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To the Graduate Council:

I am submitting herewith a thesis written by Ninganagouda Phakirgouda Patil entitled "A Study of Use of Standard Plans as Guides for Planning Farms in the Dark-Fired Tobacco Area of 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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A STUDY OF USE OF STANDARD PLANS AS GUIDES FOR PLANNING FARMS
IN THE DARK-FIRED TOBACCO AREA OF TENNESSEE

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Ninganagouda Phakirgouda Patil
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CHAPTER I

INTRODUCTION

A. THE PROBLEM

The problem toward which this study is directed arises out of the special characteristics of farming in this country and out of various economic phenomena related to farm business. Farm businesses in the United States are more numerous and smaller in size than most firms in many non-farm industries. The operators of most of these farms have less education than the managerial force in most large industries, and cannot afford to carry out adequate research activities. Hence research and extension in agriculture are in large measure public affairs. However, even with government assistance there are several hundred farms for each research and extension specialist. Although no two of these farms are exactly alike, they can usually be classified into roughly homogeneous groups.

In regard to the economic phenomena referred to above, the special characteristics of farms include: 1. A high percentage of costs are quite fixed. 2. The costs and returns are decidedly vulnerable to extreme fluctuations in weather conditions. 3. Prices of farm products and technological practices in farming are highly dynamic, and 4. Farmers

generally are at a disadvantage in bargaining in the market places, because they represent a large number of independent units trading with relatively few firms.

The problem therefore is to provide standard plans for a few particular farms that can serve as general guides for a considerable number of farms, thus facilitating the preparation of more specific plans for every farm. For this thesis, a hypothesis is set up that the farms in an area can be classified into groups in such a manner that representative farms can be selected for development of standard plans to serve as general guides for planning other farms in these groups, respectively.

B. OBJECTIVES OF STUDY

Three main objectives of this study are:

- a) To classify the farms in a selected area of Tennessee into fairly homogeneous groups on the basis of acres of open land, soil patterns, and labor resources.
- b) To formulate alternative farm plans for selected farms in several of the larger groups.
- c) To study the feasibility of using these plans as guides for other farms in these groups, respectively.

C. REVIEW OF LITERATURE

In the United States, beginnings of farm business

survey can be traced back to 1911 when Warren of Cornell University published a bulletin entitled "An Agricultural Survey". Its findings greatly impressed contemporary government leaders and research workers. This paved the way for making farm management surveys by students and research workers in the United States as well as in many other countries.¹

"Farm planning and budgeting is a method of research for analyzing the probable effects on costs and returns of the various alternative systems of enterprise combination or resource use."²

Up to the end of 1929, there were only eight experiment stations in the United States which had published the results from budget studies.³ In his book, "Farm Organization and Management", Forster mentions that "The method of budgeting as developed in this country was first presented by the author about 1922 in an address delivered at Ashville, North Carolina. Later it was presented in Research Bulletin No. 1, Bureau of Economic Research, North Carolina State College, Raleigh, North Carolina."⁴

¹Yang, W. Y. Methods of Farm Management Investigations (Food and Agriculture Organization of the United Nations, Rome, 1958) p. 8.

²Ibid. p. 123.

³Ibid. p. 123.

⁴Forster, G. W., Farm Organization and Management, Prentice-Hall, New York, 1946, revised edition, p. 36.

Hodges, in his article on "Development of Farm Budget in United States", states that "A distinct impetus was given to farm budgeting in the twenties in connection with the so called "cost routes" started in many states after World War I. The questions of proper analysis, interpretation, and presentation of these data aroused wide spread interest and spirited discussions. Many specialists favored the development of unit requirements of production or "standards" in physical quantities rather than placing too much emphasis on money costs. The development of more or less complete budgets resulted."⁵ Mention may be made of "A study of Farm Organization in Southwestern Minnesota" by Pond and Tapp. In this bulletin they refer to unit requirements of labor and materials for crops and livestock, use of unit requirement and labor distribution data in planning a cropping system. They also discuss the principles of choice and adjustment of crop and livestock enterprises and application of them to planning the farm organization.⁶ In a study of "Farm Organization for Beef Cattle Production in Southwestern Minnesota", Sallee and Pond discuss the problems involved and give the analytical process in planning the farm organization for beef cattle production. They have

⁵Hodges, Development of the Farm Budget in the United States, Heady et. al. Resource Productivity, Returns to Scale, and Farm Size, Iowa State College Press, 1956, p. 31.

⁶Pond and Tapp, A Study of Farm Organization in Southwestern Minnesota, University Farm, Bulletin 205, 1923.

classified the farms on a general basis. They have dealt with planning production programs and budgets for three types of beef-cattle farms such as (a) farms suitable for milk and beef production, (b) farms suitable for only beef production, and (c) farms suitable for feeding of purchased cattle.⁷

Practically all of the recent college text books in farm management give considerable space to farm planning and budgeting and the budget is recognized as a useful farm management tool. Usually both partial budgeting and budgeting for the entire farm are discussed.

Research workers in Kansas have made extensive use of farm budgets. The most extensive use in Kansas was the Agricultural Adjustment Project of 1935.⁸

A study has been made by Hoover on capital and labor substitution in two types of farming areas in Kansas. He studied the various possible changes representing different degrees of substitution of machinery for labor, to find out the effect upon net farm income.⁹

Recently much emphasis has been placed on individual farm planning in Missouri. The staff of the College of Agriculture prepared a handbook in cooperation with the USDA,

⁷Sallee and Pond, Farm Organization for Beef Cattle Production in Southern Minnesota, University of Minnesota, Agricultural Experiment Station 193, Bulletin 138, 1939.

⁸Hodges, op. cit. p. 33.

⁹Ibid. p. 34.

giving much useful information. The object was to help Missouri farmers in farm planning.¹⁰

A good example of the use of the budget method in farm planning is the Dairy Farm Management Project in New England. Wheeler describes this as the operating unit approach.¹¹

Kentucky Agricultural Experiment Station, University of Kentucky published a farm management handbook based on studies of farms in the Pennyroyal (dark-fired tobacco) area of Kentucky. The handbook provides useful information on production rates, costs and returns, and also method for analyzing possible changes.¹² These farms were classified into two groups, one with fairly level land, the other with hilly to steep land.

Some studies have been made by the Agricultural Experiment Station, University of Tennessee, in cooperation with the Agricultural Research Service of the United States Department of Agriculture. Two bulletins published by them are:

¹⁰Ibid. p. 34

¹¹Ibid. p. 35.

¹²Farm Management Handbook, Kentucky Agricultural Experimental Station, Lexington, Kentucky, Bulletin 463, 1944.

(a) Increasing Incomes Through Farm Adjustments in the Grenda-Loring Soil Association Area of Southwestern Tennessee.¹³

(b) Increasing Incomes Through Farm Adjustments in the Red Soil Area, Eastern Highland Rim of Tennessee.¹⁴

The authors have classified the farms into groups based on size of farms, soil types and enterprises. For suggesting the scope for increasing incomes they have used budgeting method. They have shown that farm income could be improved by using improved production practices and adjusting other resources. They state that it would be possible to raise the level of production per man-equivalent about 50 to 75 per cent above the present level.

Other studies which need mention are "Cost of Producing Farm Products in North Carolina". This report deals with these questions in terms of specified types of farms. It provides estimates of costs and returns. The information contained in this report is meant to serve as a basis for assisting farmers in developing more efficient farming systems.¹⁵

¹³Whatley, T. J., Atkins, S. W. Increasing Incomes Through Farm Adjustments, Agricultural Experiment Station, University of Tennessee, Bulletin No. 244, 1955.

¹⁴Atkins, S. W., Increasing Incomes Through Farm Adjustments, Agricultural Experiment Station, University of Tennessee, Bulletin No. 245, 1955.

¹⁵Cost of Producing Farm Products in North Carolina, Department of Agricultural Economics, North Carolina State College, Raleigh, North Carolina, A. E. Information Series No. 52, 1956.

The Test Demonstration Research Unit of the University of Tennessee has also provided useful information in their monograph, "Estimated Costs and Returns from Major Enterprises, Tennessee" which serves as a guide to farmers.¹⁶

Though there are several studies on budgeting, as previously referred to, there are no studies on dark-fired tobacco farms except the farm management handbook published by the Kentucky Agricultural Experiment Station, but the handbook deals with Pennyroyal farm situations in Kentucky. Thus this study which provides useful information on the possibility of increasing income through farm adjustment is a new approach in the area and it is hoped that this study will be useful to researchers, extension workers and farmers in the area.

Forster in his book, "Farm Organization and Management" devotes a chapter to discussing Farm Budgeting and Development of Standards and discusses most comprehensively the development of standard models and the criticisms leveled against it. He states that "standards are model combinations of farm enterprises--model in the sense that they provide a guide for the best use of the farmer's

¹⁶Estimated Costs and Returns from Major Farm Enterprises, Tennessee, Department of Agricultural Economic and Rural Sociology, Agricultural Experiment Station, University of Tennessee and Tennessee Valley Authority, Rural Research Series Monograph (Mimeograph No. 268), 1954.

available resources" usually three or four models will represent the majority of farms in most types of farming areas. Through a process of purposive sampling from the over-all random sample representative farms may be selected showing modal tendencies. In making a selection of this sort it is necessary to study the organization of the representative farm and to obtain such other data regarding the area. For the analysis, other data such as (a) normal yields and prices, (b) production trends, (c) labor and material inputs, and (d) farm practices and methods peculiar to the area, maybe collected. Collection of these data are necessary for the development of standards. Various steps suggested in developing standard models are:

- (1) Grouping the farms studies according to size and type,
- (2) Selection from each size group those farms which appear to have the best organizations or these farms which are apparently utilizing available resources to the best advantage,
- (3) Developing a cropping and livestock system,
- (4) Determining the labor and material requirement,
- (5) Projecting the probable crop and livestock production,
- (6) Preparation of income statement.

He refers to two important criticisms made against standard models. The criticisms are concerned chiefly with

the apparent artificiality of the results and the alleged defects of the theories upon which they are based. It is argued that as the standards are not the actual combinations of enterprises they may mislead the farmers. For this Forster argues that standards are intended to serve simply as guides to the farmers and not to be adopted in toto. The farmer must use his experience and judgement in adopting a standard. The standards are not artificial as the material used to develop them is obtained from a study of actual situations and other experimental data.

Another criticism of standards that he considers valid is concerning the theoretical aspects of the method. The critics state that there is no such thing as normal requirements for the production of crops and livestock products, because they vary with changing prices and costs and the efficiency and capacity of entrepreneur. Here he again points to the necessity of farm planners using their experience and judgement in determining to what extent a standard combination of enterprises should be adopted.¹⁷

D. SOURCE OF DATA

The data used in this study were obtained primarily

¹⁷Forster, G. W., Farm Organization and Management, New York: Prentice-Hall, 1953, Third Edition, p. 83-99.

from survey schedules taken from a sample of farmers in a specified area of Tennessee. Supplementary data were obtained from results of experiments conducted by the various departments of the Tennessee Agricultural Experiment Station and certain publications of this station.

E. LOCATION AND DESCRIPTION OF THE AREA STUDIED

1. Location. The area studied consists of four counties, Cheatham, Dickson, Montgomery, and Robertson. These counties were studied as a group rather than as separate segments. This area is often referred to as the dark-fired tobacco area of Tennessee. It is part of the Highland Rim section of the state.¹⁸

The dark-fired tobacco area covers part of type-of-farming area 6 and all of sub-area 7 a.¹⁹

2. Description. A description of some of the physical and economic features of the area studied is presented in Appendix A.²⁰ Briefly, the topography of the Western Highland Rim is rolling to rough. The soils are generally shallow, cherty and low in natural fertility. The growing season varies from 185 to 190 days and precipitation is around 50 inches. About 30 per cent of the

¹⁸See Appendix A.

¹⁹Ibid.

²⁰Ibid.

farms were of the livestock type, other than dairy and poultry. Cash grain and tobacco farms were also important. On the Northern Highland Rim the topography ranges from almost level to hilly. In the northern part of the four counties studied the soils are of fairly high quality. The growing season is about 198 days and precipitation ranges from 46 to 48 inches. Small grain and tobacco predominate here to a greater extent than in the rougher areas of the Rim. Livestock and tobacco markets are available to all of the four counties.

F. PROCEDURE USED

1. Sampling. A sample of farms in the four counties studied was obtained in 1957 through the cooperation of the Agricultural Stabilization and Conservation Committee, United States Department of Agriculture, in each county. These committees made available their lists of farm operating units that were used to determine crop allotments for adjustment programs. The information obtained included the farmer's name, acres in farm, and per cent that open land was of total acres.

The above lists included about 7,600 farm operating units in the four-county area. This number is fairly close to the number of farms reported in the United States census of Agriculture of 1954.

The farms were first classified into nine groups on the basis of acres of open land: 1-9, 10-19, 20-39, 40-79, 80-159, 160-319, 320-639, 640-1279, and 1280 and over. The range in acres for each group were widened with increase in size of farms because the distribution was definitely skewed, as is the usual situation for farms in all sections of this country. The above ranges resulted in having the size of a farm at the extreme end of the range in any group, except the smallest farm-size group, being the same percentage of the size of the farm at the midpoint of that group as one would find in any other group, respectively.

A sample of 450 farms was then selected at random from these stratified groups in such a manner that the number allocated to each farm-size group would result in a mean of acres of open land diverging not more than 7.5% from the actual mean in 95% of all possible samples that may be drawn.²¹

²¹The formula used in arriving at the number of farms needed for each stratum was the following: $n = \left(\frac{t \cdot \sigma N}{c.i.} \right)^2$ where n = number needed in the sample stratum; t = 5% probability level in Student's distribution for selected degrees of freedom; N = the standard deviation of acres of open land for all farms in each stratum in the universe; and c.i. = the critical interval chosen (7.5% of the mean of acres of open land in each stratum).

The following is a comparison of the actual number in each stratum in the sample for which soil maps were available, and the computed n according to the above formula:

<u>Stratum</u> <u>(acres of open land)</u>	<u>No. in</u> <u>Sample</u>	<u>Computed</u> <u>n</u>
Under 10.0	32	181
10.0-19.9	27	27
20.0-39.9	33	28
40.0-79.9	52	28
80.0-159.9	70	28

A list of alternate farms were also selected at random to provide substitutes for any farms for which it should become impossible to obtain schedules.

2. Use of Soil Maps. The percentage of open land as found in the A.S.C. lists, reflected the actual status on the farms at the time that the lists were made up. It did not, on some farms, present a true indication of the amount of land that should be open from the standpoint of practices recommended by specialists in agronomy. On a number of farms some very steep and badly eroded land was cleared and used for crops or pasture, while on other farms some of the best land available was in woodland.

In this study, for classifying the farms in the sample, it was decided to base the percentage of open land on the amount of land considered approximately feasible to be used for crops or pasture with sound agronomic practices, on the basis of recommendations of specialists in agronomy.²² This

<u>Stratum</u> <u>(acres of open land)</u>	<u>No. in</u> <u>Sample</u>	<u>Computed</u> <u>n</u>
160.0-319.9	36	27
320.0-639.9	28	27
640.0-1279.9	24	30
1280.0-2559.9	3	20

In the two largest farm-size groups, the number in the sample constituted 100% of those in the universe. The "farms" in the smallest farm-size group were mostly rural residences, and were not deemed important in this study.

²²In the remainder of this thesis this statistic will be actually the acres of land "feasibly open". It does not take into consideration cost of clearing land now in woods.

decision necessitated the use of soil maps, which were not available for all of the farms in the sample. The Soil Conservation Service, United States Department of Agriculture, cooperated in this phase of the study and surveyed the soil on as many additional farms in the sample as time permitted.

The sample that was finally used included 305 farms for which soil maps became available. After classifying these 305 farms into 9 groups as explained above, tests of significance (t tests) showed that those 305 farms were not significantly different from the original sample of 450 farms in such factors as total acres, per cent of land open, per cent of open land that was idle, age of operator, years of schooling of operator, months work off farm by operator, man-equivalents of family labor other than operator, total hours of labor used, hours of labor on livestock, hours of labor on crops, acres in various kinds of crops, and acres in pasture.

The acres of land available to be used for crops or pasture, based on agronomic considerations as stated above, were then computed. The distribution of these 305 farms into 9 groups on the basis of acres of land "feasibly open" was then compared with a similar distribution of actual acres of open land for the original sample of 450 farms. The differences were non-significant (far below the 5% point).

3. Classification of Farms. The nine groups within

the 305 farms with soil maps were then classified into sub-groups on the basis of the following criteria: soil patterns and number of adult equivalents of family labor used. The group with a low number of adult equivalents of family labor used was also subdivided into two groups, one which was low because of elderly operators without other family help, and one which was low because the operator was working considerably off the farm, and had little family help.

Tests of significance (t tests) were made to determine whether there were significant differences in certain factors among the classified groups and sub-groups. However, the results of these tests did not constitute the sole reason for selection of the bases of classification of the farms into groups and sub-groups. The recommendations of soil specialists in regard to adaptability of different soils to certain land uses justified separation of soils into groups for farm planning purposes even if the uses made by the farmers were not significantly different among the groups.

4. Inferences Made to Whole Area. Based on the percentages of all farms in the four counties falling into each of the 9 farm-size groups, estimates were made as to the probable numbers in the sub-groups in the whole area. These estimates were, of course, subject to sampling errors. However, since all of the farms in the two largest farm-size groups in the four counties were included in the sample,

there should certainly be no sampling errors in the data pertaining to the sub-groups in these two farm-size groups.

5. Selection of Farms for Standard Plans. For each of several of the sub-groups having substantial numbers of farms a farm approximating the mean of the majority of factors studied was selected for development of three alternative standard plans. Comparisons of these farms with the other farms in their respective groups was then made.

CHAPTER II

NUMBERS AND DESCRIPTION OF FARMS IN THE CLASSIFIED GROUPS

A. SIZE OF FARM

Because of a skewed distribution, the classification of the sample on the basis of size (acres of soils recommended as adaptable for open land) was made according to the following ranges in acres: (1) under 10, (2) 10.0 to 19.9, (3) 20.0 to 39.9, (4) 40.0 to 79.9, (5) 80.0 to 159.9, (6) 160.0 to 319.9, (7) 320.0 to 639.9, (8) 640.0 to 1279.9, and (9) 1280.0 to 2559.9. With the exception of the smallest farms, each group included a range in size double that of the next lower size. In this manner the extreme cases in each group represented the same percentage of the size at the midpoint, respectively.

B. SOIL PATTERNS

With the assistance of specialists in the Department of Agronomy, University of Tennessee, the soils found in this area were first divided into eight groups as follows:

- | | | |
|--------|---------------------|--------------------------------------|
| No. 1. | level to undulating | --high in water supplying capacity |
| No. 2. | " " " | --medium in water supplying capacity |
| No. 3. | " " " | --low in water supplying capacity |

No. 4.	level to undulating	--medium to high in water supplying capacity--medium well drained
No. 5.	" " "	--medium to high in water supplying capacity--poorly drained
No. 6.	hilly to steep	--medium in water supplying capacity
No. 7.	" " "	--low in water supplying capacity
No. 8.	" " "	--very low in water supplying capacity (and some level land either very poorly drained or very low in water supplying capacity)

In order to reduce the number of groups classified on the basis of the soil resource No. 1, No. 4, and No. 5 were combined and called Group A. Farms were placed in Group A if soils No. 1, No. 4, and No. 5 constituted 45% or more of the open land. No. 2 soils and farms were placed in this group if the No. 2 soils were called Group B made up 45% or more of open land. No. 6 soils were called Group C and farms were placed in this group if No. 6 soils made up 55% or more of open land. No. 3 and No. 7 soils were combined and called Group D and farms were placed in Group D if soils No. 3 and No. 7 made up 55% or more of open land. No. 8 soils are generally considered to be unsuited for crops or pasture and should as a rule be kept in woodland. On part of the farms some income can be obtained from this woodland and possibly a little pasturage from some of this land. However, in this study No. 8 was not included with acres of open land in any case.

The No. 1 soils in Group A are mostly bottom land soils and to a certain extent subject to overflow. There

was very little acreage of No. 4 and No. 5 soils on these farms. The No. 2 soils, Group B, were quite highly productive, and not subject to overflow. In good years when no overflow damage occurred the No. 1 soils in Group A tend to outyield the Group B soils a little. However, the No. 4 and No. 5 soils in Group A are not adapted to growing alfalfa.

The No. 6 soils making up Group C are similar to those in Group B, but are hilly to steep. Hence they cannot be farmed as intensively as the Group B soils, and require long rotations or other practices that help to minimize erosion. Somewhat lower crop and pasture yields are expected on Group C than on Group B soils.

The soils in Group D are less productive than those in Group C, especially for row crops that mature in late summer or in the fall. Because of their low water supplying capacity they tend to be drouthy in the latter part of the season, in which rainfall tends to be quite low. The reasons for this drouthy nature of these soils differs between soils No. 3 and soils No. 7. The No. 3 soils are fairly level with a hard-pan subsoil, while the No. 7 soils are on hilly to steep land and tend to be cherty with a rather shallow surface soil.

The No. 6 and No. 7 types of soils that are heavily eroded are included with the No. 8 group.

C. FARM FAMILY AND LABOR RESOURCES

The farms within each size and soil patterns were further sub-divided into two sub-groups on the basis of man-equivalents of family labor (operator and other family labor) used on the farm. Two groups were set up, one with .7 or more man-equivalents of family labor, the other with less than .7 man-equivalents.¹

The latter group was also broken down into two additional sub-groups, one with less than .7 man-equivalents of family labor because the operator was over 57 years old, and the other with little farm labor done mainly because the operator had an off-farm occupation.

D. NUMBER OF FARMS IN GROUPS

A sample of 305 farms for which soil maps were available was used in this study. The number of farms falling in each classified group is shown in Table I. On the basis of the percentage that the number of farms in each farm-size group was of the total of all farms in that respective farm-size group in the four county area, an inference was made as to the probable number of farms in the whole area that are in each sub-group classified on the basis of soils and family

¹See Appendix B for man-equivalents of family labor of various ages, for each sex.

labor used on the farm. This inference was deemed to be justified because the farms were selected at random within each farm-size group. These probable numbers of farms are shown in Table II.

The numbers shown in Table II show that the largest number of farms were found in the farm-size group with a range of 40.0 to 79.9 acres. The average size of all farms in the four counties was about 71 acres of open land. Over two-thirds (approximately 71%) of the farms fell within the range of 20.0 to 159.9 acres of open land, but they included only about 63% of the total acres of open land on all farms in the four counties. Only about 0.36% of all the farms had 640 or more acres of open land, but these farms included close to 5% of all of the open land. The farms with 160 or more acres of open land constituted about 9% of the total number of farms, but included about 35% of the total acres of open land.

About 45% of the farms were in Soil Group D, a little over one-fifth in each of Groups B and C, and one-eighth in Group A. A smaller percentage of the farms were in the two smallest farm-size groups (under 20 acres of open land) in the case of the more productive soil groups (A and B) than was found in Soil Groups C and D, respectively.

About 31.5% of all farms in the four counties had .7

or more of a man-equivalent of family labor working on the farm. The percentages were as follows for the different Soil Groups: A, 38%; B, 39%; C, 32%; and D, 26%. Nearly all of these farmers were full-time operators. A larger proportion of them were on the larger farms in Soil Group B than in any of the other soil groups.

About 40% of the farms with less than .7 of a man-equivalent of family labor working on the farm were elderly operators, and the remainder were part-time farmers. The percentages were as follows for the different Soil Groups: A, 40%; B, 55%; C, 38%; and D, 36%. A smaller percentage of farmers on the good productive soils, especially Group B, were part-time farmers.

About 20% of the elderly farmers were on farms with less than 20 acres of open land, 33% on farms with 20 to 39.9 acres, and 25% on farms with 40 to 79.9 acres. Approximately 30% of the part-time farmers were on farms with less than 20 acres, 25% on farms with 20 to 39.9 acres, and 30% on farms with 40 to 79.9 acres. Thus, close to 80% of both the elderly and the part-time farmers were on farms with less than 80 acres of open land, while only 48% of the full-time farmers under 58 years old were on farms of these farm-size groups.

TABLE I
NUMBER OF FARMS IN SAMPLE, BY ACRES OF OPEN LAND,
SOIL GROUPS, AND FAMILY LABOR SITUATION

Soil Group	Man-Eq. of Family Labor	Reason for Under .7 Man-Eq.	Acres of Open Land									
			Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:19.9-:39.9-:79.9-:159.9-:319.9-:639.9-:1279.9-:2559.9-:Totals								
A	.7+	--	0	0	2	2	5	4	1	1	1	15
	Under a	Elderly	0	1	4	0	0	0	1	0	0	6
	.7	Off-Farm Work	1	0	1	5	2	0	2	3	0	14
	Totals		1	1	7	7	7	4	4	4	0	35
B	.7+	--	0	1	0	5	9	9	9	11	3	47
	Under a	Elderly	0	5	3	3	5	0	0	0	0	16
	.7	Off-Farm Work	4	1	0	4	5	2	1	0	0	17
	Totals		4	7	3	12	19	11	10	11	3	80
C	.7+	--	2	1	0	4	9	5	4	2	0	27
	Under a	Elderly	1	1	0	6	5	1	0	1	0	15
	.7	Off-Farm Work	7	7	0	5	5	1	2	1	0	28
	Totals		10	9	0	15	19	7	6	4	0	70
D	.7+	--	0	2	2	7	13	9	4	4	0	41
	Under a	Elderly	6	2	7	4	7	2	2	0	0	30
	.7	Off-Farm Work	11	6	14	7	5	3	2	1	0	49
	Totals		17	10	23	18	25	14	8	5	0	120
	Totals		32	27	33	52	70	36	28	24	3	305

^aSee text, p. 19, for basis of dividing those with under .7 man-equivalents of family labor into sub-groups.

TABLE II
NUMBER OF FARMS IN THE FOUR-COUNTY AREA, BY ACRES OF OPEN LAND,
SOIL GROUPS, AND FAMILY LABOR SITUATION

Man-Eq. Reason for		Acres of Open Land									
Soil of Family Labor		Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:	Under:10.0-:20.0-:40.0-:80.0-:160.0-:320.0-:640.0-:1280.0-:
Group Labor		Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.	Under .7 Man-Eq.
A	.7+	0	0	100	87	105	59	4	1	0	356
	Under	0	29	200	0	0	0	4	0	0	233
	Off-Farm Work	23	0	50	219	42	0	8	3	0	345
Totals		23	29	350	306	147	59	16	4	0	934
B	.7+	0	29	0	219	188	133	34	11	3	617
	Under	0	145	150	130	105	0	0	0	0	530
	Off-Farm Work	92	29	0	175	105	29	4	0	0	434
Totals		92	203	150	524	398	162	38	11	3	1581
C	.7+	46	29	0	175	188	74	15	2	0	529
	Under	23	29	0	262	105	15	0	1	0	435
	Off-Farm Work	162	203	0	219	105	15	8	1	0	713
Totals		231	261	0	656	398	104	23	4	0	1677
D	.7+	0	58	100	306	271	133	15	4	0	887
	Under	138	58	350	175	146	29	8	0	0	904
	Off-Farm Work	255	175	700	306	105	44	8	1	0	1534
Totals		393	291	1150	787	522	206	31	5	0	3385
Totals		739	784	1650	2273	1465	531	108	24	3	7577

E. DESCRIPTION OF FARMS IN GROUPS

On the farms in this sample about 40% of the open land was in the two more productive Soil Groups, A and B, as shown by the data in Table III. But this percentage would be somewhat less for all farms in the county because the data in Table III show that there was a tendency for a greater proportion of the more productive land to be in the larger farm-size groups. As stated in the previous chapter, a greater percentage of the large farms than of the medium and small farms in the area studied were included in the sample of 305 farms.

As shown by the data in Table IV there was a tendency for the following items to be greater on the smaller farms than on the larger farms in 1957: per cent of open land that was idle, age of operator, and months that operator worked off the farm. The following items tended to be less on the smaller than with the larger farms: years of schooling of operator, man-equivalents of family and total farm labor used, and in work units.² The averages for all farms in Table IV need to be modified slightly in order to apply to all farms in the four counties, because of the above effects of size of farm and because the sample contained

²An explanation of work units is given in Appendix C.

larger percentages of the large farms in the area.

Averages are not presented for groups classified on the basis of soil groups, because for most of the items these averages were not significantly different among the soil groups when other factors were held constant. An exception to this situation was found in the difference in work units between Groups A and D. The average work units in 1957 were significantly greater in Soil Group B than in Group D.

For those farmers with less than .7 man-equivalent of family labor, the years of schooling was less for the elderly farmers than for the part-time farmers.

TABLE III

ACRES AND PERCENTAGES OF OPEN AND OTHER LAND BY
FARM-SIZE AND SOIL GROUPS, 305 SAMPLE FARMS, 1957

Farm-Size Group	Aver. Acres Open Land	Soil Groups				Total	Other Land in Farm
		A	B	C	D		
		Percentages					
Under 10.0	4.4	9.4	16.9	26.4	47.3	100.0	80.1
10.0-19.9	13.8	10.3	26.5	23.7	39.5	100.0	104.9
20.0-39.9	27.9	22.5	12.8	8.7	56.0	100.0	110.9
40.0-79.9	58.1	20.3	20.4	24.6	34.7	100.0	73.5
80.0-159.9	121.3	16.9	21.8	24.9	36.4	100.0	76.0
160.0-319.9	232.6	18.8	22.1	23.9	35.2	100.0	58.6
320.0-639.9	459.7	19.2	24.8	25.7	30.3	100.0	65.7
640.0-1279.9	782.5	22.4	32.0	25.6	20.0	100.0	45.5
1280.0-2559.9	1634.4	22.7	34.7	26.3	16.3	100.0	82.7
All farms	188.7	17.6	21.7	23.2	37.5	100.0	76.9

TABLE IV

AVERAGES FOR PERCENTAGE OF OPEN LAND IDLE, AGE AND
SCHOOLING OF OPERATOR, MONTHS WORK OFF FARM
BY OPERATOR, MAN-EQUIVALENTS OF FAMILY
AND TOTAL FARM LABOR, AND WORK UNITS,
BY FARM SIZE AND SOIL GROUPS,
305 SAMPLE FARMS, 1957

Farm-Size Group	% Open Land Idle	Operator			Man-Equivalents of Farm Labor		Work Units in '57
		Age	Schooling	Months Off-Farm Work	Family	Total	
Under 10.0	45	51	7.3	8.9	.2	.2	24
10.0-19.9	37	55	7.6	9.2	.3	.4	50
20.0-39.9	27	53	6.6	5.3	.3	.5	106
40.0-79.9	18	52	7.4	4.2	.5	.7	172
80.0-159.9	13	51	8.6	2.7	.8	1.3	342
160.0-319.9	9	44	10.0	2.3	1.0	2.0	568
320.0-639.9	8	48	10.3	3.6	.9	3.0	852
640.0-1279.9	1	42	11.9	3.1	.8	5.2	1656
1280.0-2559.9	0	40	11.5	0	.9	8.5	2975
All Farms	19	46	8.6	6.9	.6	1.5	431

CHAPTER III

STANDARD PLANS FOR SELECTED GROUPS

A. SELECTION OF CLASSIFIED GROUPS FOR STANDARD PLANS

Time available for this study permitted the preparation of standard plans for only a few of the groups shown in Tables I and II. Of the estimated 7577 farms in the four counties, 5,188, or 69 per cent, had less than .7 man-equivalent of operator labor, either because the operator was over 57 years old or was working most of the year at another occupation. Only 2,389, or 32 per cent, had at least .7 man-equivalent of operator labor. Most of these were largely full-time operators. However, there is generally more stability in the farming systems found on full-time farms than on those with elderly and part-time operators.

Of the 2,389 farms with at least .7 man-equivalent of operator labor, largely full-time operators, 1,938, or 81 per cent, had between 40.0 and 319.9 acres of open land (see Table II). More of these farms were in Soil Groups B and D than in Groups A and C. As stated in a previous chapter, there was a significant difference in the average work units on farms in Groups B and D in 1957. Hence, six farms were chosen for preparation of standard farm plans and budgets and numbered as follows:

<u>Farm No.</u>	<u>Soil Group</u>	<u>Acres of Open Land</u>
I	B	40.0-79.9
II	D	40.0-79.9
III	B	80.0-159.9
IV	D	80.0-159.9
V	B	160.0-319.9
VI	D	160.0-319.9

B. SELECTION OF SYSTEMS FOR STANDARD PLANS

Most of the farmers in this area grow some dark and burley tobacco, if for no other reason than to maintain their allotments. These crops are generally considered to be high return crops on most of the farms, and it is generally considered advisable to have one or two cash crops in the farming program.

This area of the state has many livestock farms. Beef cattle, dairy, sheep, and hogs are included in the farming systems. Rotated pastures are usually advisable for sheep as an assist in disease control. The cow-calf plan is in more common use on the beef farms. Only a few hens are kept on most of these farms, mainly for home use.

It was decided to prepare standard plans for three alternative systems for each farm, as follows: 1. tobacco and dairy; 2. tobacco, beef cattle and sheep; 3. tobacco and hogs. For the hog program in Soil Group B, which is adapted to the production of considerable corn, the production of market hogs averaging 225 pounds was considered. Farms in Soil Group D are not so well adapted to the growing of

corn, so the hog program was based on the production of pigs for sale at weaning time. In developing the plans it was found that if the production of weanling pigs was limited to the land adaptable to growing corn there remained a surplus of pasture land. Hence, a beef cow-calf enterprise was included on these farms.

C. FORMULATION OF THE PLANS

Basic to all planning is an inventory of the resources available. It was assumed that buildings, fences and equipment were adequate for the systems of farming outlined above, with the following exceptions: a milking parlor, silo, bulk tank, milking machine and other dairy equipment were needed for the dairy system; and woven wire fencing was needed for the sheep and hog pastures in the other systems. The field chopper and combine were not needed for the hog-farming system. Corn and small grain machinery were not needed on the beef and sheep farms. The little corn needed for the sheep was included as purchased feed. It was assumed that sufficient capital was available for financing the cropping system and a livestock system large enough to utilize approximately all grain and roughage that could be produced on the farm. It was assumed that labor requirements above the family supply could be hired.

The following tobacco allotments were assumed for each farm:¹

	<u>Dark-fired tobacco</u>	<u>Burley tobacco</u>
Small farms	1.5 acres	.1 acre
Medium size farms	2.5 acres	.2 acres
Large farms	6.0 acres	.6 acres

The acres and per cent of open land in the various soil groups for each farm selected for preparation of plans is presented in Table V.

¹Hereafter the representative farms for the 3 farm-size groups were designated as follows: 40.0-79.9 acres open land, small farms; 80.0-159.9 acres, medium size farms, and 160.0-319.9 acres, large farms.

TABLE V

ACRES AND PERCENTAGES OF OPEN LAND IN SOIL GROUPS
FOR EACH OF THE FARMS SELECTED FOR
PREPARATION OF STANDARD PLANS

Farm No.	Total Open Land	Soil Groups			
		A	B	C	D
Acres					
I	55.7	14.8	32.9	2.3	5.7
II	57.0	2.4	11.1	14.5	41.9
III	104.4	20.6	41.2	7.4	35.2
IV	117.8	9.9	24.8	13.6	69.5
V	268.7	38.8	118.8	51.3	59.8
VI	317.4	47.7	38.2	59.0	173.6
Percentages					
I	100.0	26.6	59.1	4.1	10.2
II	100.0	4.2	19.5	25.4	50.9
III	100.0	19.7	39.5	7.1	33.7
IV	100.0	8.4	21.1	11.5	59.0
V	100.0	14.5	44.2	19.1	22.2
VI	100.0	14.7	12.0	18.6	54.7

In addition to the above resources, information about the operator and other family labor that were available for the year 1957 for the 6 farms selected are presented in Table VI.

TABLE VI

INFORMATION CONCERNING THE OPERATOR AND
OTHER LABOR USED ON THE 6 SELECTED
FARMS FOR THE YEAR 1957

Farm No.	Age	Yrs. of Schooling	Man-Equivalents of Labor Used on the Farm				Months Work Off Farm	Work Units
			Operator	Other Family	Hired	Total		
I	54	12	.75	.25	.10	1.10	0	260
II	49	4	.84	.08	.05	.97	0	240
III	43	12	.84	.30	0	1.14	1	244
IV	47	8	.87	0	.64	1.51	0	531
V	40	12	.95	.42	.97	2.34	0	772
VI	39	8	.96	0	0	.96	0	281

In addition to the inventory of resources considerable information was needed pertaining to input requirements for the various crops and livestock to be produced, and expected crop yields for each soil group and expected outputs for each kind of livestock. Also, it was necessary to estimate expected prices. These data for this study are presented in Appendices D to J. The data represent estimates based on careful study of available published and unpublished results of research at the Tennessee Agricultural Experiment Station and based on consultation with specialists at the experiment station.

In formulating the standard plans certain principals, such as giving the most productive uses first choice of the highest yielding soils to which they are adapted, and balancing concentrate, pasture and other roughage needs to the livestock requirements, were followed. Plans then would show optimum earnings could undoubtedly be more precisely determined by using the tool, linear programming, but access to large computing machines were not available.

In accordance with the above principles, corn silage had first choice to Soil Group A on the dairy farms. Corn for grain on these farms had second choice to Soil Group A, and on all other farms corn had first choice to this soil and if necessary, first choice to Soil Group B. On the dairy farms wheat and oats had second choice to Soil Group B, with

the remainder of these crops, if necessary being grown on Soil Group C. All of the remainder of the open land was used for pasture herbage such as orchard grass or fescue, ladino clover and lespedeza, with oats over-seeded with a renovator in the fall. Farmers in the sample that have used this over-seeding practice estimated that it increased production during the spring months of the next year by about 20 per cent.

There is, as a rule, a considerable surplus of pasture growth during the spring months, beyond the carrying capacity during the remainder of the pasture season. A conservative estimate of the hay (or grass silage) that could be harvested from this excess spring growth was included in the plans. In all of the plans this hay was sufficient to cover the needs for hay. Hence no land was planned solely for the production of hay.

D. THE PLANS AND BUDGETS

The plans and budgets for the six representative farms are presented in Tables VII to XII, inclusive.

The operator's earnings,² as computed, is not exactly according to the usual definition for this term. But the difference is only minor. The rental value of the dwelling is not included in the income. However, the value of the operator's dwelling is excluded from total investment.

²See Appendix K.

Hence, an interest charge on the value of the dwelling is not included with the expenses. Milk used in the home and animals butchered are not shown as perquisites, but are included in the receipts along with other sales. Garden produce, eggs and chickens used in the home are not included in income. Neither are the farm shares of use of telephone, automobile, electricity, newspapers, and farm organization dues included in the expenses.

Size of farm constitutes the most important factor affecting the capital investment and the earnings. The system of farming also had considerable effect, with earnings showing highest for Grade A dairy, second highest for the hog system, and lowest for beef and sheep system. On account of some variation in the size of farms within each farm-size group, between Soil Groups B and D it is not clear from the results in Tables VII to XII as to the effects of the soil patterns. When plotted on a scale for acres of open land, as in Figure 1, it is apparent that earnings are higher for Soil Group B for comparable farming systems. This would have been more evident if the tobacco allotments had been varied exactly in proportion to the acres of open land respectively.

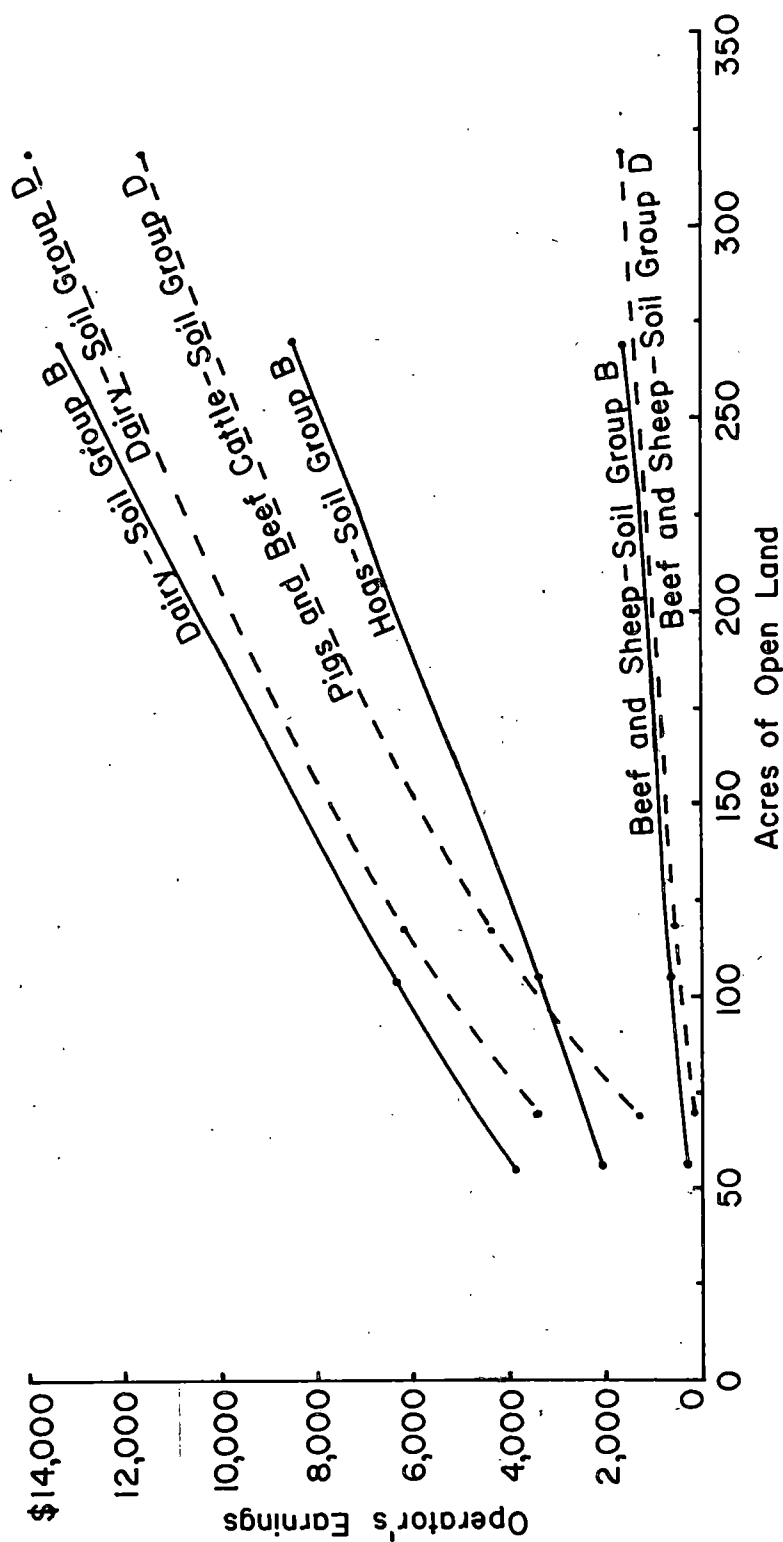


FIGURE 1

OPERATOR'S EARNINGS FOR STANDARD PLANS FOR SIX SELECTED FARMS,
 DARK-FIRED TOBACCO AREA OF TENNESSEE, BY ACRES OF OPEN
 LAND, SOIL PATTERN, AND SYSTEM OF FARMING
 (LINES DRAWN FREEHAND)

TABLE VII

PLANNED ORGANIZATIONS AND INVESTMENTS, BEEF AND SHEEP SYSTEMS,
BY SOIL GROUP AND SIZE OF FARM

	Soil Group B			Soil Group B		
	Small Acres	Medium Acres	Large Acres	Small Acres	Medium Acres	Large Acres
Dark Tobacco	1.5	2.5	6.0	1.5	2.5	6.0
Burley Tobacco	.1	.2	.6	.1	.2	.6
Pasture	54.1	101.7	262.1	68.3	115.1	311.9
Total Open Land	55.7	104.4	268.7	69.9	117.8	318.5
	Number	Number	Number	Number	Number	Number
Beef Cows	15	25	65	14	25	70
Ewes	45	75	195	42	75	210
Total Work Units	173	301	764	183	314	831
Investment						
Farm	\$10304.50	\$19314.00	\$49709.50	\$9436.50	\$15903.00	\$42997.50
Buildings and Fences	(3676.00)	(6264.00)	(14510.00)	(4613.00)	(7068.00)	(17199.00)
Machinery	8475.00	10975.00	13475.00	8475.00	10975.00	13475.00
Livestock	4350.00	7250.00	18850.00	4060.00	7250.00	20300.00
Total	\$23129.50	\$37539.00	\$82034.50	\$21971.50	\$34128.00	\$76772.50

TABLE VIII

PLANNED INCOME, EXPENSES AND EARNINGS, BEEF AND SHEEP SYSTEMS,
BY SOIL GROUPS AND SIZE OF FARM

	Soil Group B		
	Small Acres	Medium Acres	Large Acres
<u>Income</u>			
Dark Tobacco	2625#	4375#	10500#
Burley Tobacco	190#	380#	1140
Calves	12	19	49
Cull Cows	2	4	10
Lambs	44	73	190
Cull Ewes	6	10	25
	\$1102.50	\$1837.50	\$4410.00
	114.00	228.00	684.00
	1260.00	1995.00	5145.00
	300.00	600.00	1500.00
	864.16	1433.72	3731.60
	48.00	80.00	200.00
	<u>\$3688.66</u>	<u>\$6174.22</u>	<u>\$15670.60</u>
<u>Expenses</u>			
Beef Cows	62.25	103.75	269.75
Sheep	316.35	527.25	1370.85
Hired Labor	164.00	786.00	4820.50
Bldgs. Depr. & Repairs	294.08	501.12	1160.80
Mach. " "	1271.25	1646.25	2021.25
Interest on Invest.	1156.47	1876.95	4101.72
Taxes	83.00	166.00	333.00
	<u>\$3347.40</u>	<u>\$5607.32</u>	<u>\$14077.87</u>
Operator's Earnings	<u>\$ 341.26</u>	<u>\$ 566.90</u>	<u>\$ 1592.73</u>

TABLE VIII (CONTINUED)

PLANNED INCOME, EXPENSES AND EARNINGS, BEEF AND SHEEP SYSTEMS,
BY SOIL GROUPS AND SIZE OF FARM

	Soil Group D			Large Acres
	Small Acres	Medium Acres		
<u>Income</u>				
Dark Tobacco	2625#	4375#	10500#	\$ 4410.00
Burley Tobacco	190#	380#	1140#	684.00
Calves	11	19	52	5460.00
Cull Cows	2	4	11	1650.00
Lambs	41	73	205	4026.20
Cull Ewes	5	10	26	208.00
				<u>\$16438.00</u>
<u>Expenses</u>				
Beef Cows				290.50
Sheep				1476.30
Hired Labor				5468.00
Bldgs. Depr. & Repairs				1375.92
Mach. " "				2021.25
Interest on Invest.				3838.62
Taxes				253.00
				<u>\$14723.59</u>
Operator's Earnings				<u>\$ 1714.41</u>

TABLE IX

PLANNED ORGANIZATIONS AND INVESTMENTS, HOG, AND PIG AND BEEF CATTLE SYSTEMS,
BY SOIL GROUP AND SIZE OF FARM

	Market Hogs			Pigs and Beef Cattle		
	Soil Group B			Soil Group D		
	Small Acres	Medium Acres	Large Acres	Small Acres	Medium Acres	Large Acres
Dark Tobacco	1.5	2.5	6.0	1.5	2.5	6.0
Burley Tobacco	.1	.2	.6	.1	.2	.6
Corn	29.8	50.6	134.4	11.9	32.0	79.3
Pasture	24.3	51.1	127.7	56.4	83.1	232.6
Total Open Land	55.7	104.4	268.7	69.9	117.8	318.5
	Number	Number	Number	Number	Number	Number
Sows (2 litters)	9	15	40	17	46	115
Beef Cows	-	-	-	13	15	46
Total Work Units	168	287	738	178	324	840
Investment						
Farm	\$11098.23	\$20619.00	\$52598.02	\$10432.58	\$17375.50	\$46421.38
Buildings and Fences	(4442.08)	(7569.00)	(17532.68)	(5574.52)	(8540.50)	(20782.12)
Machinery	7375.00	9875.00	12375.00	10350.00	12850.00	15350.00
Livestock	450.00	750.00	2000.00	3450.00	5300.00	14950.00
Total	\$18923.23	\$31244.00	\$66973.02	\$24232.58	\$35525.50	\$76721.38

TABLE X

PLANNED INCOME, EXPENSES AND EARNINGS, HOG, AND PIG AND BEEF CATTLE SYSTEMS,
BY SOIL GROUP AND SIZE OF FARM

	Market Hogs			Soil Group B			Large		
	Small			Medium			Acres		
	Acres			Acres					
Income									
Dark Tobacco	2625#	\$1102.50	4375#	\$1837.50	10500#	\$4410.00			
Burley Tobacco	114	114.00	380#	228.00	1140#	684.00			
Hogs	135	4556.25	225	7593.75	600	20250.00			
Old Sows	9	432.00	15	720.00	40	1920.00			
		<u>\$6204.75</u>		<u>\$10379.25</u>		<u>\$27264.00</u>			
Expenses									
Hogs		\$1674.00		\$2790.00		\$7440.00			
Hired Labor		--		375.00		4378.00			
Bldgs., Depr. and Repairs		355.25		605.52		1402.61			
Mach., "		1106.25		1481.25		1856.25			
Interest on Investment		946.16		1562.20		3348.65			
Taxes		83.00		166.00		333.00			
		<u>\$4164.77</u>		<u>\$6997.97</u>		<u>\$18758.51</u>			
Operator's Earnings		\$2039.98		\$3399.28		\$8505.49			

TABLE X. (CONTINUED)

PLANNED INCOME, EXPENSES AND EARNINGS, HOG, AND PIG AND BEEF CATTLE SYSTEMS,
BY SOIL GROUP AND SIZE OF FARM

	Pigs and Beef Cattle			Large Acres
	Small Acres	Medium Acres	Large Acres	
Income				
Dark Tobacco	2625#	4375#	10500#	\$ 4410.00
Burley Tobacco	114#	380#	1140#	684.00
Pigs	255	690	1725	13800.00
Old Sows	17	46	115	5520.00
Calves	10	12	33	3465.00
Cull Cows	2	2	8	1200.00
	\$1102.50	\$ 1837.50		\$29079.00
	114.00	228.00		
	2040.00	5520.00		
	816.00	2208.00		
	1050.00	1260.00		
	300.00	300.00		
	\$5422.50	\$11353.50		
Expenses				
Hogs	\$ 786.25	\$ 2127.50		\$ 5318.75
Beef Cows	53.95	62.25		190.90
Hired Labor	--	376.00		4194.00
Bldgs., Depr. and Repairs	445.96	683.24		1662.57
Mach., "	1552.50	1927.50		2302.50
Interest on Investment	1211.63	1776.28		3836.07
Taxes	64.00	127.00		253.00
	\$4114.29	\$ 7079.97		\$17507.32
Operator's Earnings	\$1308.21	\$ 4273.73		\$11571.68

TABLE XI

PLANNED ORGANIZATIONS AND INVESTMENTS, DAIRY FARMS,
BY SOIL GROUP AND SIZE OF FARM

	Soil Group B			Soil Group D		
	Small Acres	Medium Acres	Large Acres	Small Acres	Medium Acres	Large Acres
Dark Tobacco	1.5	2.5	6.0	1.5	2.5	6.0
Burley Tobacco	.1	.2	.6	.1	.2	.6
Corn	4.8	8.1	22.7	3.4	8.1	23.4
Corn Silage	8.4	14.0	37.3	8.5	14.6	39.2
Wheat	6.3	10.5	15.0	9.0	11.1	15.0
Oats	--	--	13.0	--	--	16.5
Pasture	34.6	69.1	174.1	47.4	81.3	217.8
Total Open Land	55.7	104.4	268.7	69.9	117.8	318.5
	Number	Number	Number	Number	Number	Number
Milk Cows	18	30	80	17	30	85
Total Work Units	255	437	1134	262	451	1221
Investment						
Farm	\$12477.00	\$22968.00	\$58039.20	\$12162.60	\$20026.00	\$52871.00
Buildings and Fences	(5820.65)	(9918.00)	(22973.85)	(7304.55)	(11191.00)	(27231.75)
Machinery	12550.00	15050.00	18050.00	12550.00	15050.00	18050.00
Livestock	5400.00	7500.00	20000.00	4250.00	7500.00	21000.00
Total	\$30427.65	\$45518.00	\$96089.20	\$26962.60	\$42576.00	\$91921.00

TABLE XII

PLANNED INCOME, EXPENSES AND EARNINGS, DAIRY FARMS,
BY SOIL GROUPS AND SIZE OF FARM

	Soil Group B		
	Small Acres	Medium Acres	Large Acres
<u>Income</u>			
Dark Tobacco	2625#	4375#	10500#
Burley Tobacco	114	380#	1140
Milk	1485cwt.	2475cwt.	6600cwt.
Veal Calves	4/5		
Cull Cows	1/5		
	\$1102.50	\$ 1837.50	\$ 4410.00
	114.00	228.00	684.00
	7053.84	11756.40	31350.40
	432.00	720.00	1920.00
	432.00	720.00	1920.00
	<u>\$9134.34</u>	<u>\$15261.90</u>	<u>\$40284.40</u>
<u>Expenses</u>			
Cows & Replacements			
Hired Labor	\$1078.75	\$ 1797.90	\$ 4794.40
Bldgs., Depr. and Repairs	245.50	1720.44	12506.25
Mach., "	465.68	793.44	1837.92
Interest on Investment	1882.50	2257.50	2707.50
Taxes	1521.38	2275.90	4804.46
	83.00	166.00	333.00
	<u>\$5276.81</u>	<u>\$ 9011.18</u>	<u>\$26983.00</u>
Operator's Earnings	<u>\$3857.53</u>	<u>\$ 6250.72</u>	<u>\$13300.87</u>

TABLE XII (CONTINUED)

PLANNED INCOME, EXPENSES AND EARNINGS, DAIRY FARMS,
BY SOIL GROUPS AND SIZE OF FARM

	Soil Group D		
	Small Acres	Medium Acres	Large Acres
<u>Income</u>			
Dark Tobacco	2625#	4375#	10500#
Burley Tobacco	114#	380#	1140#
Milk	1402.5cwt.	2475cwt.	7012.5cwt.
Veal Calves	4/5		
Cull Cows	1/5		
	\$1102.50	\$ 1837.50	\$ 4410.00
	114.00	228.00	684.00
	6661.96	11756.40	33309.80
	408.00	720.00	2040.00
	408.00	720.00	2040.00
	\$8694.46	\$15261.90	\$42483.80
<u>Expenses</u>			
Cows & Replacements	\$1018.81	\$ 1797.90	\$ 5094.05
Hired Labor	329.30	1891.68	13817.10
Bldgs., Depr. and Repairs	584.40	895.28	2178.56
Mach., "	1882.50	2257.50	2707.50
Interest on Investment	1448.13	2128.80	4596.05
Taxes	64.00	127.00	253.00
	\$5327.14	\$ 9098.16	\$28646.26
Operator's Earnings	\$3367.32	\$ 6163.74	\$13837.54

E. COMPARISONS WITH AVERAGES FOR THE GROUPS REPRESENTED
BY THE SIX FARMS AND WITH THE SYSTEMS
ON THE SIX FARMS IN 1957

In selecting the representative farms for each group first consideration was given to the percentage of open land in the Soil Group that was given greatest emphasis in the Soil Patterns for each Farm Group, respectively. By comparing data in Tables V and VI with Tables XIII and XIV it can be ascertained that these respective percentages for the representative farms varied only moderately from the averages for the Groups represented. But in a few cases some of the other data, such as total acres of open land, work units, years of schooling, and amount of other family labor varied more than 30 per cent from the averages for these items, respectively. Work units for the non-dairy systems of the standard plans were a little less than the average work units for the respective groups of actual farms. The latter averages included some dairy farms, and some of the farmers purchased concentrates and roughages. This practice was excluded from the standard plans.

TABLE XIII

AVERAGE PERCENTAGES OF OPEN LAND IN DIFFERENT SOIL GROUPS
FOR EACH FARM GROUP REPRESENTED
BY SIX PLANNED FARMS

Farm Group Represented by Farms Listed Below	No. of Farms in Sample	Average Acres of Open Land	Soil Groups				
			A	B	C	D	Total
I	5	50.4	25.2	48.0	10.6	16.2	100.0
II	7	58.9	18.2	8.9	17.1	55.8	100.0
III	9	125.3	23.3	39.6	12.0	25.1	100.0
IV	13	117.8	14.2	10.1	8.9	66.8	100.0
V	9	249.3	20.2	44.7	24.0	11.1	100.0
VI	9	237.0	15.0	10.0	17.5	57.5	100.0

TABLE XIV

AVERAGES FOR CERTAIN DATA CONCERNING THE OPERATOR AND OTHER LABOR
FOR EACH FARM GROUP REPRESENTED BY SIX PLANNED FARMS

Farm Group Represented by Farms Listed Below	Age	Years of School- ing	Man-Equivalents of Labor Used on the Farm				Months Work	
			Oper- ator	Other Family	Hired	Total	Off Farm	Work Units
I	50.5	8.6	.7	.1	.4	1.2	.8	312
II	42.9	7.6	.9	.2	.1	1.2	0	265
III	44.8	9.7	.9	.2	.8	1.9	.2	910
IV	43.3	8.3	.9	.0	.5	1.4	.5	363
V	36.1	10.4	1.0	.5	.9	2.4	.5	814
VI	44.7	10.5	.9	.5	.7	2.1	.4	582

Not only was it impossible to find representative farms that were close to the Group averages in all respects, but the extent of the dispersions of the farms within each Farm Group from its respective averages is of concern in the use of standard plans to aid in farm planning within these groups. For example, the percentage of open land in Soil Group D varied among 13 farms in one Farm Group from 50 to 97 per cent. Three of the 13 farms fell outside one standard deviation, plus or minus, from the mean of this percentage in this Farm Group. Hence 77 per cent of the farms in this Farm Group fell within this range of 2 standard deviations. But in another case only 55 per cent fell within 2 standard deviations of the mean.

Computations of per cent of farms falling within 2 standard deviations of the mean were made in regard to the six groups for each of four items, viz: per cent of open land in major group, work units, age of operator, and schooling of operator.³ In respect to age none of the groups had less than 63 per cent of its farms within 2 standard deviations of the mean. But in regard to schooling and to

³These computations were not made for acres of open land because these acres cannot be expected to even approach a normal curve. These farm groups represent segments of a skewed distribution of a very wide range of open land in the four counties, as shown in Figure 2.

per cent of land in its respective major group, half of the groups had 60 per cent or less of the farms in the respective groups within 2 standard deviations of the mean. The remainder of these groups had from 67 to 100 per cent of their farms within the range of 2 standard deviations from the mean.

In regard to work units in 1957, which is an indication of use rather than availability of the resources, none of the groups had over 60 per cent of their respective farms within a standard deviation of the mean. Undoubtedly work units have as wide a dispersion as acres of open land within these groups.

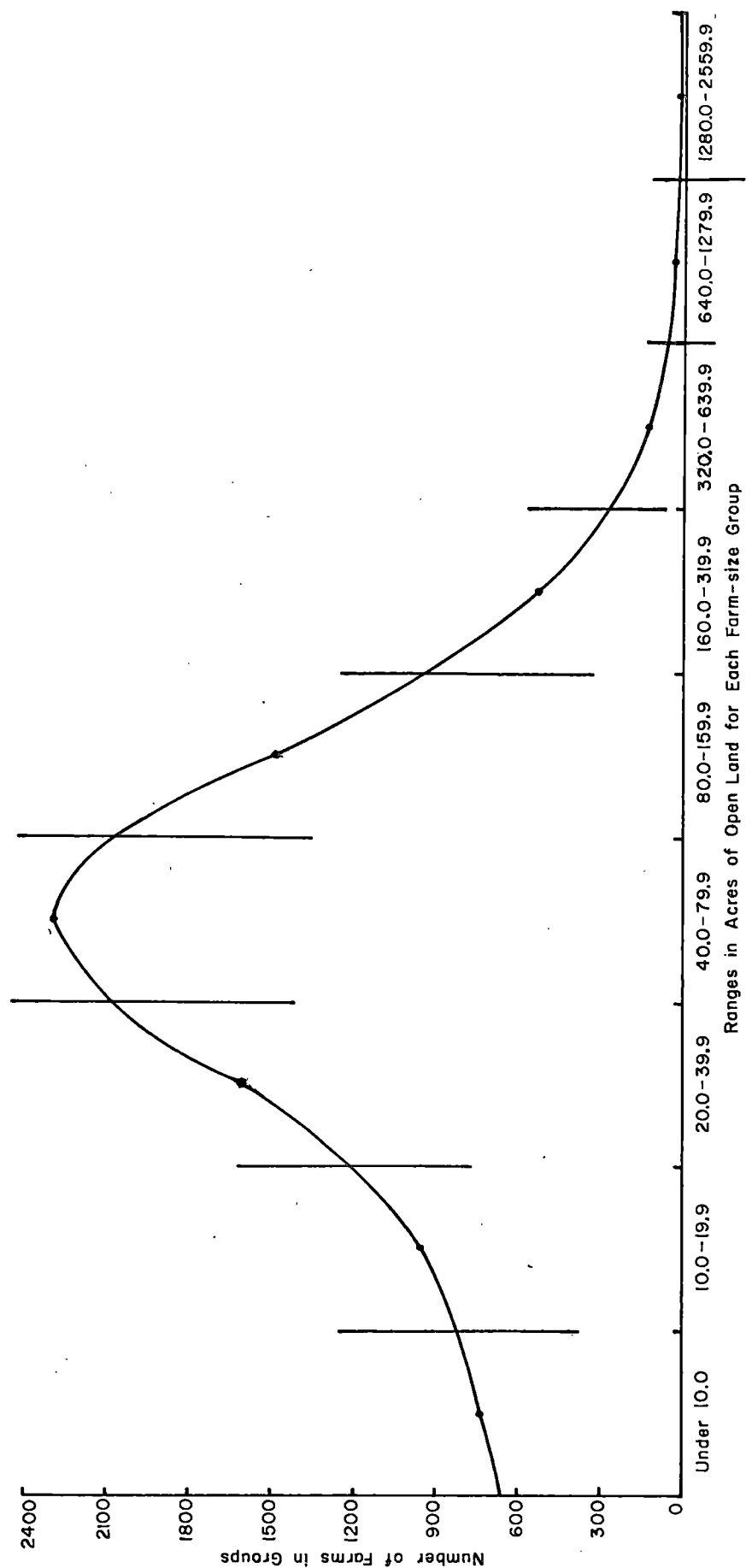


FIGURE 2
 NUMBER OF FARMS BY ACRES OF OPEN LAND IN
 DARK-FIRED TOBACCO AREA OF TENNESSEE

CHAPTER IV

SUMMARY AND CONCLUSIONS

A. REVIEW OF OBJECTIVES AND PROCEDURES USED

The main objective of this study was to provide standard plans that could serve as general guides to certain farmers in an area in planning their farms, and to test the extent to which they can be used by these farmers. The area used for this study was the dark-fired tobacco section of Tennessee, comprising four counties located on the Western and Northern parts of the Highland Rim.

For the purpose of this study a sample of 305 farms for which soil maps were made available was used. The sample was classified into 9 groups based on the acres considered feasible for open land uses. The 9 groups of farms in the sample were again classified into sub-groups on the basis of soil patterns (soil groups A, B, C, and D) and number of adult equivalents of family labor used (.70 and more and less than .70 man-equivalents of family labor). Those with over .69 adult equivalents of family labor were largely full-time farmers. The group with the low number of adult-equivalents (less than .70) of family labor used was subdivided into two groups, one that was low because of elderly operators who had no other family help and the other than was low because the

operator did considerable work off the farm and had little family help.

The "t" test for significance showed that there was a significant difference between Soil Group B and Soil Group D. For this reason it was quite certain that income and expense would be different for these two groups. Consequently they were chosen for the special study of standard plans. The full-time farmers tend to have more stability in their operations than the elderly and part-time operators. Hence, the special study was limited to the full-time farmers. Moreover, nearly 80 per cent of the farms of these soil groups with more than .70 man-equivalents of family labor were between 40.0 and 319.9 acres of open land.

For the above reasons, six farms, one representing each of the two soil groups, B and D, and size groups (40 to 79.9, 80 to 159.9, and 160 to 319.9), were selected for developing standard plans.

B. APPRAISAL OF RESULTS OF ANALYSIS FOR SIX CLASSIFIED GROUPS

For each farm selected three alternative plans, viz.

1. Tobacco and Grade A Dairy, 2. Tobacco, Beef Cattle and Sheep, 3. Tobacco and Hogs on Soil Group B and Tobacco, Weanling Pigs and Beef Cattle on Soil Group D, were developed, and these plans were presented in Tables VII to XII. Results showed that size of farm and system of farming were the two most important factors affecting capital investments and

earnings. Operator's earnings were highest for the Grade A Dairy and lowest for the beef and sheep system. When these earnings were plotted on the scale (Fig. 1) for different farm-size groups the results showed that earnings were higher for Soil Group B than for Soil Group D for the "Tobacco and Grade A Dairy" and the "Tobacco, Beef and Sheep Systems". The earnings were higher for Soil Group D with the "Tobacco Weanling Pig and Beef Cattle" system than for the Soil Group B with the "Tobacco and Market Hog" system. However, it was not possible to judge the effect of soil on the results for these two systems because they were not exactly comparable systems.

One of the objectives in preparing standard plans for representative farms was to test the hypothesis that these standard plans could serve as useful guides in preparing plans for other farms in the groups. There were several difficulties encountered in deciding on representative farms, as there was not a single farm in the selected group that represented the exact mean for all of the characteristics considered, there was a wide range and dispersion of the farms with regard to major characteristics, and there was no modal tendency within any group. If a farm had been picked that hypothetically represented the average of the group for all characteristics chosen for the study, it would have been quite artificial. But, regardless of how the typical farm was set up, there would have been a wide dis-

portion of the other farms in the group from this typical farm. Some of them were as much as one-third larger than the representative farm for that group, respectively. On these larger farms within a group it is possible that there would not be sufficient labor or capital available for a system which was found to be optimum for the "so called" typical farm.

C. PROBABLE APPLICATION TO OTHER CLASSIFIED GROUPS

The standard plan method may be even less usable for most of the other classified groups than indicated above for the 6 groups studied. In Soil Group B there were farms within the group with a wide range of 1280 to 2259.9 acres of open land, and in the other Soil Groups there were farms in the farm-size group with a range of 640 to 1279.9 acres of open land. Also, nearly in all of the farm-size groups above 639 acres of open land there were too few farms in the sample, and in reality, in the whole area for classification into 4 sub-groups on the basis of soil patterns and 3 sub-groups on the basis of family labor resources. There were only 3 farms in the 4 counties in the largest farm-size group, and only 24 in the second largest farm-size group. In the farm-size group with 320.0 to 639.9 acres of open land there were only 3 sub-groups in the sample that contained at least 2 farms. In the whole area there were 49 groups other than the 6 groups studied (with less than 320.0

acres of open land) that had a sufficient number of farms to permit selection of a representative farm, but only half of these groups in the sample had sufficient farms for this method to be used. In each of eight of these groups there was only one farm in the sample.

D. GENERAL APPRAISAL AND RECOMMENDATIONS IN REGARD
TO USE OF STANDARD PLANS

It was hypothesized in Chapter I that standard plans for so-called typical farms can be used as guides to planning the farms in an area. It has been shown in this study that for one large area in Tennessee the hypothesis is on rather shaky ground because of the necessity of classifying the farms into many groups and sub-groups to obtain anything approaching homogeneity within a sub-group, and because even then there was either wide dispersion within the sub-group or only one or two farms in the sample sub-group.

In a few sub-groups ranging from 40.0 to 319.9 acres of open land there was some indication that certain systems of farming were more profitable over the entire range in size. In this case a regression line was established, as shown in Figure 1, and the farming system can be interpolated to fit points along this line. It would still be necessary for the planner to test the fitness of this interpolated plan to the exact resources and capital available on any particular farm. The standard plans or "interpolated" standard

plans could conceivably save some time by serving as bench marks to start from in planning a particular farm. It would take less time to make adjustments in these plans to fit the particular resources and situations on each farm than to prepare a considerable number of complete alternative plans for every farm. To the extent that time is saved by the use of standard plans in this manner the hypothesis set up in Chapter I is valid.

The above conclusions apply specifically to the use of the standard plans in the dark-fired tobacco area of Tennessee. Data in the United States Census in 1954 indicated that the range and dispersion in size of farms in all parts of the United States was similar to that in the area studied in Tennessee. However, the distribution of farms to the various farm-size groups varied among areas of the country. In some sections of the country such as the level prairie regions and the Mississippi Delta there would probably be a need for fewer soil-pattern groups than in most of Tennessee. It may also be unnecessary to have separate part-time and elderly-farmer groups in some areas of the country. However, in some of these areas there would be a need for groups to represent different forms of farm-lease tenure groups, father-son partnerships, and possibly families with several sons available for help. So, undoubtedly, in most regions, a large number of classified groups would be needed as a basis for using the standard plan method. Hence,

the difficulties encountered in using the method in the area studied would apply to most sections of the United States.

As to some other country in the world the author of this thesis can relate the above problems, arising out of the use of standard farm plans, to his home country, India. The average size of farms is much smaller in India than in the United States. However, a wide range and dispersion in size is prevalent there as it is in the United States. Soil maps are not available, but from general observation farms in most areas could be classified into several broad soil groups. It is in regard to labor resources that India differs considerably from the situation on farms in the United States. There is an abundance of labor available on most farms. However, on account of the lack of mechanization and the intensive labor practices used, labor is hired on the larger farms. Hence, in order to use standard plans the extension workers would need to make some classification on the basis of number of family workers available. The expenses for hired labor would be different in the budgets for the standard plans for these various groups. Also, because the amount of capital and credit available varies among farmers some operators would not be able to carry out the operations called for by the standard plans prepared for "so-called" typical farms. Hence it appears that the conclusions outlined in regard to the validity of the hypothesis set up in this thesis apply about the same to India as to the area studied in Tennessee.

In fact, the extent to which the technique of using standard plans is usable in any area in the world is highly dependent on the variability in resource characteristics in these areas.

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APPENDICES

APPENDIX A

APPENDIX A

The following material consists of excerpts from Tennessee Experiment Station Bulletin 311, Types of Farming in Tennessee, by J. A. Martin and B. H. Luebke, 1960.

Physiographic Divisions of Tennessee

The state has eight major physiographic divisions, based on geologic and geographic differences. Reading from west, these are: 1) Mississippi Bottoms, 2) Plateau Slope of West Tennessee, 3) Western Valley of Tennessee River, 4) Highland Rim, 5) Central Basin, 6) Cumberland Plateau, 7) Valley of East Tennessee, and 8) Unaka Range.

The Highland Rim region encircles the central basin and extends to the Cumberland Plateau in the east, and beyond the Kentucky border on the north and the Alabama border on the south.

Limestone underlies the Highland Rim. Some parts of the Rim are dissected, hilly and rough, while other parts are level to undulating.

Type of Farming Areas

The 1954 census recognized 10 types of commercial farms in Tennessee: namely cotton, cash grain, vegetables, other field crops (primarily tobacco), fruit and nut, dairy, poultry, livestock other than dairy and poultry. A farm was classified as given type if 50 per cent or more of the value

of all products sold in 1954 were from the source identified by the type name. Farms were classified as general where the value of products from any one source or a closely allied group of sources did not represent as much as 50 per cent of all products sold. For a farm to be classified in any one of the commercial types, it was necessary that total cash sales from the farm in 1954 be above 250 dollars. An exception was made if the operator worked off the farm 100 days or more during the year.

The localization of farms of a certain type or combination of types give rise to type of farming areas. Specialization in the production of one or combination of enterprises in one area determines the type of farming area. Usually more than one type of farming is practiced in one area. Twelve major types of farming areas were identified in the state.

Area 6. (residential, livestock, cash grain and tobacco)--The topography of the western Highland Rim is rolling to rough. The area is made up of the Dickson-Mountview-Bodine soils Association (No. 11). Soils are generally shallow, cherty and low in natural fertility.

The growing season varies from 185 to 190 days and precipitation is around 50 inches.

About 30 per cent of farms were of livestock type, other than dairy and poultry. Cash grain and tobacco farms were the remaining important types found in the area.

Area 7. (tobacco, residential, part-time, general livestock)--It is located on the northern Highland Rim. The topography ranges from almost level to hilly. Soils of the area are largely in the Bewleyville-Baxter-Crider and the Dickson-Mountview-Bodine Associations.

The growing season is about 198 days and precipitation ranged from 46 to 48 inches.

The Nashville market was readily accessible to most of the area. Tobacco markets in the area were Clarksville, Springfield and Gallatin.

Tobacco was the major crop. It occupied about 8 per cent of the cropland harvested and it provided over half of the cash farm income.

Sub-area 7 a. Small grain and dark tobacco were more predominant than in sub-areas 7 b and 7 c. Sub-area 7 a is located principally in Montgomery and Robertson Counties. Soils are of fairly high quality. It had the greatest concentration of tobacco in the state. Most of the tobacco was Eastern dark fire-cured (type 22) with considerable burley (type 31). There was also some dark, air cured, and sucker tobacco (type 35) along the northern border.

In 1954, 10 per cent of the cropland harvested was in tobacco. About two-thirds of the farms were crop speciality (tobacco) farms. The cash income from tobacco was about 60 per cent.

APPENDIX B

APPENDIX B

FACTOR RATES USED FOR DISCOUNTING FARM WORK DONE BY CHILDREN, WOMEN, AND OLDER MEN

AVERAGE MAN-EQUIVALENT OF MALE FARM LABOR^a

Age	Man-Equivalent	Age	Man-Equivalent
10	.09		
11	.14		
12	.19		
13	.24	53	.78
14	.33	54	.75
15	.41	55	.73
16	.49	56	.72
17	.70	57	.71
18	.90	58	.69
19	.90	59	.67
20	.95	60	.66
21	.98	61	.65
22-31	1.00	62	.62
32-37	.98	63	.60
38	.97	64	.57
39	.96	65	.56
40	.95	66	.53
41	.94	67	.52
42	.93	68	.49
43	.92	69	.47
44	.91	70	.45
45	.89	71	.42
46	.88	72	.41
47	.87	73	.38
48	.85	74	.36
49	.84	75	.33
50	.82	76	.30
51	.81	77	.26
52	.80	78	.20
		79	.13
		80	.07

^aAdapted from a thesis, "Labor Foundations of Wisconsin Family Farms," by E. J. Long, University of Wisconsin, 1948.

APPENDIX B (CONTINUED)

FACTOR RATES USED FOR DISCOUNTING FARM WORK DONE BY
CHILDREN, WOMEN, AND OLDER MENAVERAGE MAN-EQUIVALENT OF FARM FEMALES^b

Age	Man-Equivalent	Age	Man-Equivalent
12	.09	45	.37
14	.17	50	.28
16	.21	55	.24
18	.25	60	.18
20	.30	65	.13
30	.35	70	.12
40	.36	72	.10

^bSource: U.S.D.A. Technical Bulletin No. 1037,
September 1950: (Northeastern Nebraska, 292 cases).

APPENDIX C

APPENDIX C

EXPLANATION OF WORK UNITS

A work unit as used in this study is 10 hours of work performed by human labor on crop and livestock enterprises at average rates of performance.

RATES USED IN COMPUTATION OF WORK UNITS IN THIS STUDY

<u>Crop</u>	<u>Work Units Per Acre</u>
Dark Fired Tobacco	37.5
Burley Tobacco	45.0
Corn	2.0
Corn Silage	2.4
Wheat or Oats (Lespedeza)	1.5
Alfalfa Hay	2.0
Pasture	.07
Hay Off Pasture in Spring	.5
Silage Off Pasture in Spring	1.4

<u>Livestock</u>	<u>Unit</u>	<u>Work Units Per Unit</u>
Beef Cow (and Calf)	cow	1.3
Milk Cow	cow	7.0
Dairy Heifer	heifer	1.2
Ewe (and Lamb Raised)	ewe	.9
Brood Sow (2 litters of Pigs to Weaning Age)	sow	19.0
Market Hog (Weaning Age to 225 Lbs.)	hog	3.3
Brook Sow (2 litters of Pigs to Market Weight)	sow	72.0

APPENDIX D

APPENDIX D

PRICES USED IN PROPOSED BUDGETS

Item	Unit	Price
Corn	bu.	\$ 1.10
Oats	"	.65
Wheat	"	1.25
Dark Tobacco	lb.	.42
Burley Tobacco	"	.60
Cows, Dairy	head	2.50
Cows, Beef	"	2.00
Ewes	"	.30
Sows	"	.50
Milk, Grade A	cwt.	4.75
Cull Cows, Beef	head	150.00
Cull Cows, Dairy	"	120.00
Veal Calves	cwt.	20.00
Beef, Young Bulls	"	200.00
Beef Calves & Fed Cattle	"	21.00
Hogs	"	15.00
Packing Sows	"	12.00
Pigs (40 lb.)	"	20.00
Lambs	"	21.00
Sheep (Cull)	"	8.00
Wool	lb.	.60
Artif. Insem.	cow	7.00
Custom Baling	ton	6.00
Custom Combining	acre	6.00
Custom Corn Picking	"	6.00
Gasoline	gal.	.26
Kerosene	"	.19
Motor Oil	"	1.25
Grease	lb.	.22
Gas & Oil for Tractor	hr.	.40
Wood Fence Posts	each	.40
Woven Wire, 40"	rod	.80
4 Ft. Barb Wire	"	.12
Alfalfa Hay	ton	32.00
Other Hay	"	25.00

APPENDIX D (CONTINUED)

PRICES USED IN PROPOSED BUDGETS

Item	Unit	Price
<u>Seeds</u>		
Orchard Grass	lb.	\$.35
Ladino Clover	"	.65
Alfalfa	"	.45
Lespedeza	"	.15
Crimson Clover	"	.20
Rye Grass	"	.12
Fescue	"	.60
Oats	bu.	1.25
Wheat	"	2.00
Hybrid Corn	"	11.00
<u>Commercial Feed</u>		
Corn	bu.	1.32
Oats	"	.78
Wheat	"	1.50
C.S.M.	cwt.	3.75
Hog Supplement	"	5.00
Salt	"	1.50
Minerals	"	5.00
<u>Fertilizer & Lime</u>		
P2O5 (18% Phos.)	lb.	6.9¢
K2O (56% M of P)	"	4.7¢
N (33% Am. Nit.)	"	11.7¢
Boron	"	5.0¢
Limestone (Spread)	ton	\$5.00
Am. Nitrate	"	78.00
8-20-20 (w/borax)	"	64.00
3-12-12	"	40.00
5-15-10	"	58.00
6-12-12	"	48.00
<u>Hired Labor</u>	<u>Dairy Farms^a</u>	<u>Other Farms</u>
	<u>Unit</u>	<u>Unit</u>
Small Farms	hr.	hr.
Medium-size Farms	"	"
Large Farms	"	"
	Wage	Wage
	\$1.00	\$1.00
	1.20	1.00
	1.50	1.00

^aThe reason for raising the wages per hour with increase in size for the dairy farms is that farmers are having difficulty in obtaining and keeping hired help for milking and caring for cows twice a day every day of the year. Skilled labor is needed to help maintain high rates of production on dairy farms. High wages will have to be paid to meet the competition for good workmen.

APPENDIX E

APPENDIX E

ENTERPRISE BUDGETS FOR CROPS (PER ACRE BASIS)

(Excluding Depreciation, Repairs, and Interest on Equipment)

Dark-Fired Tobacco

Seed, Cover Crop	\$ 5.00
Plant Bed	13.00
Poison	9.00
Fertilizer, 6-12-12, 500 lbs., A. N., 100 lbs.	12.00 3.90
Haul Wood	10.00
Marketing	60.00
Labor, Tobacco and Cover Crop, 391.8 hrs.	293.85
Tractor, Gas and Oil, 55.7 hours	22.25
	<u>\$429.00</u>

Burley Tobacco

Seed, Cover Crop	\$ 5.00
Plant Bed	11.00
Poison	5.00
Fertilizer, 6-12-12, 1000 lbs., A. N., 100 lbs.	24.00 3.90
Marketing	60.00
Labor, Tobacco and Cover Crop, 452.4 hrs.	339.30
Tractor (Gas and Oil), 63.5 hours	25.40
	<u>\$473.60</u>

Corn

Seed, Cover Crop	\$ 5.00
Seed, Hybrid Corn .16 bu.	1.76
Fertilizer, 6-12-12, 400 lbs., A. N., 200 lbs.	9.60 7.80
Labor, 9.6 hours	7.20
Tractor (Gas and Oil), 9.6 hours	3.84
	<u>\$ 35.20</u>

Wheat or Oats (and Lespedeza Hay)

Wheat Seed, 125 bu. (or Oat Seed, 2 bu.)	\$ 2.50
Lespedeza Seed, 25 lb.	3.75
Fertilizer, 5-15-10, 300 lbs., A. N., 100 lbs.	8.70 3.90
Labor, 13.5 hours	10.13
Tractor (Gas and Oil), 13.5 hours	5.40
	<u>\$ 34.38</u>

APPENDIX E (CONTINUED)

ENTERPRISE BUDGETS FOR CROPS (PER ACRE BASIS)

(Excluding Depreciation, Repairs, and Interest on Equipment)

Corn Silage

Seed, Cover Crop	\$ 5.00
Seed, Hybrid Corn .20 bu.	2.20
Fertilizer, 6-12-12, 500 lbs.	12.00
A. N., 300 lbs.	11.70
Labor, 18.2 hours	13.65
Tractor, (Gas and Oil), 15 hours	6.00
	<u>\$ 50.55</u>

Alfalfa Hay (Establish 1/5 Acre Each Year)

Seed, 4 lbs.	\$ 1.80
Inoculant	.15
Fertilizer, Establish, 3-12-12, 200 lbs.	4.00
Fertilizer, Maintenance, 0-20-20, with Borax, 600 lbs.	19.00
Lime, Establish, .5 ton	2.50
Labor, Establish, 1.2 hours	.90
Labor, Maintenance and 4 Crops, 16.0 hours	12.00
Tractor, (Gas and Oil), Establish, 1.2 hours	.48
Tractor (Gas and Oil), Maintenance and 4 Crops, 16.0 hours	6.40
	<u>\$ 47.23</u>

Pasture (Establish 1/8 Acre Each Year)

(Fescue or Orchard Grass, Ladino Clover and Lespedeza)	
Seed, (15 lbs. Orchard Grass or 10 lbs. Fescue; Clover 2 lbs; Lesp. 20 lbs.	\$ 1.30
Seed, Sod Seeding with Oats in August, 1 bu.	.10
Inoculant	1.25
Fertilizer, Establish, 3-12-12, 125 lbs.	2.50
Fertilizer, Maintenance, 0-20-20, 300 lbs.	9.60
Lime, Establish, .3 ton	1.50
Labor, Establish, .8 hour	.60
Labor, Maintenance, 4 hours	3.00
Tractor, (Gas and Oil), Establish, .8 hour	.32
Tractor, (Gas and Oil), Maintenance, 4 hours	1.60
	<u>\$ 21.77</u>

Hay Off Pasture in Spring

Labor, 5 hours	\$ 3.75
Tractor (Gas and Oil), 5 hours	2.00
	<u>\$ 5.75</u>

Silage Off Pasture in Spring

Labor, 6.4 hours	\$ 4.80
Tractor (Gas and Oil), 4.2 hours	1.68
	<u>\$ 6.48</u>

APPENDIX F

APPENDIX F

ENTERPRISE BUDGETS FOR LIVESTOCK

(Excluding Depreciation, Repairs, and Interest
On Shelter and Equipment)

INPUTS EXPECTED

Beef Cow-Calf Herd (Per Brood Cow Basis, Assuming Over 25 Cows)

Requirements (Including Pro-Rate Share for Sire and Replacement Heifers)	
Pasture, 280 Animal Unit Days	
Hay, 3 tons	
Salt, 20 lbs., and Minerals, 12 lbs.	\$.90
Veterinary, Pesticides and Medicants	1.00
Pro-Rate Share of Depreciation on Sire	1.00
Hauling	1.25
Total, Excluding Pasture	<u>\$ 4.15</u>

Dairy Herd (Per Cow Basis, Assuming 20 or More Cows of Medium Weight, and an Average Production of 8500 lbs. of 4% B.F. Equivalent of Milk Per Cow)

Pasture, 180 Animal Unit Days	
Hay, 2 tons	
Silage, 6 tons	
<u>Suggested Concentrate Ration</u>	
Corn, 9.0 bu.	
Oats, 11.5 bu.	
Wheat, 8.0 bu.	
C.S.M., 400 lbs.	\$ 15.00
Salt, 20 lbs. & Minerals, 12 lbs.	.90
Veterinary, Pesticides & Medicants	2.00
Breeding fees (Artificial)	7.00
Supplies for Cleaning Utensils, A.D.A. etc.	2.00
Feed Gringing	1.50
Milk Hauling	25.00
Other Hauling	2.50
Labor, 73 hours	
	<u>\$ 55.90</u>

For Replacements on a Per Cow Basis

Pasture, 30 Animal Unit Days	
Hay, .3 ton	
Silage, 1 ton	
Corn, 2 bu.	
Oats, 3.5 bu.	\$ 2.27
C.S.M., 35 lbs.	1.31
Salt, 3 lbs. and Minerals 2 lbs.	.15
Veterinary, Pesticides & Medicants	.30
Total (Excluding Pasture)	<u>\$ 59.93</u>

APPENDIX F (CONTINUED)

ENTERPRISE BUDGETS FOR LIVESTOCK

(Excluding Depreciation, Repairs, and Interest
On Shelter and Equipment)

Sheep (Per Ewe and Lamb, Including Sire and Replacements)

Pasture, 50 Animal Unit Days	
Corn, 32 lbs.	\$.63
C.S.M., 6 lbs.	.23
Salt, 12 lbs, Minerals 5 lbs.	.42
Veterinary, Pesticides, & Mendicants, Bags, etc.	1.00
Hauling	.25
Replacement Ewe, one-sixth @ \$24	4.00
Pro-Rata Share of Depreciation on Sire	.50
Total, Excluding Pasture	\$ 13.40

Hogs (Per Sow, 2 Litters of 8 Pigs each, Fed to 225 lbs. each, 1 Pig for Replacement, Including Pro-Rata Share of Sire Expenses)

Pasture, 300 Animal Unit Days	
Corn, 240 bu.	
Hog Supplement, 2000 lbs.	\$100.00
Minerals, 150 lbs.	7.50
Veterinary, Pesticides, & Mendicants	8.00
Bedding	6.00
Hauling	10.00
Pro-Rata Share of Depreciation on Sire	.50
Labor, 72 hours	
Total, Excluding Pasture	\$132.00

Hogs (Per Sow, 2 Litters of Pigs Each Sold at Weaning Age, 1 Pig for Replacement, Including Pro-Rata Share of Sire Expenses)

Pasture, 60 Animal Unit Days	
Corn, 50 bu.	
Hog Supplement, 400 lbs.	\$ 20.00
Minerals, 30 lbs.	1.50
Veterinary, Pesticides, & Mendicants	4.00
Bedding	4.00
Hauling	2.00
Pro-Rata Share of Depreciation on Sire	.50
Labor, 19 hours	
	\$ 32.00

APPENDIX F (CONTINUED)

ENTERPRISE BUDGETS FOR LIVESTOCK

(Excluding Depreciation, Repairs, and Interest
On Shelter and Equipment)

Hours Labor for Cleaning Shelter

Beef Cow	1.9
Dairy Cow	3.4
Dairy Heifer	1.3
Hogs, Sow & 2 Litters	2.6
Sheep, Ewe, & Lamb	.2

INCOME EXPECTED

Beef Cow-Calf Herd

Calf, 500 lb. @ \$21	\$105.00
Cull Cow	150.00
Figure Approximately a 90% Calf Crop Saved.	
Figure on Replacing Approximately one-sixth of Brood Cows Each Year.	

Dairy Herd

Veal Calves, 150 lbs., @ \$20, four-fifths	\$ 24.00
Cull Cow, one-fifth	24.00
Milk, 8250 lbs. @ \$4.75	391.88

Sheep

Lamb, 1.1, 85 lbs. each @ \$21	\$ 19.64
Cull Ewe, @ \$8, one-eighth	1.00
Wool, 7 lbs., @ 60¢	4.20

Hogs (Sell at 225 lbs. weight)

Market Hogs, 3375 lbs. weight @ \$15.00	\$506.25
1 Old Sow, 400 lbs. @ \$12.00	48.00

Hogs (Sell at Weaning Age)

Pigs, 15, 600 lbs. @ \$20	\$120.00
1 Old Sow, 400 lbs. @ \$12	48.00

APPENDIX G

APPENDIX G

LABOR DISTRIBUTION BY MONTHS

Unit	Total	Months											
		J	F	M	A	M	J	J	A	S	O	N	D
HOURS OF LABOR BY MONTHS PER ACRE													
D. Tobacco	387.9	116.2	14.6		4.6	37.2	21.1	53.8	54.4	56.0	10.0	10.0	10.0
B. Tobacco	448.5		16.5	4.7	3.7	65.3	19.6	19.4	116.7		6.0	90.8	105.8
Corn	9.6			.5	3.7	1.8	.7				2.9		
Corn Silage	18.2			.5	3.7	1.8	.7		11.5				
Wheat (Lesp. Hay)	13.5		.5		.2		5.4	1.9		3.2	2.3		
Oats (Lesp. Hay)	13.5		.5		.2		5.4	1.9	1.6	2.8	1.1		
Alfalfa	17.2		.5				4.0	.4	4.0	3.4			
Pasture	4.8		.5			4.9	.6	.9	.8	1.5			
Hay Off Past.	5.0					5.0							
Silage Off Past.	6.4					6.4							
HOURS OF LABOR BY MONTHS													
Beef - Cow	12.5	2.0	1.9	1.4	.5	.4	.4	.4	.4	.5	.8	1.8	2.0
Dairy - Cow	70.0	7.0	6.3	5.8	5.2	5.3	5.2	5.3	5.3	5.2	5.7	6.7	7.0
Dairy - Heifer 1/6	2.0	.3	.3	.1	.1	.1	.1	.1	.1	.1	.1	.3	.3
Sheep - Ewe	8.5	1.8	1.5	.3	.9	.3	.3	.3	.3	.3	.3	.9	1.3
Hogs (Mkt.)-Sow	72.0	5.7	7.2	5.7	6.5	5.5	5.3	5.5	7.2	5.7	6.5	5.5	5.7
Weanling Pigs-Sow	19.0	1.1	3.3	1.3	1.7	1.0	1.1	1.1	3.3	1.3	1.7	1.0	1.1

APPENDIX H

APPENDIX H

ESTIMATED YIELDS PER ACRE FOR SOIL GROUPS^a

Crop	Unit	Soil Groups			
		A	B	C	D
D. Tobacco	lbs.	1500	1750	1400	1300
B. Tobacco	lbs.	1500	1900	1600	1300
Corn	bu.	75	70	45	40
Corn Silage	tons	15	14	9	8
Wheat	bu.	18	23	20	17
Oats	bu.	35	43	37	35
Lesp. Hay	tons	.8	.8	.7	.6
Alf. Hay	tons	2.8	3.6	3.0	1.5
Hay Off Past.	tons	1.5	1.2	.9	.8
Silage Off Past.	tons	4.5	3.6	2.7	2.4
Pasture	a. u. days	150	120	100	80

^aEstimates based on consideration of available published and unpublished data and suggestions from soil specialist of the University of Tennessee.

APPENDIX I

APPENDIX I

BUILDING AND FENCING INVESTMENTS FOR MEDIUM-SIZE FARM.

Items

Tobacco Barns	\$2000
Stock Barns, Sheds & Feed Storage	2400
Machine Shed	1000
Fences	1200
Total	<u>\$6600</u>
Total Per Acre	\$ 55
Extra Needed for Dairy Farm:	
Milk Parlor, Bulk Tank, etc.	\$4000
Silo	800
	<u>\$4800</u>
Extra Needed for Sheep and Hogs:	
Fencing, Partitions in Barn, etc.	\$ 600
Extra Needed for Hogs:	
Corn Crib	\$1500

Figure Depreciation @ 4% and Repairs @ 4%.

Adjust the per acre values for buildings, bulk tank and fences as follows:

For the medium-size farm, and for large farms subtract 10% from per acre averages for the medium-size farm.

APPENDIX J

APPENDIX J

FARM MACHINERY INVESTMENTS

Tractor	\$2500	Side Delivery Rake	\$ 375
Plow, 2 Bottom	300	Field Chopper	2100
Disk	300	Blower	500
Harrow	150	Manure Spreader	400
Drill	600	Lime Spreader	100
Corn Planter	300	Trailer	400
Cultipacker	200	Combine	1950
Cultivator	275	Corn Picker, 1 Row	1300
Mower	250	Elevator	300
			\$12,300

Need 1 extra tractor for medium size farm and 2 extra tractors for large farm.

Need a double milking machine for dairy farm, \$250.

Need two double milking machines for large dairy farm, \$500.

Not needed for market hogs:

Side Delivery Rake	\$ 375
Field Chopper	2100
Blower	500
Combine	1950
	<u>\$4925</u>

Not needed for weanling pig and beef system:

Combine	\$1950
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Not needed for beef and sheep system:

Corn Planter	\$ 300
Cultivator	275
Corn Picker	1300
Combine	1950
	<u>\$3825</u>

Figure depreciation @ 10% and repairs @ 5%.

APPENDIX K

APPENDIX K

DEFINITION OF OPERATOR'S EARNINGS

Operator's earnings is the net cash farm income plus an increase (or minus a decrease) in total farm capital, plus the farm perquisites, minus the value of unpaid family labor other than the operator's labor, and minus a charge for the use of the total farm capital.