0	-	-
Lespedeza hay	acre	5.0	31.5	5.5
yield	ton	1.0	1.0	.5
Lespedeza hay	acre	28.0	-	-
yield	ton	1.0	-	-
Alfalfa, o. g.	acre	-	10.5	-
yield	ton	-	3.0	-
Alfalfa, o. g.	acre	-	2.0	-
yield	ton	-	3.5	-
Vetch (G.M.)	acre	(36.0)	(27.0)	(44.0)
Garden	acre	.2	.2	.2
Total crops	acre	110.2	98.2	99.2
Double-cropped	acre	(41.0)	(27.0)	(49.5)
Used for crops	acre	69.2	71.2	49.7
Pasture, imp. ^a	acre	45.0	60.7	10.0
Pasture, unimp.	acre	12.5	8.8	47.0
Other land	acre	59.3	45.3	79.3
Total land	acre	186.0	186.0	186.0

^aFescue and ladino clover.

TABLE XIV

ESTIMATED NUMBER OF LIVESTOCK FOR ALTERNATIVE FARMING SYSTEMS, PHASE
NUMBER III, BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Unit	VII	VIII	IX
		Cotton, Beef, Poultry, Soybean	Cotton, Dairy, Soybean	Cotton, Hogs, Sheep, Soybean
<u>Livestock:</u>				
Dairy cows	no.	-	22	1
Dairy heifers	no.	-	8	-
Beef cows	no.	15	-	-
Beef heifers	no.	6	-	-
Sows	no.	3	-	7
Hogs, raised	no.	42	-	98
Sheep	no.	-	-	70
Rams	no.	-	-	2
Lambs, raised	no.	-	-	84
Bulls	no.	1	-	-
Boars	no.	-	-	1
Hens	no.	400	20	20

TABLE XV

FINANCIAL SUMMARY OF ALTERNATIVE FARMING SYSTEMS, PHASE NUMBER III,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	VII Cotton, Beef, Poultry, Soybean	VIII Cotton, Dairy, Soybean	IX Cotton, Hog, Sheep, Soybean
	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Cash income:			
Crops	2,400	2,170	2,450
Livestock	3,229	675	6,348
Livestock products	2,995	7,115	485
Total cash receipts	8,624	9,960	9,283
Value of products used in home:	359	325	395
Total farm earnings	8,983	10,285	9,678
Cash expenses and depreciation:			
Crops	2,403	1,946	1,538
Livestock	2,056	1,316	1,135
Miscellaneous	932	1,706	881
Depreciation	141	202	127
Total expenses	5,532	5,170	3,681
Net farm income	3,092	4,790	5,602
Net farm earnings	3,451	5,115	5,997
Interest on investment	1,379	1,516	1,217
Net labor earnings	2,072	3,599	4,780
Net labor income	1,713	3,274	4,385
Available labor (M.E.)	1.6	1.6	1.6
Income per man-equivalent	1,070	2,046	2,740
Hours labor	2,733	3,356	2,603
Income per hour labor	.62	.97	1.68
Labor earnings per hour	.76	1.07	1.83
Average investment:			
Real estate	22,229	24,344	21,713
Machinery	1,720	2,095	1,639
Livestock	3,640	3,880	984
Total average investment	27,589	30,319	24,336

This alternative would require the largest increase in investment of any alternative system examined. An additional investment of \$20,368 would be required. This amount would include \$9875 for additional land. The net farm earnings would be \$5115 for this system as compared to \$5103 for alternative V. The net farm earnings estimated for this system was \$4769 above the present system.

The net labor earnings would be about \$3599. The labor earnings per hour of labor used would be about \$1.07 as compared with \$1.19 for alternative V. About 3356 hours of labor would be used (Table XV) as compared with 3251 for alternative V and 1167 hours for the present system. The returns per hour of labor available would be about 88 cents.

Alternative IX--Cotton, Hog, Sheep and Soybeans

This system would be similar to Alternative IV. The cotton would be reduced to 6 acres (field IIIa) while the corn acreage would remain the same (Table XIII). Fifteen acres of soybeans (fields IVa, XXI, XXIX and XXX) would be added; but they would require custom harvesting to fit into the labor pattern.

The sheep flock would be increased to 70 head and the swine herd would remain the same. One dairy cow would be kept to provide milk for home consumption (Table XIV).

The estimated net farm earnings for this system would be about \$5997 which would be the largest of any system examined. This would be a \$1272 increase over the similar Alternative IV and \$882 more than Alternative VIII which is estimated to have the second highest earnings for any system. The increase in investment over the Alternative IV

would be about \$5581.

The total labor earnings would be about \$4780 or an increase of \$1018 above the similar Alternative IV. The labor earnings per hour of labor used (2603 hours) would be \$1.83 as compared with \$1.57 for Alternative IV. The estimated returns per hour of labor available would be about \$1.17.

CHAPTER IV

CONCLUSIONS

Implications of Analysis

This analysis indicates that various opportunities do exist for profitable adjustments of farming systems in the area including both horizontal and vertical expansion.

The success of any business depends upon the qualities of the operator as a decision maker. These qualities are rather intangible and vary among the individual operators. In this analysis of the various alternatives it was assumed that a greater degree of technical skill and managerial ability would be incorporated into each system.

It appears that significant opportunities for improving output and farm earnings are feasible. However, the most profitable system depends upon many variables such as the expected yields as they are affected by soil, weather, and other conditions. Others that are important are increased capital investments, price fluctuations, and greater degrees of uncertainty. Each operator must appraise his own conditions and make adjustments accordingly, because profitable adjustments open to one operator might mean bankruptcy or worse for another. Any degree of certainty as to the plan which will prove to be the most advisable can be attained only if one goes through a process of studying and weighing the involvements of alternative plans. In many cases the more efficient farmers are the ones that are willing to read farm magazines, research or extension bulletins and outlook material that

are useful in estimating the returns that are likely when shifting from one enterprise to another, or in substituting a new practice for an old one. Many are willing to attend meetings and try to interpret what the specialists are trying to explain in a way that it would be applicable to their own conditions. Learning is a continuous process because the world does change. Changes in weather, new farming practices, farm programs and prices, constantly require that the operator, as a learner, continue to observe, obtain and weigh information, analyze and then make his decisions. These things apply to the above analysis of the alternative farming systems in that they should serve only as an indication of possible adjustments.

Many farmers operating under conditions similar to those found in Phase Number I have various avenues for improving their farm earnings. In this case the operator and his family had approximately \$346 in net farm earnings. If the present operations could not be improved the family would be better off financially to sell the farm and loan out the \$11,900 at 5 per cent interest. That would leave all their labor free for work off the farm or on someone else's farm.

A brief summary of the returns and investments for the alternative systems is given in Table XVI. It was estimated that short run improvements would increase the net farm earnings to \$2187 with only 300 hours of additional labor required. This increase would result primarily from increased crop yields and livestock products. This would require about \$530 in additional investment above the present system. See Table XVI for the comparison of labor earnings per hour of labor used and per hour of labor available.

TABLE XVI

SUMMARY OF RETURNS AND INVESTMENTS OF ALTERNATIVE FARMING SYSTEMS,
OBION COUNTY, TENNESSEE

Item	Present	Alternative Systems								
		I	II	III	IV	V	VI	VII	VIII	IX
Net farm earnings	346	2187	3374	3809	4725	5103	2873	3451	5115	5997
Net labor earnings	-249	1568	2542	2980	3778	3880	1737	2072	3599	4780
Hours labor used	1167	1474	2527	3265	2399	3251	2595	2733	3356	2603
Labor earnings per hour labor used	-.21	1.06	1.00	.91	1.57	1.19	.67	.76	1.07	1.83
Labor earnings per hour labor available	-.62	.39	.63	.73	.92	.95	.43	.51	.88	1.17
Total investment \$1000	11.9	12.4	16.6	16.5	18.9	24.5	22.7	27.6	30.3	24.3
Total acres	48	48	48	48	106	106	106	186	186	186
Acres used for crops and pasture	35	33	36	42	79	87	87	127	140	107
Average investment per acre	248	258	346	344	178	231	214	148	163	131
Percent return on total investment ^a	-1.9	7.9	12.0	12.7	16.7	13.9	6.5	7.2	11.3	18.3
Additional investment above present system \$1000	-	.5	7.4	7.0	7.9	15.4	11.6	16.6	20.3	13.6
Net farm earnings per \$1000 invested	29	176	203	231	250	208	124	125	168	246

^aLabor is charged at 40 cents per hour.

Alternative II is a system which involves more risk and an investment of \$7451 over the present system. If the operators were willing and able to acquire more skill and accept more risk it appears possible to increase the net farm earnings to \$3374 and the net farm earnings per \$1000 invested from \$29 to \$203 (Table XVI).

The small grade B dairy would furnish an opportunity for the operators to gain experience in dairy management before expanding the herd. One could gradually move into grade A production as more cows and buildings were added.

Alternative III is very closely related to Alternative II. The poultry and broilers in both cases require close attention to obtain profits. This system would require \$7026 more investment than the present system. It would return \$3809 in net farm earnings which is the largest for any alternative in Phase Number I. It would also return 73 cents in labor earnings per hour of available labor (Table XVI).

In Phase Number II where the acreage has been expanded to include two tracts of land it appears to be possible to increase the net farm earnings considerably above the present level and in some cases above the alternatives developed in Phase Number I.

With cotton controls being considered in Alternative IV in 1955, it should be possible to increase the cotton acreage to 7 acres and the additional land should allow two more brood sows to be added and a small sheep herd to be developed. This system would require \$7988 in additional investments over the present system. However, it would return \$4725 in net farm earnings to the operator and his family. The sheep would require close attention as well as a great amount of risk. The

labor earnings per hour of labor used would be \$1.57 and the returns per hour of labor available would be 92 cents. This system would return (\$250) the highest net farm earnings per \$1000 invested of any alternative (Table XVI).

Alternative V deals primarily with the establishment of a small grade A dairy, assuming that markets would be available for the milk. It would allow a 15 cow herd to be developed and would be supplemented with 5 acres of cotton and hogs from 5 brood sows. The additional investment above the present system would be about \$15,494. The net farm earnings would be increased to \$5103. The net labor earnings per hour of labor used would be \$1.19 and labor earnings per hour of labor available would be about 95 cents (Table XVI).

If the operator desires, he might establish a small beef herd (Alternative VI) supplemented with a small flock of 400 hens and 5 acres of cotton rather than to "fool with dairy cows." The additional investment over the present system would be about \$11,623. The net farm earnings (\$2873) would not be so high as some of the previous alternatives nor would the 67 cents in labor earnings per hour of labor used be high, but the increase in farm earnings might be offset by the likes and dislikes of the operator and his family. It would be an improvement over the present system and alternative I.

Some systems of farming could utilize more land to increase the net farm earnings as in Phase Number III. The system in Alternative VII is similar to Alternative VI, but it would require about \$4000 increase in investment over Alternative VI and about \$16,623 over the present system. Soybeans (17 acres) would be used as a cash crop pro-

vided the operators could get the crop custom harvested. This situation offers much uncertainty as many farmers know, because at times it is difficult to get custom work done at all or done when the crop, weather, and etc., are most favorable. The net farm earnings would be increased to \$3451 which ranks above four of the alternatives examined previously. The labor earnings per hour of labor used would be only 76 cents (Table XVI).

Alternative VIII is developed around a small grade A dairy herd of 22 cows, supplemented with cotton and soybeans. Again it is assumed that the soybeans would be custom harvested. Additional investments over the present system would be about \$20,368. The net farm earnings would be increased to \$5115. This system would return \$1.07 labor earnings per hour of labor used (Table XVI).

The last alternative examined involves a great amount of risk and uncertainty. Much of this risk is dependent upon the individual's skills and attitudes. It would require \$13,569 in additional investments over the present system and the net farm earnings would be about \$5997. The labor earnings per hour of labor used would be about \$1.83 which is the largest of any alternative examined in this analysis. The labor earnings per hour of labor available would be about \$1.17 which is also larger than any other system examined.

It appears that considerable opportunities lie in the adapting of more efficient practices with the farming systems and reorganizing some of the enterprises to better balance the resources at hand. This applies to the short run improvements and to the long run adjustments which in-

volve expanding the present small acreages to somewhat larger units. These adjustments would require much work on the part of the various farm agencies in the area to coordinate their work to provide the farmers with information needed in further planning of their farms. These agencies should devote considerable time to both the individual farm problems and to the more general problems in the area.

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APPENDIX

APPENDIX A

ASSEMBLED INFORMATION AS TO ESTIMATED CROP YIELDS, FERTILIZER RECOMMENDATIONS, FEED REQUIRED FOR LIVESTOCK AND LABOR REQUIRED FOR CROPS AND LIVESTOCK

PRODUCTIVITY RATING OF CERTAIN WEST TENNESSEE SOIL GROUPS^{a, b}

	Corn			Lesp.			Lesp. Soy- (alone) beans (seed)	Cr. Cl.	No. Cow- days
	Corn (grain)(silaged) Bu.	Corn Tons	Corn Soy- beans Bu.	Cotton Lbs. of Lint	Wheat Bu.	Oats Bu.	Alf. Tons		
1. Moderately to well drained bottom, Rep. Series-Vicks- burg and Collins	75	15	75	625	-	-	-	-	275
2. Imperfectly drained bot- toms and col- luvials, Rep. Series-Falaya	65	12	65	500	-	-	-	-	250
3. Poorly drained bot- toms and col- luvials- Rep. Series- Waverly	-	-	-	-	-	-	-	-	250

APPENDIX A (CONTINUED)

PRODUCTIVITY RATING OF CERTAIN WEST TENNESSEE SOIL GROUPS^a, ^b (CONTINUED)

	Corn			Corn and Cotton			Lesp. in			Lesp. Soy-			Gr. Cl. Cow-		
	Corn (grain)(silaged) Bu.	Corn Tons	Corn Soy-beans Bu.	Lint Bu.	Wheat Bu.	Oats Bu.	Barley Gr. Tons	Sm. Alf. Tons	(alone) Tons	beans Bu.	(seed) Lbs.	days grazing ^c			
4. Swamps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Well drained terraces and uplands with A & B slopes, 1 erosion, Rep. Series-Lintonia and Memphis	65	12	65	625	30	65	45	.25	3.5	1.5	25	300	200		
6. Well drained terraces and uplands with C slopes, 2 erosion, Rep. Series-Lintonia and Memphis	50	8	50	500	25	55	40	.50	3.0	1.25	20	270	1750		
7. Well drained terraces and uplands, greater than C slopes, Rep. Series-Lintonia and Memphis	-	-	-	-	-	-	-	-	-	-	-	-	125		

- Continued

APPENDIX A (CONTINUED)

PRODUCTIVITY RATING OF CERTAIN WEST TENNESSEE SOIL GROUPS^a, ^b (CONTINUED)

	Corn			Lesp.			Lesp.			Gr.			No. Cow-days grazing ^c
	Corn (grain)(silaged) Bu.	Corn Tons	Corn and Soy-beans Bu.	Cotton Lbs. of Lint	Wheat Bu.	Oats Bu.	Barley Bu.	Sm. Gr. Tons	Alf. Tons	Soy-beans (alone) Tons	Soy-beans (seed) Bu.	Gr. Gl. Lbs.	
8. Moderately drained terraces and uplands, A & B slopes, 1 erosion, Rep. Series-Grenada and Richland	45	7	45	450	250	55	-	.5	2.0	1	20	250	150
9. Moderately drained terraces and upland, C slopes, 2 erosion, Rep. Series-Grenada and Richland	40	8	40	350	23	50	35	.5	2.0	1	15	200	125
10. Moderately drained terraces and uplands, greater than C slopes, Rep. Series-Grenada and Richland	-	-	-	-	20	45	30	.5	-	1	-	-	100

- Continued

APPENDIX A (CONTINUED)

PRODUCTIVITY RATING OF CERTAIN WEST TENNESSEE SOIL GROUPS^a, ^b (CONTINUED)

	Corn		Corn and Cotton		Lesp.		Lesp.		Lesp.		Lesp.		No. Cow-days
	Corn (grain) (silaged) Bu. Tons	Corn (grain) (silaged) Bu. Tons	Soy-beans of Lint Bu. Lbs.	Wheat Oats Barley Gr. Alf. Tons	Sm. Gr. Tons	in Sm. Gr. Tons	Soy-beans (seed) Bu. Lbs.	Alf. Tons	Alf. Tons	Alf. Tons	Alf. Tons	Alf. Tons	
11. Imperfectly drained terraces and uplands, Rep. Series-Oliver and Center	40	7	40 300	15 40	-	.5	-	1	15	-	-	-	150
12. Poorly drained terraces and uplands, Rep. Series-Calhoun and Henry	-	-	- -	- -	- -	- -	.75	15	-	-	-	-	200

^a Estimate of yields assumes some rotation of crops (not continuous cropping) on all soils of B slope and steeper. The fertilization is according to Soil Testing Laboratory recommendations.

^b All quantities are per acre yields.

^c Assuming 25 pounds of air dry forage or the equivalent of one cow-day of grazing. Not recommended and/or not commonly grown.

APPENDIX A (CONTINUED)

TENTATIVE RECOMMENDATIONS FOR NITROGEN, PHOSPHATE,
AND POTASH APPLICATIONS^a

Crop	Nitrogen Application		Phosphate Application	Potash Application
	Planting	Side- or	When Soil Test	When Soil Test
	or Seeding	Top-dressing	Indicates: Med.	Indicates: Med.
Pounds per acre of N, P ₂ O ₅ , and K ₂ O recommended				
Perma. past.	30	0	60	60
Past. maint. ^b	0	15-30	30	30
Alfalfa	15	0	60	90
Alf. maint. ^b	0	0	30	90
Corn	15	45	20	20
Cotton	20	30	25	25
Small grain	15-30	30	20	0
Small grain, crimson cl., or vetch	15-30	0-30	20	0
Red clover	0-15	0	30	30
Sericea	0	0	20	20
Ser. maint.	0	0	20	20
Lespedeza	0-10	0	20	20
Cowpeas or soybeans	0-10	0	20	20
Vetch, cr. cl., button clover, Austin W.P., Caley peas	0-15	0	20	0

^aAdjust for manure for most crops by reducing N at the rate of 5 pounds per ton and K₂O at the rate of 7-8 pounds per ton.

^bApply after second crop production year.

APPENDIX A (CONTINUED)

LIVESTOCK FEED REQUIREMENTS FOR ALTERNATIVE FARMING SYSTEMS,
OBION COUNTY, TENNESSEE, 1954

Kind of Livestock		Bu. Grain Corn Equiv.	Protein Supplement Kind	Pounds	Good Legume Hay (tons)	Mixed Legume & Grass Hay (tons)		Coarse Rage (tons)	Silage (tons)
1 Beef cow and calf to 450:	A	-	Oil Meal	120-150	-	1-1 1/4	-	-	-
	B	-	-	-	3/4	-	3/4	-	-
	C	-	-	120	-	-	1/2	2	-
1 Beef bull:	A	10-20	-	-	1/2	1 1/4	-	-	-
	B	-	-	200	-	1 1/2	-	2	-
1 Replacement heifer or bull:					winter pasture				
	A	7-8	-	-	-	1/2	-	-	-
	B	-	-	100	-	1/2	-	1 1/4	-
	C	-	Oil Meal	120	1/2	-	1/2	-	-
1 Brood sow and 2 litters to weaning		25	40% Supple- ment	150-200	Legume pasture	-	-	-	-
		25	40% Supple- ment	100	Legume pasture	-	-	-	-
1 Herd boar		25	40% Supple- ment	55-65	Legume pasture	-	-	-	-
1 Market hog (weaning to 220#) pasture - - -		10-12	40% Supple- ment	70-80	-	-	-	-	-
		12-14	40% Supple- ment	70-80	-	-	-	-	-
					1 1/2 tons: with winter pasture reduce hay				
7 Ewes		7	-	-	1/2	-	-	-	-
1 Dairy cow:									
5000# milk		1250	Oil Meal	310	2.5	-	-	-	-
6000# milk		1500	Oil Meal	375	2.5	-	-	-	-
7000# milk		1750	Oil Meal	440	2.5	-	-	-	-
1 Heifer		8	-	-	1.0	-	-	-	-

APPENDIX A (CONTINUED)

ESTIMATED LABOR REQUIREMENTS PER ACRE OF CROPS ON FARMS OPERATED WITH TRACTOR AND TRACTOR EQUIPMENT, IMPROVED SYSTEMS OF FARMING, BLUFF AREA, OBION COUNTY, TENNESSEE

Crop	Total	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Corn	15.9	-	.2	.2	1.4	2.9	1.7	.4	-	3.1	5.3	.7	-
Cotton	117.0	-	.2	1.1	3.3	11.9	10.9	1.2	-	25.4	41.9	20.9	.2
Oats	6.0	-	-	.1	-	.2	1.8	.8	.7	1.7	.7	-	-
Soybeans	8.4	-	.1	.2	1.3	1.7	1.2	.5	.2	.9	2.1	.2	-
Establish and maintain pasture	2.9	-	.6	-	-	-	.7	.8	.4	.2	.1	.1	-
Secircea hay	7.1	-	-	2.9	-	-	-	-	4.2	-	-	-	-
Lespedeza hay	5.1	-	.1	.5	.2	-	-	-	2.5	2.1	-	-	-
Cover crops	1.8	-	-	-	-	-	-	-	-	.9	.9	-	-
Alfalfa - Establish and maintain ^a	2.0	-	.6	-	-	-	.1	.4	.6	.3	-	-	-
Harvest	13.5	-	-	-	-	4.4	3.5	2.0	1.9	1.7	-	-	-

^aEstablishment prorated over 5 year period.

APPENDIX A (CONTINUED)

ESTIMATED LABOR REQUIREMENTS FOR LIVESTOCK, IMPROVED SYSTEMS OF FARMING,
BLUFF AREA, OBION COUNTY, TENNESSEE

Livestock	Total	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Dairy cow (hand milked)	130.0	13.0	13.0	13.0	10.0	9.6	9.6	9.6	9.6	9.6	9.6	10.0	13.0
Dairy cow (machine milked)	100.0	10.0	10.0	10.0	8.0	7.4	7.4	7.4	7.4	7.4	7.4	8.0	10.0
Other cattle	20.0	4.0	4.0	3.0	1.0	.5	.5	.5	.5	.5	.5	2.0	3.0
Bulls	50.0	5.0	5.0	5.0	4.0	4.0	4.0	3.0	3.0	3.0	4.0	5.0	5.0
Sow (prod. 2 litters)	30.0	1.2	3.0	6.0	3.0	.9	.9	.9	3.0	6.0	3.0	1.2	.9
Hogs, weaning 225# (2)	10.0	1.0	2.0	1.0	.2	.2	.3	.3	1.0	2.2	1.2	.3	.3
Hen	1.55	.132	.12	.132	.128	.132	.128	.128	.132	.128	.132	.128	.132
Calves	10.0	2.0	1.0	1.0	.5	.5	.5	.5	.5	.5	1.0	1.0	1.0
Boar	30.0	3.0	3.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
Sheep	6.0	1.0	1.0	.8	.5	.4	.3	.2	.2	.2	.3	.5	.6
Pullets (per 100)	37.6	6.3	7.4	6.5	6.6	6.5	4.2	-	-	-	-	-	-

APPENDIX B

ASSEMBLED LIST OF PRICES PAID AND RECEIVED BY FARMERS FOR PRODUCTION
IN 1954, OBION COUNTY, TENNESSEE

PRICES PAID BY FARMERS FOR ITEMS USED IN PRODUCTION,
OBION COUNTY, TENNESSEE, 1954

Item	Unit	Price	Item	Unit	Price
Fertilizer:			Feed:		
Lime	ton	3.30	Soybean meal	cwt.	4.50
0-12-12	ton	39.50	Cottonseed meal	cwt.	4.00
0-20-20	ton	61.50	Tankage 60%	cwt.	6.40
0-12-20	ton	44.70	Poultry starter	cwt.	6.00
0-9-27	ton	46.00	Poultry laying mash	cwt.	5.00
10-10-10	ton	64.30	Hog supplement 20%	cwt.	6.25
14-14-14	ton	80.20	Hog supplement 40%	cwt.	6.70
5-10-10	ton	45.00	Dairy feed 32%	cwt.	5.00
5-10-10	ton	49.60	Dairy feed 18%	cwt.	4.00
6-12-12	ton	55.20	Broiler ration 18%	cwt.	5.10
3-9-18	ton	49.00			
3-9-6	ton	38.80	Oyster shells	cwt.	.80
3-12-12	ton	46.30	Salt	cwt.	1.50
16-0-0	ton	88.00	Minerals	cwt.	2.50
33-0-0	ton	90.00	Calf starter	cwt.	6.85
0-20-0	ton	32.50	Steamed bone meal	cwt.	2.50
0-49-0	ton	67.75	Phenathiazine	lb.	1.10
0-0-60	ton	60.00			
Borax	ton	100.00	Miscellaneous:		
Seed:			Chicks, sexed	ea.	.30
Orchard grass	lb.	.30	Cotton ginning	bale	8.50
Fescue	lb.	.20	Custom combining	acre	5.00
Sericea lesp.	lb.	.43	Custom baling	bale	.20
Ladino clover	lb.	1.60	Broiler	ea.	.15
Lespedeza	lb.	.15	Milk hauling	cwt.	.30
Red clover	lb.	.50	Feed grinding	cwt.	.20
Alfalfa	lb.	.38			
Button clover	lb.	.26			
Sudan	lb.	.08			
Soybeans	bu.	4.00			
Oats	bu.	1.25			
Crimson clover	bu.	.25			
Corn, hybrid	bu.	10.00			
Rye grass	lb.	.18			
Vetch	lb.	.20			

APPENDIX B (CONTINUED)

AVERAGE PRICES RECEIVED FOR FARM PRODUCTS SOLD,
OBION COUNTY, TENNESSEE, 1954

Item	Unit	Price
Cotton lint	lb.	.32
Cottonseed	ton	59.00
Wheat	bu.	1.90
Rye	bu.	1.40
Corn	bu.	1.65
Oats	bu.	.85
Barley	bu.	1.20
Lesp., hay	ton	25.00 ^a
Alfalfa, hay	ton	30.00 ^a
Soybeans	bu.	2.70
Hogs	cwt.	20.00
Veal calves	cwt.	20.00
Beef steers	cwt.	20.00
Feeder steers	cwt.	17.50
Beef calves	cwt.	17.50
Cows	cwt.	12.00
Grade A milk	cwt.	5.00
Ungraded milk	cwt.	3.20
Sheep	cwt.	7.00
Lambs	cwt.	24.00
Wool	lb.	.55
Chickens, broilers	lb.	.25
Chickens, hens	ea.	1.00
Eggs	doz.	.50
Sows	cwt.	16.00

^aLespedeza hay was reduced from \$28.90 per ton and alfalfa hay was reduced from \$35.99 because of the small crops produced in 1954.

APPENDIX B (CONTINUED)

PRICES PAID FOR NEW FARM EQUIPMENT, OBION COUNTY, TENNESSEE, 1954

Kind	Value
Tractor, 2-plow	\$1980
Plow, 2-14"	255
Disc, 6'-7'	257
Cult., 2-R	253
Harrow, 2-S	56
Mower, 7'	309
Drill, 12-7"	476
Planter, 2-R	250
Side delivery rake	348
Trailer	225
Manure spreader	422
Fertilizer spreader	246
Cultipacker	185
6' combine (motor)	2000
Baler self-tie (motor)	1800
Corn picker, 2-R	1800

APPENDIX C

LAND CAPABILITIES AND CHARACTERISTICS OF SELECTED SOIL GROUPS,
OBION COUNTY, TENNESSEE

LAND CAPABILITY CLASSES AS USED BY THE SOIL CONSERVATION SERVICE

Capability of the land, determined by such physical factors as character of the soil, steepness of slope, and degree of erosion, is the basis for all recommendations for its use and treatment. Each farm is mapped by a soil technician before planning is done and the land is placed into capability classes. There are six classes used in this area.

- Class I: Land which is nearly level and suitable for intensive cropping with ordinary farming methods. It has suffered little or no erosion. May require some drainage.
- Class II: Land that can be cultivated safely in short rotations if done on the contours or in strips. It is usually gently sloping and moderate erosion is common. Some drainage may be necessary.
- Class III: Land on moderate slopes where moderate to severe erosion is common. Requires terracing and contour cultivation for cropping in moderately long rotations.
- Class IV: Land best suited to meadow or pasture but can be cultivated about one year in six. It is usually moderately steep and severe erosion is common.
- Class VI: Land best suited to permanent vegetation or trees. Usually steep and severely eroded. Requires careful management to stabilize erosion.
- Class VII: Land because of steepness and severe erosion is best suited to trees and wildlife. Selected areas may stand grazing.

APPENDIX C (CONTINUED)

CHARACTERISTICS OF SELECTED SOIL GROUPS¹

Group 30 - Soils

Well Drained Silt Loam and Fine Sand Loam Uplands and Terraces
Representative Series: Memphis, Loring, Lintonia

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

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

Group 40 - Soils

Soils with Imperfect Internal Drainage Due to Pan Development in the Subsoil, Representative Series: Grenada, Richland

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

¹Adapted from Thomas J. Whatley and Samuel W. Atkins, Agricultural Adjustments in the Southern Brown Loam Area of West Tennessee. (Knoxville, Tennessee: Agricultural Experiment Station, University of Tennessee, 1954).

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

Group 42 - Soils

Moderately Drained First Bottom Soils
Representative Series: Collins, Hymon

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

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

Group 43 - Soils

Poorly Drained First Bottom Soils
Representative Series: Falaya, Ina

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

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

APPENDIX D

MAN-EQUIVALENT RATING OF THE LABOR FORCE, OBION COUNTY, TENNESSEE

Age	Man-equivalent
Males	
10	.402
11	.482
12	.562
13	.642
14	.723
15	.803
16	.833
17	.964
18-35	1.000
36-40	.958
41-45	.904
46-50	.821
51-55	.630
56-60	.438
61-65	.301
66-70	.192
71-75	.082
76-80	.027
Females	
10-12	.329
13-45	.493
46-60	.329

APPENDIX E

ESTIMATED ACREAGE AND YIELD PER ACRE FOR ALTERNATIVE VII, BLUFF AREA,
OBION COUNTY, TENNESSEE, 1954

Alternative VII		
Item	Unit	Cotton, beef, poultry, and soybeans
Crops:		
Cotton	acre	4.5
yield	bale	1.25
Corn, upland	acre	2.0
yield	bu.	65.0
Corn, bottom land	acre	7.5
yield	bu.	75.0
Soybeans	acre	17.0
yield	bu.	30.0
Oats	acre	(5.0)
yield	bu.	55.0
Lespedeza hay	acre	31.0
yield	ton	1.0
Vetch (green manure)	acre	(36.0)
Garden	acre	0.2
Total crops	acre	110.2
Double-cropped	acre	41.0
Total used for crops	acre	69.2
Pasture, improved	acre	45.0
Pasture, unimproved	acre	12.5
Other land	acre	59.3
Total land	acre	186.0

APPENDIX E (CONTINUED)

ESTIMATED PRODUCTION AND SALE OF FARM PRODUCTS, ALTERNATIVE VII,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Unit	Production	For Sale	
			Quantity	Value
				<u>Dollars</u>
<u>Crops:</u>				
Cotton: lint	cwt.	28	28	896
seed	cwt.	43.1	43.1	127
Corn	bu.	1017	-	-
Soybeans	bu.	510	510	1377
Oats	bu.	275	-	-
Lespedeza	ton	33	-	-
Garden	\$	150	-	-
Total Crops	-	-	-	2400
<u>Livestock:</u>				
Cull cows	no.	3	3	360
Calves	no.	12	9	648
Hogs	no.	42	37	1665
Sows	no.	-	3	216
Hens	no.	400	340	340
Eggs	doz.	6000	5910	2995
Total Livestock	-	-	-	6224
Total Cash Receipts	-	-	-	8624

APPENDIX E (CONTINUED)

ESTIMATED CASH AND NON-CASH EXPENSES, ALTERNATIVE VII,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Value
	<u>Dollars</u>
Cash expenses:	
Fertilizer	1324
Lime	184
Seed	519
Ginning	48
Combining	110
Baling	218
Hog supplement	198
Cottonseed meal	6
Salt and minerals	17
Laying mash	1100
Starter and growing mash	367
Miscellaneous	44
Breeding fees	12
Vet., and medicine	90
Hauling	87
Chicks	135
Tractor operations	382
Auto farm share	200
Machinery repairs	86
Building and fence repairs	55
Taxes	83
Insurance	90
Telephone and electricity farm share	36
Total cash expenses	5391
Non-cash expenses:	
Depreciation	
Machinery	86
Buildings and fences	55
Total non-cash expenses	141
Total cash and non-cash expenses	5532

APPENDIX E (CONTINUED)

ESTIMATED FINANCIAL SUMMARY, ALTERNATIVE VII,
BLUFF AREA, OBION COUNTY, TENNESSEE, 1954

Item	Alternative VII	
	Cotton, beef, poultry and soybeans	
	Dollars	
Total receipts	8,624	
Value of products used in home	359	
Total farm earnings	8,983	
Total expenses	5,532	
Net farm income	3,092	
Net farm earnings ^a	3,451	
Interest on investment	1,379	
Net labor earnings ^b	2,072	
Net labor income	1,713	
Available labor (m.e.)	1.6	
Income per man-equivalent-	1,070	
Hours labor required	2,733	
Labor income per hour labor used	.62	
Labor earnings per hour used	.76	
Average investment		
Real estate	22,229	
Machinery	1,720	
Livestock	3,640	
Total	27,589	
Additional investment over present system		
Equipment	3,164	
Dairy barn	3,000	
Loafing barn	400	
Fences	369	
Land	9,875	
Livestock	3,560	
Total additional investment	20,368	

^aNet farm earnings as used in this analysis includes the cash income from the sale of crops, livestock and livestock products plus the estimated value of the products used in the home by the operator's family minus the year's prorated share of direct cash costs, depreciation on buildings, fences, machinery and livestock. It does not include the value of living in the farm house.

^bNet labor earnings as used here is the earnings left for the family after deducting from the total farm earnings the direct cash costs, depreciation on buildings, fences, machinery and livestock and 5 percent interest on the average investment.

APPENDIX F

FIELD NUMBER, ACREAGE AND CROPS PRODUCED UNDER EACH ALTERNATIVE
FARMING SYSTEM ANALYZED IN THE THREE PHASES

Field No.	Acreage	Phase Number I		
		Alternative I	Alternative II	Alternative III
Ia	7.0	Corn (vetch)	Corn (6A)(vetch)	Corn (6A)(vetch)
Ib	1.0	Corn (vetch)	Improved pasture	Improved pasture
II	2.0	Corn (vetch)	Improved pasture	Garden (.4A)
III	10.5	Improved pasture (7A)	Improved pasture (2.5A)	Improved pasture (6A)
IV	8.0	Unimproved pasture Corn (3A)(vetch) Cotton (vetch)	Unimproved pasture Corn (6A)(vetch) Lespedeza	Unimproved pasture Cotton (3.5A) (vetch) Corn (vetch)
V	8.0	Idle	Improved pasture	Improved pasture
VI	4.5	Corn (vetch)	Corn (1A)(vetch) Cotton (vetch)	Corn (vetch)
VII	4.0	Woods	Improved pasture (3A) Woods	Improved pasture (3A) Woods
VIII	2.0	Woods	Woods	Woods
IX	1.0	Garden (.4A) Homestead	Garden (.4A) Homestead	Garden (.4A) Homestead

APPENDIX F (CONTINUED)

FIELD NUMBER, ACREAGE AND CROPS PRODUCED UNDER EACH ALTERNATIVE
FARMING SYSTEM ANALYZED IN THE THREE PHASES (CONTINUED)

Field No.	Acreage	Phase Number II		
		Alternative IV	Alternative V	Alternative VI
Ia	7.0	Corn (vetch)	Corn (vetch)	Improved pasture (2A) Corn (vetch)
Ib	1.0	Corn (vetch)	Improved pasture	Improved pasture
II	2.0	Corn (vetch)	Alf.-orchard gr.	Lespedeza
III	10.5	Improved pasture (4A)	Improved pasture (6A)	Improved pasture (6A)
IV	8.0	Unimproved pasture Cotton(7A)(vetch) Corn (vetch)	Unimproved pasture Corn (3A) (vetch) Cotton (vetch)	Unimproved pasture Corn (3A) (vetch) Cotton (vetch)
V	8.0	Idle	Improved pasture	Improved pasture
VI	4.5	Corn (vetch)	Corn (vetch)	Oats (o.s., Lesp.)
VII	4.0	Woods	Woods	Woods
VIII	2.0	Woods	Woods	Woods
IX	1.0	Garden (.2A) Homestead	Garden (.2A) Homestead	Garden (.2A) Homestead
X	7.5	Corn (vetch)	Corn (vetch)	Corn (vetch)
XI	5.5	Oats, pasture Lesp., o.s.	Alf.-orchard gr.	Lespedeza
XII	9.0	Unimproved pasture	Improved pasture	Improved pasture
XIII	0.5	Unimproved pasture	Improved pasture	Improved pasture
XIV	3.0	Woods	Woods	Woods
XV	1.0	Idle	Idle	Idle
XVI	7.5	Unimproved pasture	Unimproved pasture	Unimproved pasture
XVII	5.0	Unimproved pasture	Unimproved pasture	Unimproved pasture
XVIII	6.5	Improved pasture (6A)	Improved pasture (6A)	Improved pasture (6A)
XIX	12.5	Unimproved pasture Woods (8.5A) Unimproved pasture	Unimproved pasture Woods (8.5A) Unimproved pasture	Unimproved pasture Woods (8.5A) Unimproved pasture

APPENDIX F (CONTINUED)

FIELD NUMBER, ACREAGE AND CROPS PRODUCED UNDER EACH ALTERNATIVE
FARMING SYSTEM ANALYZED IN THE THREE PHASES (CONTINUED)

Field No.	Acreage	Phase Number III		
		Alternative VII	Alternative VIII	Alternative IX
Ia	7.0	Corn (5A) (vetch) Improved pasture	Soybeans (vetch)	Corn (vetch)
Ib	1.0	Improved pasture	Improved pasture	Corn (vetch)
II	2.0	Corn (vetch)	Alfalfa-orchard grass hay	Corn (vetch)
III	10.5	Improved pasture (6A)	Improved pasture (6A)	Improved pasture (4A)
IV	8.0	Unimproved pasture Soybeans (vetch)	Unimproved pasture Soybeans (vetch)	Unimproved pasture Corn (1A) (vetch) Soybeans (1A) (vetch) Cotton (6A) (vetch)
V	8.0	Improved pasture	Improved pasture	Idle
VI	4.5	Cotton (vetch)	Cotton (3A) (vetch) Corn (vetch)	Corn (vetch)
VII	4.0	Woods	Woods	Woods
VIII	2.0	Woods	Woods	Woods
IX	1.0	Garden (.2A) Homestead	Garden (.2A) Homestead	Garden (.2A) Homestead
X	7.5	Corn (vetch)	Corn (vetch)	Corn (vetch)
XI	5.5	Lespedeza	Alfalfa-orchard grass hay	Oats, pasture over seed Lespedeza
XII	9.0	Improved pasture	Improved pasture	Unimproved pasture
XIII	0.5	Unimproved pasture	Unimproved pasture	Unimproved pasture
XIV	3.0	Woods	Woods	Woods
XV	1.0	Idle	Idle	Idle
XVI	7.5	Improved pasture	Improved pasture	Unimproved pasture
XVII	5.0	Improved pasture	Improved pasture	Unimproved pasture

- Continued

APPENDIX F (CONTINUED)

FIELD NUMBER, ACREAGE AND CROPS PRODUCED UNDER EACH ALTERNATIVE
FARMING SYSTEM ANALYZED IN THE THREE PHASES (CONTINUED)

Field No.	Acreage	Phase Number III		
		Alternative VII	Alternative VIII	Alternative IX
XVIII	6.5	Improved pasture (6A)	Improved pasture (6A)	Improved pasture (6A)
		Unimproved pasture	Unimproved pasture	Unimproved pasture
XIX	12.5	Woods (8.5A)	Woods (8.5A)	Woods (8.5A)
		Unimproved pasture	Unimproved pasture	Unimproved pasture
XX	13.0	Woods	Woods	Woods
XXI	9.0	Soybeans (vetch)	Lespedeza	Soybeans (vetch)
XXII	8.0	Lespedeza	Lespedeza	Unimproved pasture
XXIII	6.0	Lespedeza	Improved pasture	Unimproved pasture
XXIV	0.5	Woods	Woods	Woods
XXV	3.0	Woods	Woods	Woods
XXVI	1.0	Idle	Idle	Idle
XXVII	8.5	Lespedeza	Lespedeza	Idle
XXVIII	12.0	Idle	Improved pasture	Idle
XXIX	3.0	Oats (overseed Lespedeza)	Alfalfa-orchard grass hay	Soybeans (vetch)
XXX	2.0	Oats (overseed Lespedeza)	Alfalfa-orchard grass hay	Soybeans (vetch)
XXXI	4.0	Idle	Idle	Idle
XXXII	2.0	Woods	Unimproved pasture	Woods
XXXIII	6.2	Idle	Improved pasture	Idle
XXXIV	1.8	Idle	Unimproved pasture	Idle

APPENDIX G

HOURS OF LABOR REQUIRED AND AVAILABLE BY MONTHS FOR ALTERNATIVE FARMING SYSTEMS

Alternative	Hours	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
I. Short-run improvement	Used Not used	53 287	80 260	67 273	75 265	140 200	119 221	49 291	47 293	271 69	376 -36	155 185	42 298	1474 2606
II. Cotton, dairy, hog and broiler	Used Not used	170 170	224 116	191 149	159 181	197 143	193 147	144 196	158 182	343 -3	385 -45	212 128	151 189	2527 1553
III. Cotton, dairy, hog and poultry	Used Not used	227 113	314 26	217 123	207 133	256 84	246 94	194 146	168 172	381 -41	507 -167	336 4	212 128	3265 815
IV. Cotton, hog and sheep	Used Not used	109 231	183 157	149 191	116 224	191 149	165 175	70 270	154 186	445 -105	527 -187	233 107	57 283	2399 1681
V. Cotton, dairy and hog	Used Not used	217 123	289 51	247 93	204 136	250 90	258 82	228 112	237 102	451 -111	512 -172	172 168	186 154	3251 829
VI. Cotton, beef and poultry	Used Not used	160 180	238 102	203 137	156 184	209 131	223 117	163 177	153 187	342 -2	401 -61	223 117	124 216	2595 1485

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APPENDIX 3 (CONTINUED)

HOURS OF LABOR REQUIRED AND AVAILABLE BY MONTHS FOR ALTERNATIVE FARMING SYSTEMS (CONTINUED)

Alternative	Hours	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Hours
VII. Cotton, beef, poultry, and soybeans	Used	155	243	210	179	228	226	134	200	375	395	273	118	2733
	Not used	185	97	130	161	112	114	209	140	-35	-55	67	222	1347
VIII. Cotton, dairy and soybeans	Used	252	304	225	219	255	276	236	279	352	352	346	260	3356
	Not used	88	36	115	121	85	64	107	61	-12	-12	-5	80	724
IX. Cotton, hogs, sheep and soybeans	Used	145	220	180	151	220	184	80	164	427	496	258	79	2603
	Not used	195	120	160	189	120	156	260	176	-87	-156	82	261	1476