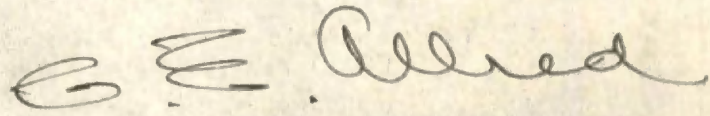


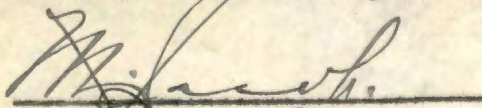
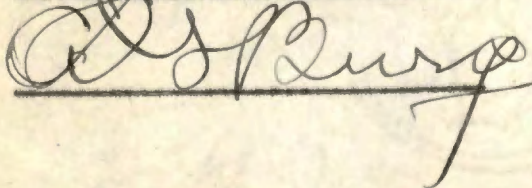
April 24, 1936

To the Committee on Graduate Study:

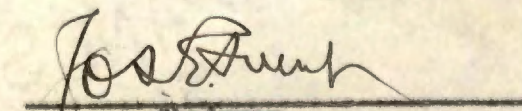
I submit herewith a thesis written by Mr. William Elbert Hendrix and entitled "The Influence of Soil Type on Certain Economic and Social Factors in Tennessee", and recommend that it be accepted for eighteen quarter hours credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.


Major Professor

At the request of the
Committee on Graduate Study,
we have read this thesis,
and recommend its acceptance.

Accepted by the Committee


Chairman

THE INFLUENCE OF SOIL TYPE ON CERTAIN ECONOMIC
AND SOCIAL FACTORS IN TENNESSEE

-2-

A THESIS

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

by

WILLIAM ELBERT HENDRIX

June 1936

ACKNOWLEDGMENTS

The writer expresses thanks to all who have given assistance in the preparation of this study. Special acknowledgments are due Professor C. E. Allred, Head, Department of Agricultural Economics and Rural Sociology, for his many valuable suggestions in outlining and preparing the report; to S. W. Atkins, Assistant Agricultural Economist, for reading the manuscript and making many constructive criticisms; to Robert W. Swatts, Resettlement Representative, for the use of farm appraisals; to Ruby Smith for her assistance in preparing the charts; and to Mrs. Weldon Cate for her painstaking care in typing the report.

139076

CONTENTS

	Page
Chapter I. Introduction	1
Purpose of Study	1
Source of Data	1
Method of Procedure	2
Limitations to Study	2
The Major Soil Areas	6
Unaka Range	6
East Tennessee Valley	7
Cumberland Plateau	8
Highland Rim	8
Central Basin	10
West Tennessee Soils	11
Chapter II. Influence of Soils on Land Utilization	14
Total Land Area	14
Farm Land	17
Trends in Farm Land	20
Trend in Improved Farm Land	26
Crop Land	29
Pasture Land	32
Farm and Non-Farm Woodland	36
Other Farm Land	39
Summary of Land Utilization	41
Needed Adjustment in Land Utilization	41
Chapter III. Influence of Soil Type on Agriculture	43
Influence on Early Agricultural Developments	43
Influence of Soil on Number of Farms	44
Size of Farms	48
Influence of Soil on Farm Tenure	49
Type of Farming	52
General Farms	53
Cash-Grain Farms	53
Cotton Farms	56
Crop Specialty farms	57
Fruit Farms	60

(continued)

	Page
Truck Farms	61
Dairy Farms	61
Animal Specialty	62
Stock-Ranch Farms	64
Poultry Farms	64
Self-Sufficing Farms	65
Part-Time Farms	67
Influence of Soils on the Quality of Farming	67
Crop Yields	68
Farm Machinery	72
Chapter IV. Influence of Soil Types on Farm Income	76
Net Farm Income	76
Cash Rent Value of Land	80
Farm Wages	81
Relationship of Ratio of Farm Income to Value of Farm Land and Buildings	82
Chapter V. Influence of Soils on Farm Wealth	89
Value of Land Alone	89
All Farm Buildings	95
Dwellings Alone	97
Farm Implements and Machinery	99
Livestock	102
All Farm Property	102
The Distribution of Farm Capital	104
Trends in Value of Land and Buildings	106
Chapter VI. Influence of Soil Type on Farm Credit	111
The Need and Basis of Credit	111
Percentage of Farms Mortgaged	112
Ratio of Debt to Value of Land and Buildings	114
Cost of Credit	116
Safety of Credit Transactions	118
Summary	129
Chapter VII. Influence of Soil Type on Farm Taxation	131
Tax Rates	132
County Tax Rates	132
Tax Rates As Reported by the Bureau of the Census	132
Relation Between Taxes and Income	136
Relation Between Taxes and Cash Rent	139
Taxes Paid Per Farm and Per Capita	139
State and Federal Aid to Counties	142
Tax Delinquency	145

Chapter VIII. Influence of Soil Type on Farm Population	152
Density of Population	152
Trend in Farm Population, 1920-1930	155
Characteristics of the Population	156
Race	156
Size of Families	157
Illiteracy	160
Chapter IX. Influence of Soil Types on the Farm Family's	
Standard of Living	163
Amount of Money Spent as Indicated by Index of	
Purchasing Power	163
Amount of Goods and Services Used	166
Farm Dwelling	166
Homes Lighted by Electricity	167
Running Water	170
Telephones	170
Radios	171
Automobiles	174
Chapter X. Influence of Soil Types on Certain Community	
Institutions and Services	175
Schools	175
Teachers Employed Per School	175
Training of Teachers	177
Annual Turnover in Teaching Personnel	179
Expenditures Per Child Enrolled	179
State Aid to Schools	182
Per Cent of Scholastic Population in School	183
Public Libraries in Tennessee	184
The Rural Church	184
Roads	187
Rural Relief	190
Bibliography	195

TABLES

	Page
I. Total Land Area and Land Uses, 1930: County Groups	15
II. Land Area and Land Uses, 1930: Minor Civil Division Groups	16
III. Trends in Per Cent of Total Land Area in Farms, 1880 to 1935	21
IV. Trends in Per Cent of Total Land Area in Improved Farm Land, 1880 to 1935	26
V. Per Cent Change in Number of Farms, 1930 to 1935	48
VI. Average Size and Value Per Acre of 814 East Tennessee Farms	49
VII. Farms by Tenure: Per Cent of All Farms, 1930	52
VIII. Percentage Distribution of Farms by Types, County Soil Areas, 1930	55
IX. Crop Yield Index in Tennessee	70
X. Value of Farm Implements per Acre and Number of Farms Per Tractor, 1930	73
XI. Farm Income, Cash Rent, and Wages by Representative Soil Areas, 1929	77
XII. Per Cent Value of Farm Products Sold, Traded, or Used by Farm Operator's Family Is of Value of Land and Buildings, 1930	86
XIII. Value of All Farm Property and of Fixed Farm Property by Classes for Soil Regions, By County Groups, 1930.	90
XIV. Value of Farm Property by Soil Types, by Civil District Groups, 1930	91
XV. Farm Operating Capital: Value of Implements and Machinery, and Livestock by Soil Areas in County Groups, 1930	100

TABLES (continued)

	Page
XVI. Farm Capital: Percentage Distribution by Classes of Property, 1930	105
XVII. Trends in Value of Farm Land and Buildings Per Acre, 1880 - 1935	109
XVIII. Farms Mortgaged, and Amount of Debt by County Soil Areas, 1930	112
XIX. Interest Rates on Full Owner Operated Farms Mortgaged, by County Soil Areas, 1930.	116
XX. Amount Sale Price Exceeded or Was Less Than Debt on Foreclosed Farms, by Soil Areas, Tennessee, 1927-1933	121
XXI. Amount Sale Price Exceeded or Was Less Than Debt on Foreclosed Farms by Size, Obion County, 1927-1933. . .	124
XXII. Farm Foreclosures: Number and Per Cent of All Farms Mortgaged	127
XXIII. Ratio of Farm Taxes to Value of Farm Land and Buildings and the County Tax Rates, 1929	135
XXIV. Ratio of Taxes to Farm Income and to Cash Rent of Land . .	137
XXV. Ratio of Net Farm Income to Farm Taxes, Property Taxes Per Farm, and County Property Tax Levy Per Capita . . .	140
XXVI. Per Cent State and Federal Aid to Counties Was of County's Revenue Receipts, Tennessee, 1932	144
XXVII. Per Cent of Taxes on Rural Property Which Became Delin- quent in Tennessee Counties, 1929 and 1932, and Per Cent Increase or Decrease, 1929 to 1932	146
XXVIII. Tax Delinquent Acres in Henry and Carroll Counties, 1928 and 1932	151
XXIX. Rural Farm Population and Per Cent Negroes, Tennessee Counties, 1930	153
XXX. Median Size of Rural Farm Families, Tennessee Counties, 1930	158

TABLES (continued)

	Page
XXXI. Percentage Illiteracy of Population	161
XXXII. Index of Farm Purchasing Power in Tennessee	164
XXXIII. Size and Condition of Farm Dwellings by Soil Types in East Tennessee, 1935	167
XXXIV. Per Cent of Farms and Homes Having Specified Modern Conveniences	168
XXXV. Percentage of Schools by Number of Teachers Employed, By County Soil Areas, 1932-33	177
XXXVI. Training and Experience of County Elementary School Teachers (White), by County Soil Areas, 1932-1933.	178
XXXVII. Source of School Receipts and School Expenditures Per Pupil by County Soil Regions, 1932 - 1933	181
XXXVIII. Per Cent Enrollment in County Schools Is of County Population (6-18 Years) by County Soil Areas, 1932-33	183
XXXIX. Road Mileage on Which Farms Are Located, By Types of Roads	188
XL. Per Cent of Farm Owners and Tenants on Relief, Tennessee Counties, 1935	191
XLI. Distribution of Population and Rural Relief Cases by Soil Type, Overton County, 1935	193

FIGURES

	Page
1. Areal distribution of Major Geologic Formations in Tennessee	3
2. County Soil Groups	4
3. Civil District Soil Areas	5
4. Per Cent of Total Land Area in Farms - County Groups	18
5. Per Cent of Total Land Area in Farms - Civil District Groups	18
6. Trend in Per Cent of Total Land Area in Farms, 1880-1935 . .	22
7. Per Cent Increase in Farm Land, 1930 to 1935	25
8. Trends in Per Cent of Total Land Area in Improved Farm Land, 1880-1935	27
9. Per Cent of Farm Land in Crops, 1930, County Groups	30
10. Per Cent of Farm Land in Crops, 1930, Civil District Groups	30
11. Per Cent of Farm Land in Pasture, 1930, County Groups . . .	33
12. Per Cent of Farm Land in Open Pasture, 1930, Civil District Groups	33
13. Per Cent of Farm Land in Woodland, 1930, County Groups . .	37
14. Per Cent of Farm Land in Woodland, 1930, Civil District Groups	37
15. Per Cent of Farm Land Classified as "Other Farm Land", 1930, County Groups	40
16. Per Cent of Farm Land Classified as "Other Farm Land", 1930, Civil District Groups	40

FIGURES (continued)

	Page
17. Number of Farms, Tennessee Counties, 1930	45
18. Average Size of Farms, by Counties, Tennessee, 1930	45
19. Per Cent Change in Number of Farms, 1930-1935	47
20. Per Cent of Farm Operators Tenants, 1930	51
21. Per Cent of Farms Cash Grain, 1930	54
22. Acres of Sweet Potatoes, Tennessee Counties, 1930	58
23. Acreage and Type of Tobacco Grown, Tennessee Counties, 1930	58
24. Acres of Peanuts, Tennessee Counties, 1930	58
25. Per Cent of All Farms That Are Dairy Farms, 1930	63
26. Per Cent of All Farms That Are Animal Specialty Farms, 1930	63
27. Per Cent of All Farms That Are Self-Sufficing, 1930	66
28. Per Cent of All Farms That Are Part-Time, 1930	66
29. Crop Yield Indices, Tennessee Counties	69
30. Value of Farm Machinery per Farm Acre, 1930	74
31. Number Farms Per Tractor, 1930	74
32. Net Income Per Farm, by County Soil Areas, 1929	79
33. Cash Rent Received Per Acre of Land, by County Soil Areas, 1929	79
34. Per Cent That Value of Farm Products Sold, Traded, or Used by Farm Family Was of Value of Land and Buildings, by Type of Farms, 1930	84
35. Value of Farm Land Per Acre, by County Soil Areas, 1930	92
36. Value of Farm Land Per Acre, by Civil District Soil Areas, 1930	92

FIGURES (continued)

	Page
37. Per Cent of Population Urban, Tennessee Counties, 1930	94
38. Per Cent Increase of Urban Population, Tennessee Counties, 1920-1930	94
39. Value of Buildings (Other Than Dwellings) Per Farm, by County Soil Areas, 1930	96
40. Value of Buildings (Other Than Dwellings) Per Farm, by Civil District Soil Areas, 1930	96
41. Value of Dwellings Per Farm, County Soil Areas, 1930	98
42. Value of Dwellings Per Farm, by Civil District Soil Areas, 1930	98
43. Value of Farm Implement Per Farm, by County Soil Areas, 1930	101
44. Value of Farm Implements Per Farm, by Civil District Soil Areas, 1930	101
45. Value of All Property Per Farm, by County Soil Areas, 1930	103
46. Per Cent That Value of Dwellings Is of All Farm Property, by County Soil Areas, 1930	103
47. Trends in Value of Land and Buildings Per Acre, by County Soil Areas, 1880-1935	107
48. Per Cent of Owner Operated Farms Mortgaged, 1930	113
49. Ratio of Debt to Value of Mortgaged Farms Operated by Full Owners, 1930	113
50. Amount That Sale Price Exceeded or Was Less Than Debt Held Against Foreclosed Property, for Certain Counties and Areas, 1929-1933	122
51. Amount Sale Price Exceeded or Was Less Than Debt on Fore- closed Farms by Size, Obion County, 1927-1933	125
52. Per Cent That Farms Foreclosed Are of All Farms Mortgaged, by Certain Tennessee Counties, 1929-1933	128

FIGURES (continued)

	Page
53. County Tax Rate Per \$100 Assessed Valuation, 1934	134
54. Taxes Per \$100 Census Value of Land and Buildings, Tennessee Counties, 1929	134
55. Relationship Between Taxes Per \$100 Census Valuation of Land and Buildings and Taxes Per \$100 Assessed Valuation	135
56. Percentage of Net Farm Income Taken by Taxes in Tennessee Counties, 1929	138
57. Property Tax Paid Per Farm, Tennessee Counties, 1929.	138
58. Per Capita County Tax Levy, Tennessee Counties, 1933	138
59. Percentage That Taxes Were of Cash Rent, 1929	143
60. Per Cent State and Federal Aid To Counties Was of County's Revenue Receipts, Tennessee, 1932	143
61. Per Cent of Taxes on Rural Property Delinquent in Tennessee Counties, 1929 and 1932	147
62. Per Cent Increase or Decrease in Rural Property Delinquent Taxes, Tennessee Counties, 1929-1932	147
63. Acres of Tax Delinquent Land in Carroll and Henry Counties, 1928 and 1932	150
64. Rural Farm Population, Tennessee, 1930	154
65. Per Cent Change in Farm Population, Tennessee Counties, 1920-1930	154
66. Per Cent of Farm Population, Negroes, Tennessee Counties, 1930	154
67. Median Size of Farm Families, Tennessee, 1930	159
68. Percentage Illiteracy Among Native White Population, Tennessee, 1930	159
69. Farm Purchasing Power of Tennessee Counties	165
70. Per Cent of Farm Dwellings Lighted by Electricity, County Soil Areas, 1930	169

FIGURES (continued)

	Page
71. Per Cent of Farm Dwellings Having Running Water, County Soil Areas, 1930	169
72. Per Cent of Farms Having Telephones, County Soil, Areas, 1930	172
73. Per Cent of Farm Families Having Radios, County Soil Areas, 1930	172
74. Per Cent of Farms Having Automobiles, County Soil Areas, 1930	173
75. Per Cent of County Elementary Schools (White) Having Only One-Teacher Per School, County Soil Areas, 1932. .	176
76. Per Cent of County Elementary Teachers (White) Having Only High School Training, County Soil Areas, 1932 . . .	176
77. Median Annual Salary Paid County Elementary School Teachers, Tennessee Counties	180
78. Location of Public Libraries in Tennessee, 1932	180
79. Per Cent That Total Church Membership Is of Total Population, Tennessee Counties, 1926	186
80. Church Membership: Average Members Per Church (White Only) of 4097 Tennessee Churches, 1934	186
81. Per Cent of Farm Owners on Relief, Tennessee Counties, May 1, 1935	192
82. Per Cent of Farm Tenants on Relief, Tennessee Counties, May 1, 1935	192

CHAPTER I

INTRODUCTION

That the soil constitutes one of our most important natural resources is a generally accepted fact. Man has always been dependent, either directly or indirectly, upon the products of the soil. Not only is he dependent upon the soil but to a greater or less extent the character of the land upon which he lives is a determining factor in his economic and social status in life. That is, man is largely a product of his natural environment. To some extent, he has overcome natural factors, but for the most part he has had to adjust himself to his natural conditions.

Purpose of Study

It is the purpose of this study to show how the soil has affected the lives of the people of Tennessee, and how the people have adjusted themselves to the environmental factor of soil.

Insofar as possible the discussion is limited to the soil factors. However, for a state of such heterogeneous character as Tennessee it is often necessary to introduce other factors in order to explain variations from what one would normally expect. For instance, the influence of industrial developments within a region frequently offsets the advantages of one soil type over another.

Source of Data

The primary source of data used in this study are the reports of the Bureau of the Census. These data are supplemented wherever possible by

the use of various surveys made within the state. Chief of these are the data collected by the Tennessee Agricultural Experiment Station in cooperation with the Federal Civil Works Administration dealing with land transfers, tax delinquency, and tax sales, and relief surveys made in cooperation with the Tennessee Emergency Relief Administration. In the main, the Geologic Map of Tennessee, published by the State Division of Geology in 1933, has been used as a basis for the soil classifications (see figure 1).

Method of Procedure

In this study representative counties lying in areas having similar soil types have been selected and grouped together for comparison. In several instances these counties contained parts of two geologic formations. Thus in order to further refine the soil types, minor civil districts, lying wholly within a given area, were selected for comparative study with similar divisions lying within other areas (see figures 2 and 3). In addition to this procedure of comparing soil areas, data for several factors are shown for all of the counties of the state and the relationship of these to soils is pointed out. In the consideration of factors for which data are limited to a single county, farms are classified according to their soil types, as reported, and comparisons are made of these.

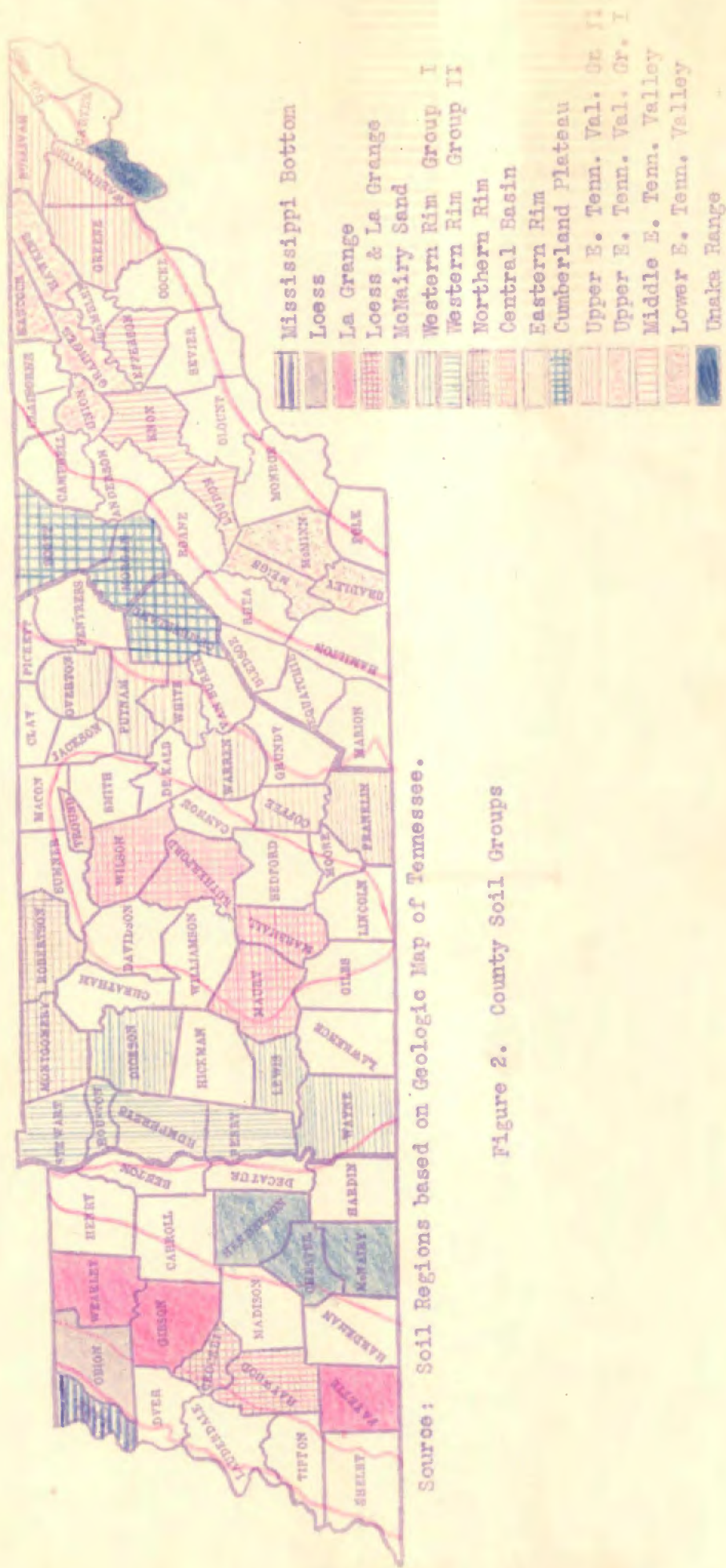
Limitations to Study

The lack of a state soil survey map showing well defined soil types and differences makes difficult a study of this kind for the state as a whole. While there are several counties for which such surveys are completed, data which might be applied to these soil types are not available except for isolated factors and areas insufficient for the purpose of this study. The state geologic map does not indicate the many variations in



Source: Pond, W. F. Geologic Map of Tennessee. Tennessee Division of Geology, Nashville, 1933.

Figure 1. Areal distribution of Major Geologic Formations in Tennessee





Source: Based on Tennessee Geologic Map. Tennessee Division of Geology, 1933.

Figure 3. Civil District Soil Areas

soil characteristics shown by a larger scale soil map. However, by supplementing the information given on the geologic map with studies and observations made of the soils of these regions, it is possible to obtain a general idea as to the characteristics of the soil for any given area.

There is also lack of sufficient data relating to several aspects of this study. Reference is made to these limitations throughout the report.

The Major Soil Areas

The soils of Tennessee vary widely in both texture and fertility. In texture, they range from the heavy clays of the East Tennessee Valley to the sandy soils of the Cumberland Plateau; in fertility, they range from the poor gravel and slate hill soils to the very fertile valley loam and river bottom soils.

These differences in soil are due primarily to differences in the underlying geologic formations from which all of the soils of Tennessee have been formed, with the exception of the small amounts of alluvial soil found in the river valleys. The topography of the State is also due to the character of the original rock formations and to the position in which the sedimentary rocks were deposited. ⁽¹⁾

The soil areas used in this study are shown in figures 1 and 2.

Unaka Range. ⁽²⁾ The Unaka Range lies along the eastern border of the State in a northeast-southwest direction. Its soils are derived from sandstones, quartzites, and conglomerates. Thus for the most part they are

(1) Mooers, C. A., The Soils of Tennessee, p. 1.

(2) Pond, W. F., Geologic Map of Tennessee, Tennessee Division of Geology. Nashville. 1933.

sandy and rocky and are of little value except for timber. Excluding small areas found in the valleys and coves, the land is not suited for agriculture.

The Unaka Range is represented in this study by Unicoi County and by selected civil districts representing the Archean and the Unicoi geologic formations.

(3)
East Tennessee Valley. The East Tennessee Valley is characterized by knobs and hills, and by ridges and valleys running in almost parallel lines southwest and northeast across the State. On the knob and ridge land, more or less fragmentary chert is found that gives rise to some of the poorest soils of the State. These appear more frequently in the southern than in the northern part of the Valley. The limestone soils of the Valley are usually deep and fertile, and under judicious management they are highly productive.

Because of the differences in the soils of the southern and northern part of the Valley and because of the influences of urbanization in the central part of the Valley, this major geologic region is divided into three groups for this study. These are: the Lower East Tennessee Valley, consisting of Bradley, McMinn, and Meigs counties; the Middle East Tennessee Valley consisting of Jefferson, Knox, and Loudon counties, and the Upper East Tennessee Valley, which is sub-divided into two groups - Group I, consisting of Grainger, Hancock, Hawkins, and Union counties, and Group II, consisting of Greene, Sullivan, and Washington counties. Group I is made up of poorer and rougher land than either Group II of the Upper East Tennessee Valley or than the Middle East Tennessee Valley. Selected civil districts are used to represent the area underlain by each

of the major geologic formations of the region. These are: Knox Dolomite, Ordovician, and Conasauga-Wautauga formations.

Cumberland Plateau.⁽⁴⁾ The soils of the Cumberland Plateau vary from sandy and stoney to clayey in nature, but for the most part fine sandy loams predominate. Due to the slow weathering of the formations from which they are derived, these soils are very shallow - not more than one third to one half of the entire Plateau being covered with a soil deep enough to be cultivated successfully. Considering the area as a whole, its soils rank among the poorest in the State for agricultural purposes, although considerable areas are very productive under proper fertilization and soil management practices.

The Plateau is represented in this study by Cumberland, Morgan, and Scott counties and by selected civil districts representing the areas of both the Lee and the Jellico-Briceville formations, which underly the major part of the Plateau.

The Highland Rim.⁽⁵⁾ The soils of the Highland Rim are derived primarily from two geologic formations -- Tullahoma-Ft. Payne chert and Chester-St. Louis limestone. The Tullahoma-Ft. Payne chert gives rise to the poorest soils of this large region. These cherty soils are found on the lower part of the Rim, immediately surrounding the Central Basin and largely on the Western Rim as it gives way toward the Tennessee River Valley in its northward flow across the State. The Chester-St. Louis limestone formation, though variable in character, gives rise to a fairly

(4) Ibid.

(5) Ibid.

fertile soil that is adapted to the production of a wide range of farm crops. This formation is found chiefly on the outer parts of the Highland Rim, in the area adjacent to the Plateau and toward the north western part of Middle Tennessee. In addition to these two soil types some of the counties, particularly those on the Western Rim, have considerable areas of fertile river bottom land.

Because of the wide differences in the soils of the Highland Rim as a whole, this area is divided into three groups for this study. These are the Eastern Rim, Northern Rim, and the Western Rim. The Eastern Rim is represented by Coffee, Franklin, Overton, Putnam, Warren, and White counties. Both the chert and limestone formations are prevalent particularly in Putnam and Warren counties. The Northern Rim is represented by Montgomery and Robertson counties in which the limestone soils predominate. The Western Rim is sub-divided into two groups - Group I represented by Dickson, Lewis, and Wayne counties, and Group II represented by Houston, Humphreys, Perry, and Stewart counties. Due to the large amount of alluvial soil, the soils of Group II are more productive as a whole than are the soils of Group I. Excluding these alluvial soils found along the valleys of the Cumberland, Tennessee, and Duck rivers and their tributaries, the soils of the Western Rim are characteristically cherty and relatively infertile even though the geologic map shows a considerable portion of this area as St. Louis limestone.

In order to further refine the soil areas, civil districts are used to represent the Highland Rim region. These are chosen to represent the Ft. Payne cherty soils and the soils of the St. Louis limestone. The civil

districts used to represent the latter area are divided into three groups, depending upon location as follows: Eastern Rim, Northern Rim, and Western Rim. The Northern Rim area is typically limestone soil, whereas the soils of the Western Rim tend to be cherty and similar to the soils derived from the Ft. Payne chert formation.

The Central Basin.⁽⁶⁾ The soils of the Central Basin vary greatly in agricultural value, although the typical soil is a fertile brown loam that is easily tilled. Other productive soils are the red loams found around Murfreesboro, in Rutherford County and the gravelly hill soils, the latter being more fertile than the gravelly hills in East Tennessee and the inner Highland Rim. Another type of soil found within the Central Basin area is that referred to as "cedar glades". The frequent outcropping of rocks above the surface and the shallowness of these soils combine to make this land of little value except for pasture and woodland. It is estimated that approximately 40 per cent of the soils of the entire Central Basin⁽⁷⁾ belong to this type.

Taken as a whole the soils of the Central Basin are decidedly the most durable and productive under cultivation of any large area in the State. They belong to the Hagertown series which are the principal soils of the limestone valleys of Pennsylvania, Maryland, Virginia, and the Blue Grass Region of Kentucky. These soils are highly prized for general and livestock farming.⁽⁸⁾

(6) Ibid.

(7) Mooers, *op. cit.*, p. 8.

(8) Bennett, H. H., Soils and Agriculture of Southern United States, p. 202.

The Central Basin is represented in this study by Marshall, Maury, Rutherford, Trousdale, and Wilson counties, and by selected civil districts representing the Ordovician limestone formation which underlies the entire Basin.

(9)

West Tennessee Soils.

1. Water-Shed Area. The soils of this region are extremely variable in character. For the most part the land is hilly to rolling, and much of the natural fertility of these soils has been lost by overcropping and by soil erosion. The lowlands are fairly fertile and well suited for general farming. For the most part, however, these soils are relatively poor.

The Water-Shed area of West Tennessee is represented in this study by Chester, Henderson, and McMairy counties and by selected civil districts within the area representing the area of the McMairy sand formation. Throughout the study both of these groups (county group and civil district group) are referred to as the McMairy Sand (figures 2 and 3).

2. The LaGrange area constitutes about one-third of West Tennessee. It comprises the area underlain by the Grenada and Holly Springs geologic formations (see figure 1). The soils vary in character according to the percentage mixture of the LaGrange and loess soils, a sprinkling of the latter covering the entire area, and gradually thinning out toward the east. The Geologic Map of Tennessee shows that the Holly Springs geologic formation underlies the eastern half of the LaGrange belt and that the

(9) Pond, op. cit.

Grenada formation comprises the western half. The soils derived from the Grenada formation are more fertile than the soils derived from the Holly Springs formation, probably due to the greater percentage mixture of the loessal soils. Also, in the northern part of the LaGrange belt the soils are more fertile than in the southern part. This is probably due to two factors -- better soil management and greater natural fertility in the northern counties.

The LaGrange soil is represented in this study by Fayette, Gibson, and Weakley counties, and each of the geologic formations are represented by selected civil districts.

3. The loessal soils (referred to as the Loess group) is characteristically an upland soil. In the northern part of the State this soil is one of the most productive in the State. As the loess belt extends southward, it decreases in fertility. This is true not only of Tennessee, but of the entire Loess area covering eastern Nebraska and Kansas, southern and central Iowa and Illinois, northern Missouri and parts of Ohio and Indiana, with a band extending almost to the Gulf.⁽¹⁰⁾

The soil area referred to in this study includes only one county - Obion. This county is not representative of the loess soils of Tennessee as a whole; rather, it is representative of the best part of the Tennessee loessal soils, which rank among the leading soils of the State in agricultural value. The civil districts chosen to represent the loess soils are fairly representative of the entire loess belt.

(10) Lyon, T. L., and Buckman, H. O., The Nature and Properties of Soils, p. 141.

4. LaGrange and Loess (combined). This group is a combination of the counties listed under both the Loess and LaGrange groups. These are Fayette, Gibson, and Weakley, classified as LaGrange, and Obion referred to as Loess. In addition two other counties, Crockett and Haywood, are included in this group. The soils of these two counties are about equally divided between the LaGrange and Loess soils.

5. The Alluvial soils of the Mississippi River Valley (referred to in this study as Mississippi Bottom) are the most fertile and productive soils in the State. These soils produce farm crops, including alfalfa, without attention to liming. However, much of this land is swampy and subject to overflow, and, therefore, is not suited to the extensive agricultural developments which one would ordinarily expect for such fertile soil. This is more true of the lower part of the alluvial belt than of the northern part.

The Mississippi Bottom is represented in this study by Lake County, which comprises the best soils of the area, and by selected civil districts which are fairly representative of the entire Mississippi Bottom area.



CHAPTER II

INFLUENCE OF SOILS ON LAND UTILIZATION

The use that is made of any given area of land depends upon a number of factors, such as topography, soil fertility, climate, location, and the characteristics of the people living on the land. Very fertile land may remain in virgin forest because of its location in regard to market, or because the people occupying it are not capable of engaging in commercial agriculture, as was the case with the American Indian.

Along with changes both in the physical character of the land and in the social and economic factors affecting its use, land is constantly shifting from one use to another. As the fertility of the soil is depleted there is likely to be a shift in the use of the land from crops to less intensive uses. The use of land might also fluctuate to some extent with changes in business conditions which affect the profitability of farming.

This chapter deals with the influence of soils on land use, and the relationship between soil types and various economic and social factors in the changing uses of the land.

Total Land Area

The 47 counties used in this study comprise a total land area of 12,925,360 acres, or 48.4 per cent of the land area of the State. They are distributed among the soil areas as shown in Table I.

TABLE I. TOTAL LAND AREA AND LAND USES, 1930: COUNTY GROUPS

Soil Region	Total Land Area	Farm Land					Non-Farm Forests	
		Total	Per Cent of Total Land Area	Per Cent Distribution of Farm Land			Area (1000) Acres	Per Cent of Total Land Area
				Crop Land	All Pasture	Wood-land		
	Acres	Acres	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Unaka Range	128,340	43,381	33.7	28.7	27.7	40.2	3.4	64.2
Upper East Tenn. Valley Group I	801,280	667,126	83.3	30.5	35.5	29.2	4.8	16.5
Group II	879,350	703,570	80.0	41.1	36.9	17.2	4.7	17.3
Middle East Tenn. Valley	662,400	560,984	84.7	41.9	32.9	19.0	6.1	13.9
Lower East Tenn. Valley	640,640	537,356	83.8	39.5	25.6	26.4	8.6	22.7
Cumberland Plateau	1,109,760	248,816	22.4	28.5	14.8	44.9	39.1	75.9
Central Basin	1,457,520	1,308,822	89.2	42.7	46.7	5.3	5.3	17.8
Eastern Rim	1,698,560	1,204,430	70.9	43.7	25.0	27.9	5.1	27.9
Northern Rim	621,440	586,169	94.3	47.8	25.6	13.6	12.9	21.9
Western Rim Group I	1,013,760	467,107	46.1	31.0	17.6	44.2	7.4	55.0
Group II	1,013,760	607,959	60.1	29.2	17.5	46.8	6.7	41.1
McNairy Sand	919,680	693,149	75.4	37.5	20.5	27.0	15.0	32.4
LaGrange	1,171,840	969,947	82.8	55.8	24.5	10.0	9.7	19.1
LaGrange and Loess	2,021,120	1,511,006	79.7	57.8	24.5	9.7	8.0	20.1
Loess	353,280	276,119	78.2	54.2	29.9	10.7	5.2	20.4
Mississippi Bottom	78,060	63,856	81.8	90.4	3.1	4.4	2.1	16.9
All Groups	12,925,360	9,303,811	72.0	43.1	26.6	21.7	7.4	32.3
State	26,679,680	18,003,241	67.5	42.5	28.7	21.6	7.1	32.6

Source: (1) Total Land Area and Farm Land: 15th Census of Agriculture, 1930, Tennessee, Series 1, pp. 8-13.

(2) Non-farm forests: Allred, C. E., Atkins, S. W., and Cotton, W. P., Economic Aspects of Agriculture, Land Utilization and Forestry in Tennessee, p. 134.

The total land area by civil district soil groups is shown in Table II. Only certain civil districts lying within the Appalachian area of East and Middle Tennessee were included in this grouping for lack of data.

TABLE II. LAND AREA AND LAND USES, 1930; MINOR CIVIL DIVISION GROUPS

Soil Type	Total Land Area	Farm Land Area						
		Total	Per Cent of All Land	Uses of Farm Land: Per Cent				
				Crop Land	Pasture		Wood-land Not Pas-ture	Other Farm Land
					Open Pas-ture	Wood-land Pas-ture		
	Acres	Acres	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Archean	89,258	52,191	58.6	29.1	25.8	5.1	37.5	2.5
Uniooi	392,252	101,816	25.9	21.6	19.9	6.8	38.1	13.6
Conasauga-Watauga	159,707	63,055	39.5	37.5	24.5	9.4	19.0	9.6
Ordovician								
East Tennessee	164,419	135,219	82.2	34.3	29.2	2.3	29.4	3.3
Middle Tennessee		313,742		43.3	22.9	22.0	5.8	5.8
Knox Dolomite	46,583	43,244	92.8	42.2	34.4	2.8	17.0	4.3
Jellico-Briceville	146,024	34,448	23.6	27.2	6.1	8.6	47.8	10.4
Lee	427,550	65,628	15.4	29.7	6.0	21.0	39.3	4.0
Chester-St.Louis-								
Warsaw:			(b)					
Eastern Rim	118,407	121,997	103.0	46.8	15.8	4.8	29.2	3.3
Western Rim	(a)	56,439	-	31.1	17.7	5.2	39.9	6.2
Northern Rim	(a)	159,189	-	53.6	21.9	2.8	10.3	11.4
Ft. Payne	(a)	129,743	-	46.4	15.8	5.9	25.2	5.8
McMairy Sand	(a)	151,417	-	30.3	14.1	7.4	31.4	19.0
Holly Springs	(a)	247,561	-	41.1	20.2	10.9	13.2	10.5
Grenada	(a)	136,315	-	59.9	19.0	5.4	8.3	6.9
Loess	(a)	164,293	-	62.8	20.9	5.4	5.5	5.4
Alluvial	(a)	122,017	-	80.6	5.0	2.1	9.8	2.6
All Groups	(a)	2,098,314	-	46.9	19.2	8.7	19.0	7.7

(a) Data not available. (b) The per cent that farm land is of the total land area exceeds 100 per cent possibly because of farms which had part of the land in two civil districts. The farm acreage was reported for the civil district in which the operator resided.

Source: (1) Farm land area: Fifteenth Census of Agriculture, 1930, Minor Civil Divisions. (2) Total land area: Special tabulation from U.S. Department of Agriculture, Revision of Civil District Areas in Southern Appalachians. (Filed in Department of Agr. Economics, Univ. of Tennessee.)

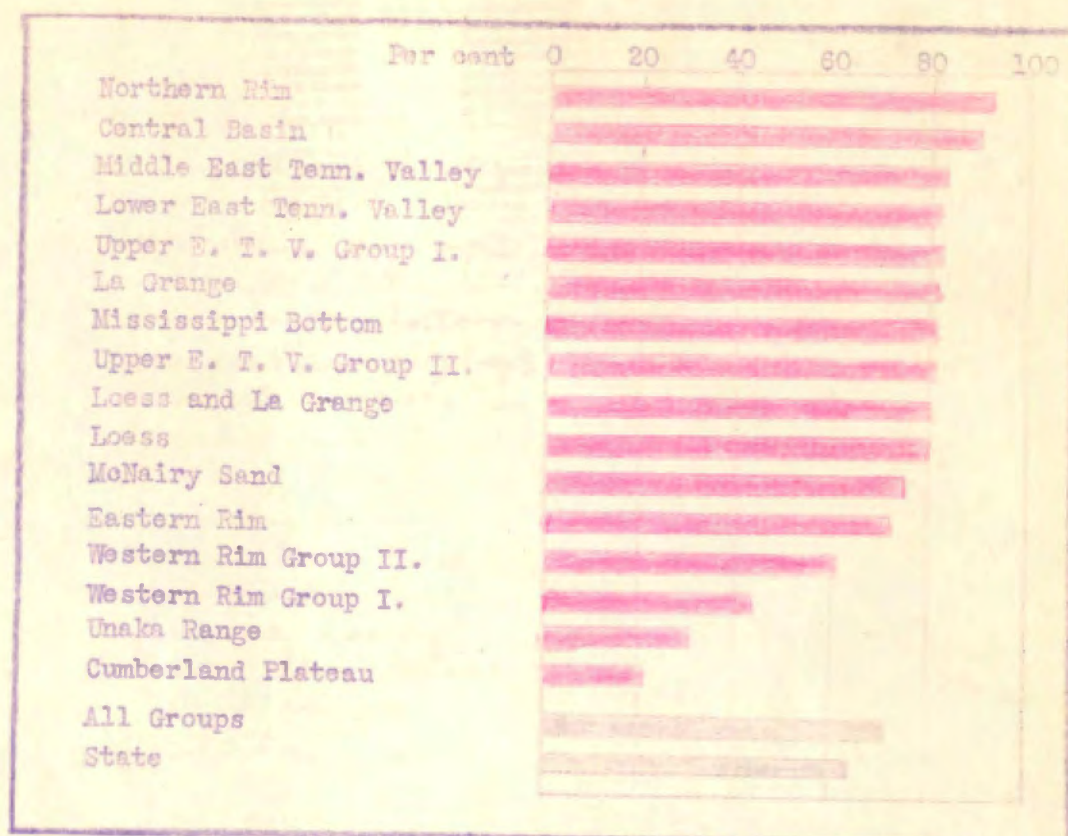
Farm Land⁽¹⁾

Soil and the related factor of topography are probably the most important factors affecting the use of land for agriculture in Tennessee. While there are comparatively large regional variations in climate within the State, there are not sufficient extremes to make any area of the State unadapted to some type of profitable farming, although climate is an important factor in determining the geographic distribution of certain crops, such as cotton. In some instances local market demand has modified the uses made of land, mainly in the direction of a more intensive use of land.

The influence of soil type on the use of land is observed in a comparison of the soil groups in the percentages of land in farms (Figure 4). In the case of poor soils comparatively little of the land is used for farming. For instance, only 22.4 per cent and 33.7 per cent of the total land area of the Cumberland Plateau and the Unaka Range, respectively, was in farms in 1930. Both of these areas have soils which rank among the poorest in the State, although the low percentage on the Plateau is due in part to late agricultural development. Likewise, in the case of the poor cherty soils of the Western Rim Group I (Dickson, Lewis, and Wayne counties) only 46 per cent of the land was in farms in 1930.

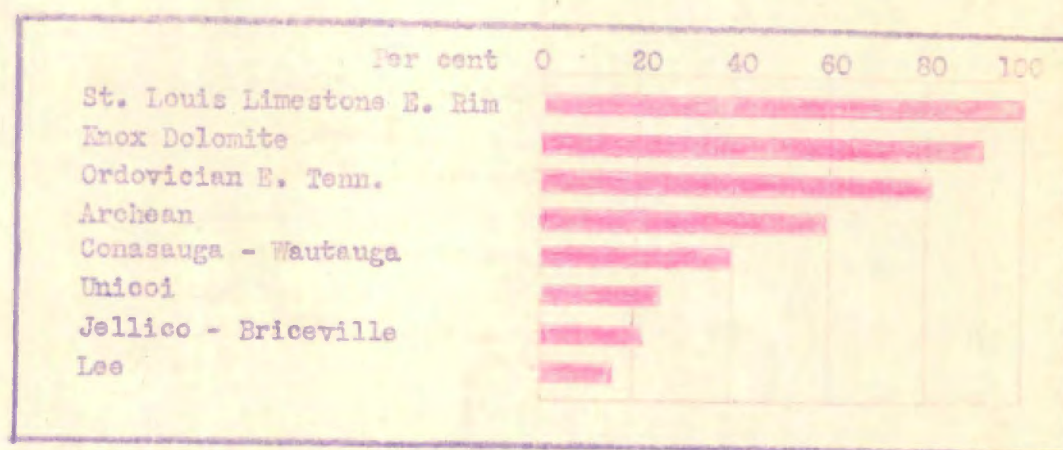
On the other hand, a relatively large percentage of the total land area is in farms in regions having fertile soils. The Central Basin, notwithstanding the fact that much of its land is glady, had 89.2 per cent

(1) Farm land includes crop land, pasture, farm woodland not used for pasture and "other" land, which refers to waste land, land used for buildings, roads, etc.



Source: Based on Table I.

Figure 4. Per cent of total land area in farms - county groups



Source: Based on Table II.

Figure 5. Per cent of total land area in farms-civil district groups

of its total land area in farm land in 1930. There the high productivity of the land suitable for cultivation makes possible the inclusion of the glady land within the farm area mainly as pasture land. The Northern Rim, the soils of which are fertile and adapted to the production of a wide range of crops, had 94.3 per cent of its land in farms.

Although the West Tennessee groups are above the state average in percentage of land in farms, the area having the poorest soils, the McMairy Sand group, has the smallest percentage of total land area in farms in the western part of the State.

Since data showing the total land area by civil districts are not available except for the Appalachian region, it is not possible to show the percentage of land in farms for all of the civil district groups. Yet using the groups for which such data are available, the influence of soils on the use of land for farming follows the same tendencies shown by the county groups (Figure 5). In the case of the rocky soils derived from the Unicoi geologic formation, only 25.9 per cent of the land was in farms in 1930; and only 15.4 per cent of the poor shallow soils derived from the Lee formation on the Cumberland Plateau. In contrast, land in farms constituted about 93 per cent and 82 per cent of the soils derived from the Knox Dolomite and Ordovician limestone formations of the East Tennessee Valley.

Topography, of course, is an important factor in determining the suitability of land for farming. Yet soils are closely related to topography. Land of rough topography usually has relatively poor or rocky soils. The soil on level to gently rolling land is superior in natural fertility, as a rule, to the soils of hilly land.

Trends in Farm Land

There has been a general decline of farm acreage in Tennessee and in other eastern states during the past half century. In many of the eastern states, competition from the better lands of the middle west has been a leading factor in this decline. The introduction of modern farm machinery has made farming less profitable in the rougher areas of the East which have not been able to use machinery. Furthermore, an increasing tax burden has made it expedient that the farmer abandon areas of land which offer neither present nor possible future returns.

The decline in farm acreage in Tennessee, while greatest in the poorest and roughest areas, does not seem to be due to the competition of westward expansion in agriculture. As a matter of fact, there has not been a decrease in acreage of farm land used for crops and pasture. Instead, there has been an increase in the acreage of such land in all areas of the State, irrespective of soil type (see Figure 8). In view of this increase in improved farm land, the inevitable conclusion as to the cause of the decrease in farm acreage is that it has been due to farm woodland changing from farm land to non-farm woodland.

This conclusion is substantiated by the fact that the decrease in farm acreage has been greatest in the regions having the greatest percentage of total land area in forests. Due to the fact that a greater proportion of the land in the poor areas is in forests, the decline in farm acreage in Tennessee has been greatest in the poorest areas. For example, while the percentage of land in farms in 1880 was only 48.1 per cent of the total land area of the Cumberland Plateau, the area in farms declined with each

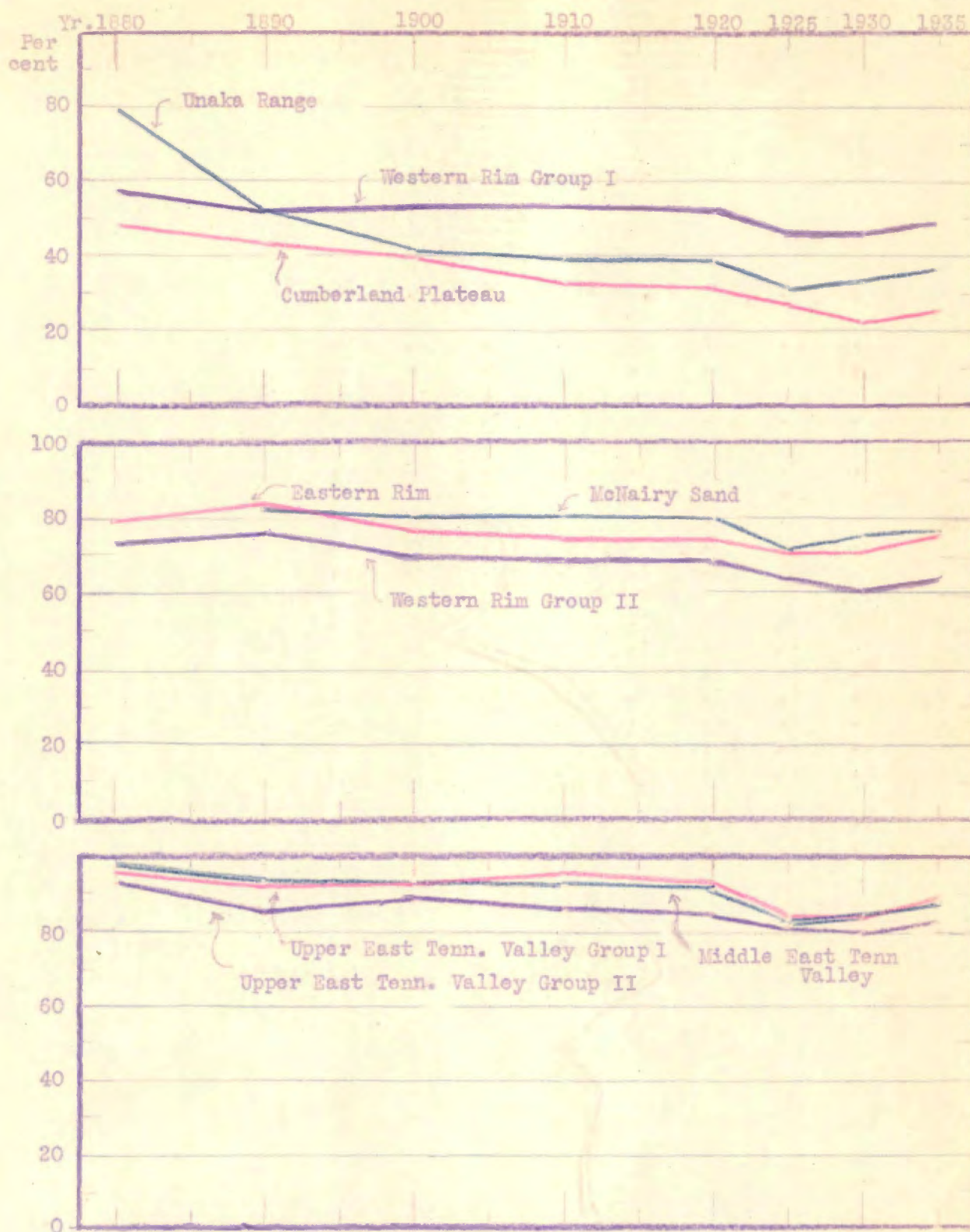
TABLE III. TRENDS IN PER CENT OF TOTAL LAND AREA IN FARMS, 1880 TO 1935

Soil Regions	Per Cent of Land Area in Farms								Per Cent Increase in Farm Land, 1930-35
	1880	1890	1900	1910	1920	1925	1930	1935	
Unaka Range	79.4	51.4	40.8	38.8	38.3	31.4	33.7	36.8	9.2
Upper East Tenn. Valley: Group I	95.2	91.5	92.0	95.4	92.5	84.1	83.5	88.5	5.2
Group II	93.6	84.1	88.6	86.8	84.9	81.0	80.0	82.0	2.5
Middle East Tenn. Valley	97.3	93.0	93.6	92.2	91.2	83.5	84.7	88.2	4.1
Lower East Tenn. Valley	82.6	92.2	91.4	90.1	88.8	79.8	83.8	85.7	2.3
Cumberland Plateau	48.1	43.3	39.9	33.0	31.4	27.6	22.4	24.1	7.6
Central Basin	94.0	93.4	95.0	94.1	92.6	89.9	89.2	91.4	2.5
Eastern Rim	79.4	83.7	77.1	74.6	74.7	70.3	70.9	74.7	5.4
Northern Rim	96.1	92.7	96.5	99.8	96.4	90.9	94.3	97.3	3.2
Western Rim:									
Group I	57.9	51.5	52.5	53.8	51.3	45.9	46.1	48.3	4.8
Group II	73.4	75.9	69.3	68.4	69.3	63.0	60.0	63.6	6.0
McNairy Sand	-	82.8	80.8	80.9	80.1	71.1	75.4	76.5	1.4
LaGrange	86.9	89.2	91.9	88.1	85.7	78.7	82.8	88.9	7.4
Loess & LaGrange	83.6	86.0	88.7	85.8	81.9	77.2	79.7	86.9	9.0
Loess	70.1	75.4	86.3	87.1	84.0	80.1	78.2	88.4	13.0
Mississippi Bottom	91.2	49.3	69.5	74.8	77.2	69.9	81.8	94.8	15.9
All Groups	82.3	80.6	80.0	78.7	77.1	70.7	72.0	75.5	4.9
State	77.5	75.6	76.2	75.1	73.1	67.1	67.5	71.5	6.0

Source: U. S. Census of Agriculture: 1880, 1890, 1900, 1910, 1920, 1925, 1930, and 1935.

succeeding census period to 22.4 per cent in 1930. The decline in farm acreage in the Unaka Range has been even greater. Beginning in 1880 with 79.4 per cent of the land in farms, this area declined with each succeeding census period to 31.4 per cent in 1925; rising to 33.7 per cent in 1930.

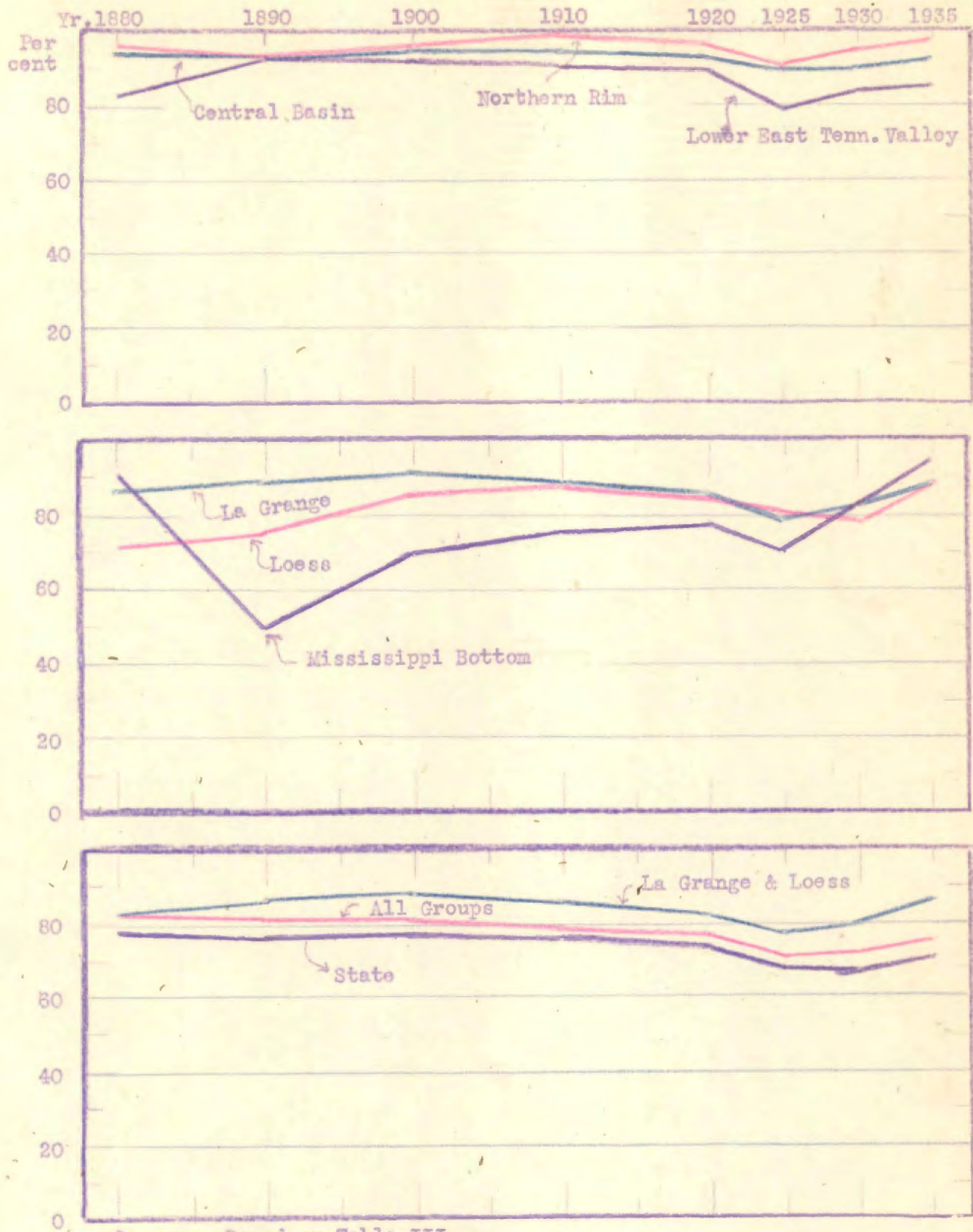
In contrast to the poorest areas, the farm acreage of areas having fertile soils has declined less rapidly, in some cases even increasing. In the Loess area, for instance, 70.1 per cent of the land was in farms in 1880; 75.4 per cent in 1890; 86.3 per cent in 1900; and 87.1 per cent in 1910. From 1910 to 1930 there was a small decrease. The Central Basin with 94.0



Source: Based on Table III.

Figure 6. Trend in per cent of total land area in farms, 1880-1935

(Continued on next page)



Source: Based on Table III.

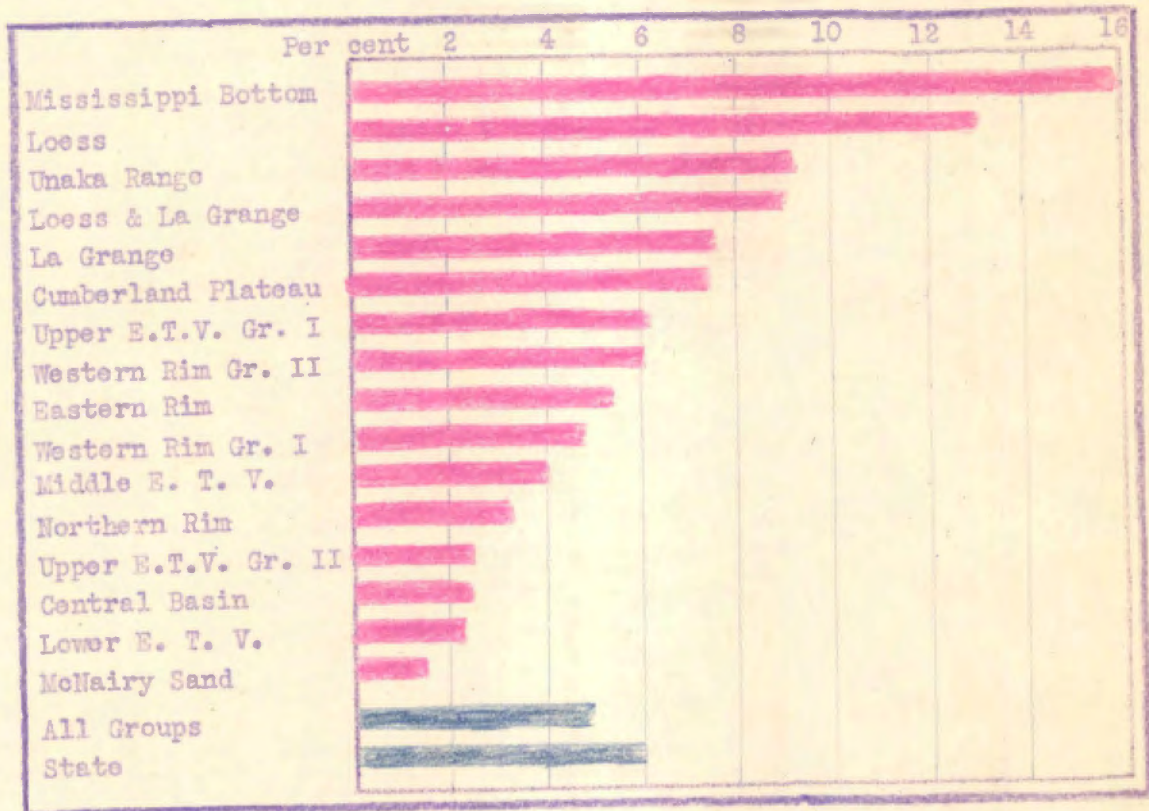
Figure 6. Trend in per cent of total land area in farms, 1880-1935 (Cont'd)

per cent of its total land area in farms in 1880 has not varied from this percentage at any census period by as much as 5 per cent.

The above trends show the reaction of farm acreage to the changes that have taken place in the past half century. Up to 1930 these trends were in one general direction. From 1930 to 1935, however, this general trend was reversed. Instead of a further decline in farm acreage there was a marked increase. The total farm acreage of Tennessee for 1935 was 19,088,208 compared to 18,003,241 acres for 1930.

This increase of land in farms during the depression represents the return to old home communities of those who had sought industrial work during the period of greater business activity. Just as farmers in poorer areas had most readily abandoned the farm land in previous years, so likewise one would expect these same people to return to these areas when they could no longer obtain industrial employment. Excluding the West Tennessee groups this increase in farm acreage from 1930 to 1935 was greatest in the poor areas. As shown in Figure 7 there was an increase in farm acreage of 9.2 per cent and 7.6 per cent for the Unaka Range and the Cumberland Plateau respectively, compared to an increase of only 2.5 per cent and 3.2 per cent for the Central Basin and the Northern Rim respectively.

The percentage increase of farm acreage in West Tennessee, however, was greater than in either of the other two main divisions of the State. There are two possible explanations for this. In the first place, a large percentage of the West Tennessee population is made up of negro tenants. Because of the easy mobility of these farmers and the low income that they usually make, large numbers of negroes sought industrial work prior



Source: Based on Table III.

Figure 7. Per cent increase in farm land, 1930 to 1935

to 1930. When the depression came, these naturally returned to their home communities. The second explanation is that with the drainage of river valley land that has taken place in West Tennessee a large acreage of land possibly has shifted from non-farm woodland to crop land. These factors have offset the influence of soil type on the changes in farm acreage.

Trend in Improved Farm Land. (2) While there has been a general decline in farm acreage, the acreage of improved farm land has been increasing since 1880 in all of the soil areas (see Table IV and Figure 8). The

TABLE IV. TRENDS IN PER CENT OF TOTAL LAND AREA IN IMPROVED FARM LAND, 1880 TO 1935

Soil Regions	1880	1890	1900	1910	1920	1925	1930	1935
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Unaka Range	15.0	12.8	14.7	16.2	17.0	12.8	15.1	17.2
Upper East Tenn. Valley								
Group I	43.3	45.1	49.9	55.7	55.9	46.8	45.1	47.4
Group II	49.7	50.5	58.3	61.4	60.6	56.9	56.4	55.0
Middle East Tenn. Valley	52.3	54.4	59.7	61.4	63.0	56.1	57.2	58.3
Lower East Tenn. Valley	37.6	44.4	47.8	47.0	48.5	41.3	43.9	47.4
Cumberland Plateau	6.4	7.7	7.0	8.6	8.6	7.9	7.6	8.0
Central Basin	56.5	58.6	56.6	56.7	57.0	51.0	51.8	51.2
Eastern Rim	29.6	32.4	37.6	39.4	42.2	39.3	40.9	42.9
Northern Rim	50.9	55.2	64.4	70.2	69.7	64.4	60.9	63.4
Western Rim Group I	13.0	14.3	16.1	17.9	18.9	19.1	18.2	17.8
Group II	16.7	19.9	21.8	23.3	25.3	23.5	22.4	22.0
McNairy Sand	-	25.6	27.5	30.8	34.9	29.9	32.8	34.9
LaGrange	42.0	48.0	55.9	60.3	61.0	56.5	59.4	62.4
LaGrange & Loess	40.6	46.6	54.1	60.1	60.2	56.8	59.0	62.8
Loess	33.1	40.8	52.9	61.2	63.6	61.1	60.1	64.6
Mississippi Bottom	44.5	35.2	54.3	61.7	67.4	66.3	74.7	74.6
All Groups	34.8	37.6	41.6	44.3	45.4	41.4	42.0	42.3
State	31.9	35.1	38.4	40.8	41.9	38.2	39.1	40.2

Source: U. S. Census of Agriculture, 1880, 1890, 1900, 1910, 1920, 1925, 1930, and 1935.

(2) Improved land was listed in the census reports from 1880 to 1920. For the census periods since 1920, the acreage of improved land was taken as the total crop land plus plowable pasture. These data slightly underestimate the acreage of improved land, due to the fact that improved land classified as other farm land and included in farmstead was necessarily omitted.

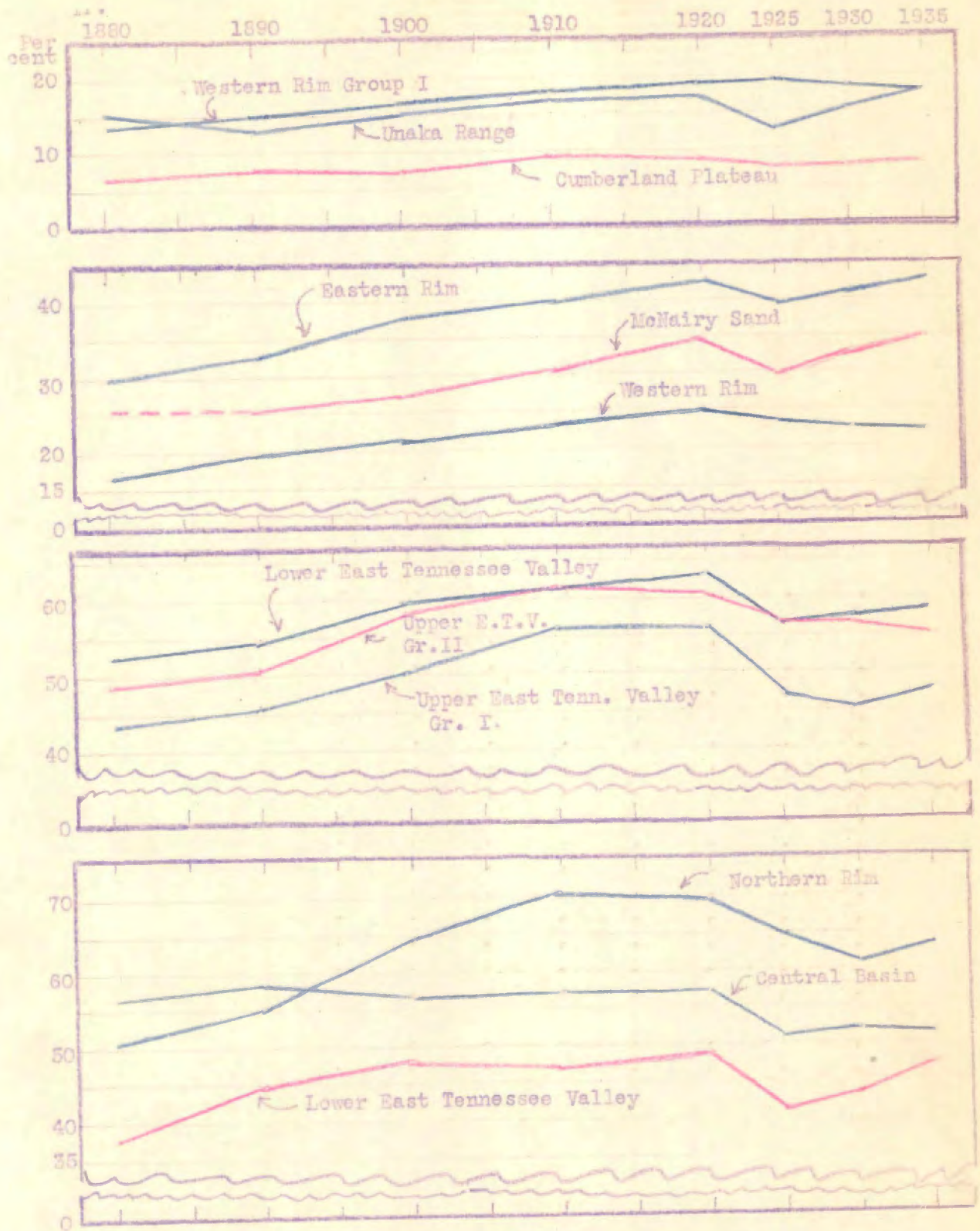
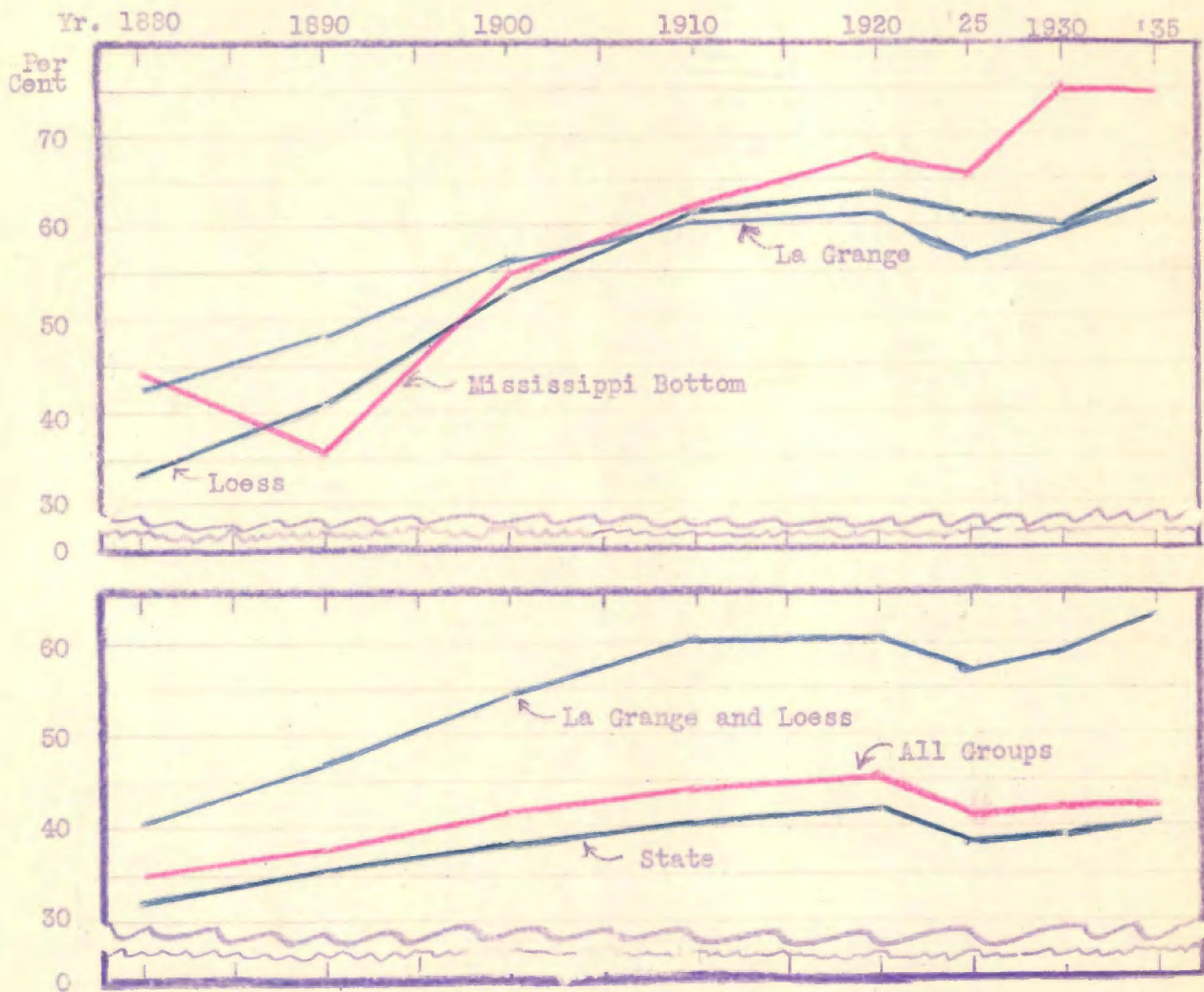


Figure 8. Trends in per cent of total land area in improved farm land, 1880-1935
(Continued on next page)



Source: Based on Table IV.

Figure 8. Trends in per cent of total land area in improved farm land, 1880 - 1935 (Continued)

The most fertile regions naturally have a larger proportion of the total land area in improved land than the poorest regions, due to the fact that a larger proportion of the land is in farms in the better areas than in the poorer areas. However, the percentage increase in improved land has not varied greatly for the soil areas. The increase has been about as great in the poor areas as in the fertile land areas.

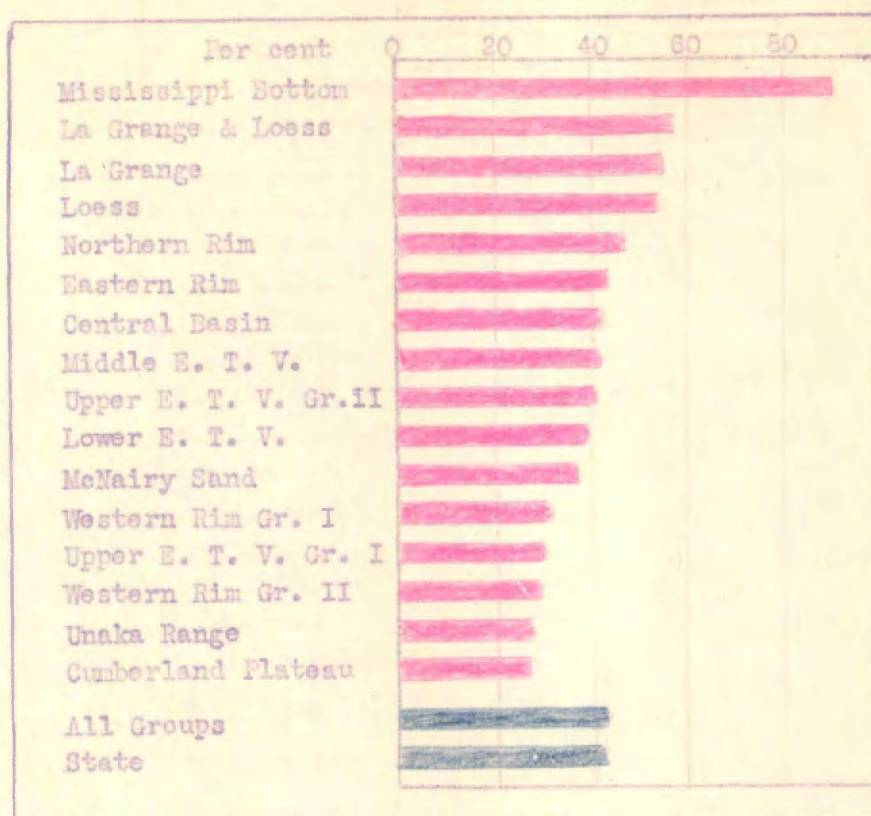
Crop Land⁽³⁾

The area in crops and the natural yielding power of the soil are the most important factors in determining farm profits. The use of land for crops is the most intensive and most profitable use that can be made of farm land. Hence, there is a tendency for a large percentage of the land that is suitable for cultivation to be used for crops.⁽⁴⁾

Soil and the related factor of topography are the most important factors determining the use of farm land for crops. The more productive the soil, the greater is the proportion of land in crops; or conversely, the poorer the soil, the less the proportion of farm land in crops. As shown in Table I and Figure 9, the two areas under study having the poorest soils, the Cumberland Plateau and the Unaka Range, have only 23.5 per cent and 23.7 per cent, respectively, of the farm land in crops. On the other hand, two comparatively fertile areas, the Central Basin and the Northern Rim, have 42.7 per cent and 47.8 per cent, respectively. The Mississippi Bottom (Lake County), which has the most fertile soil of any area included in this study, has 90.4 per cent of its farm area in crops.

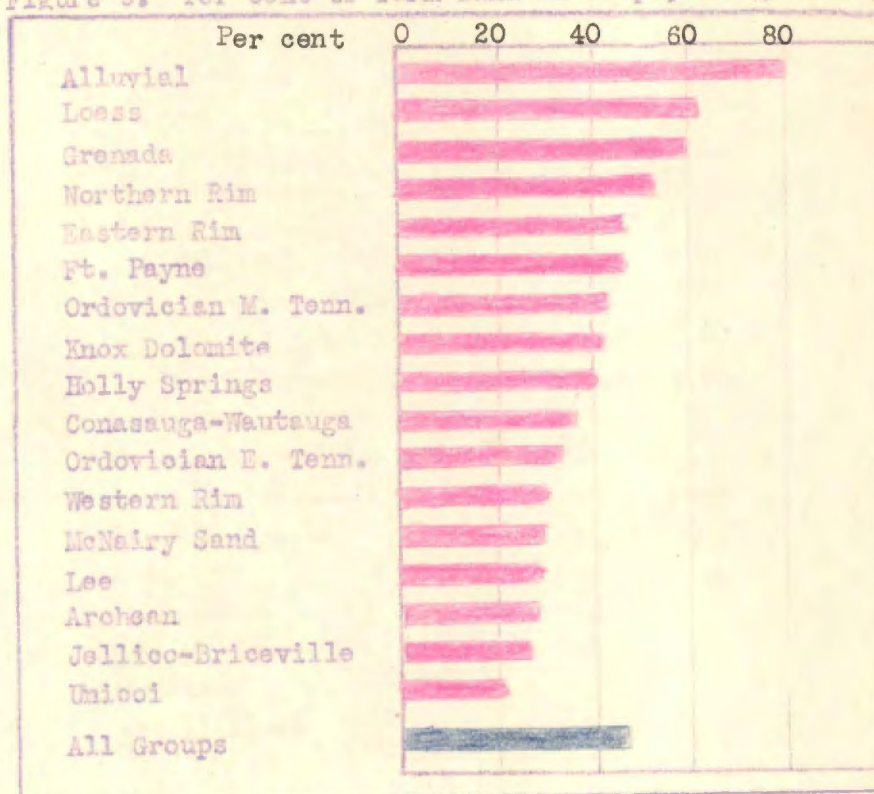
(3) Crop land consists of all land from which cultivated crops, hay, and fruits were harvested, of crop failure land and of cultivatable land idle or fallow.

(4) Warren, G. F., Farm Management, p. 518.



Source: Based on Table I.

Figure 9. Per cent of farm land in crops, 1930, county groups



Source: Based on Table II

Figure 10. Per cent of farm land in crops, 1930, civil district groups

The effects of soils on the use of farm land for crops is shown even more strikingly in Table II and Figure 10, in which certain civil districts are grouped by soil type. While an average of 46.9 per cent of the farm land of all groups is used for crops, four groups have less than 50 per cent. Only 21.6 per cent of the farm land, the soils of which are derived from the Unicoi geologic formation, is in crop land, 27.2 per cent of the Jellico-Briceville area; 29.0 per cent of the Archean area; and 29.7 per cent of the farm land, the soils of which are derived from the Lee formation. The soils derived from the Archean and Unicoi formations are sandy and rocky and very poor. The soils derived from the other two formations, which make up the greater part of the Cumberland Plateau, are comparatively shallow and low in natural fertility.

On the other hand, there are four groups of soil which have over 50 per cent of the farm area in crops. These are: Alluvial, 80.6 per cent; Loess, 62.8 per cent; Grenada, 59.9 per cent; and the St. Louis limestone of the Northern Rim, 53.6 per cent. Each of these soils rank from fertile to very fertile and cover the greater part of the area in which they occur.

A study of the West Tennessee soil groups reveals a considerable influence of soil type on the use of land for crops. The soils increase in fertility as they extend from the eastern part of West Tennessee, westward toward the Mississippi River. Likewise the percentage of farm land used for crops increases from the east to the west. Beginning with the eastern part and extending westward, the percentage of farm land in crops on the soil types is as follows: McMairy Sand, 30.5 per cent; Holly Springs, 41.1 per cent; Grenada, 59.8 per cent; Loess, 62.8 per cent; and the Alluvial, 80.6 per cent.

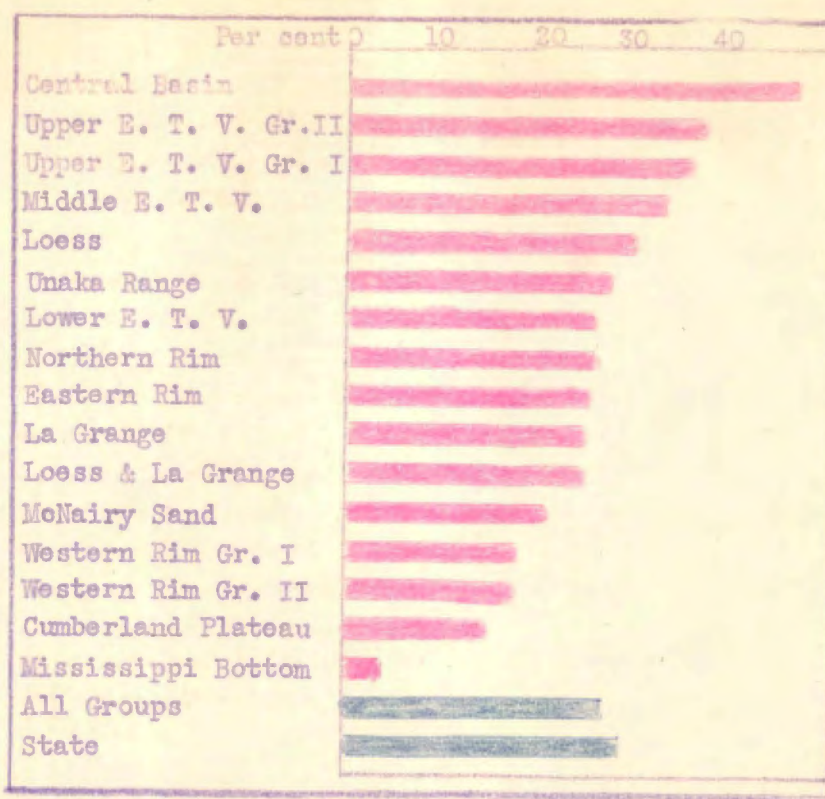
(5)

Pasture Land

While the use of land for crops is the most intensive use that can be made of farm land, crops alone do not necessarily make for the most prosperous agriculture. Since it is necessary that the farm labor supply be maintained the year around, it is desirable that the labor needs be distributed throughout the year. Crop production alone does not make this possible. The production of livestock and livestock products in combination with crop enterprises is the best means of achieving this objective, as well as that of maintaining or improving soil fertility. Hence the use of land for pasture constitutes a land use second in importance only to crops.

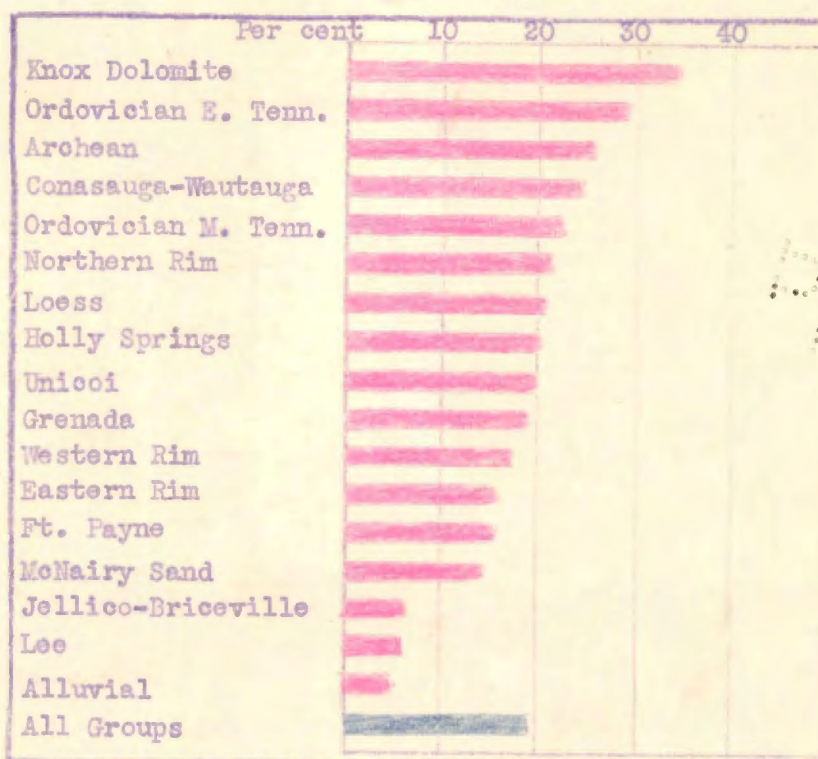
The influence of soils on the use of land for pasture may be seen by a study of the percentages of land in pasture for the various soil groups, as shown in Table I and Figure 11. The three groups having the highest percentages are the Central Basin, with 46.7 per cent; and the Upper East Tennessee Valley Groups I and II which have 35.5 per cent and 36.9 per cent, respectively. These soils, due to their limestone origin, are especially favorable to the growth of pasture crops. Furthermore, a large part of the land in these areas is not suitable for cultivation due to the presence of glady lands and hilly topography. In the case of the Central Basin, for instance, not more than 60 per cent of the total land area is suitable for cultivation, as approximately 40 per cent of the land is "glady". Of this, 38 per cent is in crop land and 14 per cent is reported as plowable pasture. With 42.2 per cent of the total land area

(5) Pasture land consists of plowable pasture, woodland pasture, and "other" pasture not woodland or plowable.



Source: Based on Table I.

Figure 11. Per cent of farm land in pasture, 1930,
County Groups



Source: Based on Table II.

Figure 12. Per cent of farm land in open pasture, 1930,
Civil District Groups

in pasture, it remains that at least 20 per cent and possibly more of the total land area in pasture (approximately one-half of all the pasture land) consists of this glady land which is not suitable for cultivation. In the East Tennessee Valley the comparatively large proportion of ridge land lying adjacent to fertile valleys is better adapted to pasture and to livestock farming than to crops, chiefly because of the poorer soils and steep topography. Thus the farmers of these areas have adapted the land use to suit the natural character of the land.

The areas having the lowest percentage of farm land in pasture are the Mississippi Bottom, with 3.1 per cent; and the Cumberland Plateau, with 14.8 per cent. In the Mississippi Bottom area the superiority of the soils for crops combined with the difficulties of livestock production, tends to crowd out other uses of the land.⁽⁶⁾ As shown by crop yield indices, the soils of the Mississippi Bottom (Lake County) are the most productive of any soils in the State, the area having a crop yield index of 148 per cent of the state average. Naturally with such fertile soils, only the minimum of land needed to pasture work animals and livestock kept for home use would be used for pasture. On the Cumberland Plateau, the opposite is true. There very little of the land is suitable for crops, only 6.4 per cent of the total land area and 28 per cent of the farm area being in crop land in 1930. Mainly because of its deficiency in lime and phosphate and the sandy nature, the soil is not well adapted to pasture

(6) Frequent inundations and difficulties with sanitation tend to retard livestock production.

production. In fact, 50.8 per cent of the pasture on farms in this area is woodland pasture, on which livestock is ranged in addition to large areas of woodland pasture outside of farms.

The Civil District groups run true to the tendencies shown by a study of the county groups, as a rule (see Figure 12). Groups in which most of the land is suited for crops have comparatively little of the farm land used for pasture. These include the Northern Rim, the Alluvial soil and other West Tennessee groups. Groups having extremely poor soils and rough topography have a very small proportion of the land in pasture. These include the soils of the Jellico-Briceville area, the soils of the Unicoi area, and the soils of the Lee formation.

Thus there are two important factors, both of which are closely related to soils, that influence the use of land for pasture -- the competition of crops and the suitability of the land for pasture.

(7)

Farm and Non-Farm Woodland

There is a place on the farm for woodland as a source of cash income, and of fuel, fence posts, and lumber for use on the farm. Forests also have a value for their beauty and aesthetic qualities. Nevertheless, the use of land for forests constitutes the least intensive, and as a rule the least profitable use that can be made of land which is adapted to crop and pasture production. Thus, forests tend to occupy mainly the poorer and rougher lands. Generally forests have been cleared in areas where the

(7) Farm woodland refers to all woodland included in farm acreage which is not pastured. Non-farm woodland was determined by subtracting farm woodland and woodland pasture from commercial forest area as reported by State Forestry Division, Nashville.

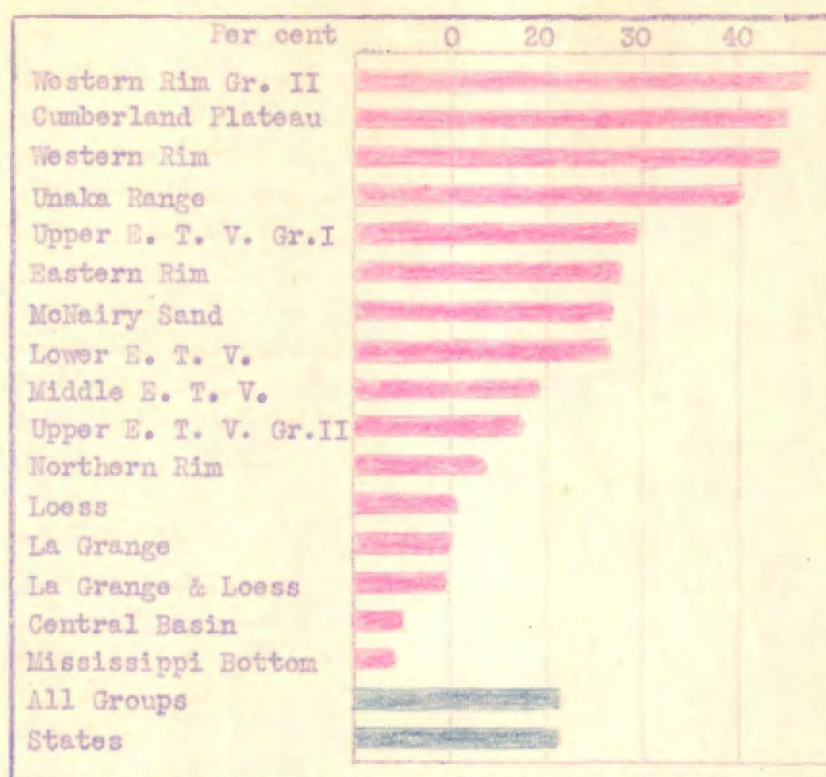
land is productive and well drained, the land being used for crops and pasture. This is shown by the percentage of farm land in woodland (Table I and Figure 13). Four of the county groups have more than 40 per cent of the farm land in forests. These areas and the per cent of land in forests are: Western Rim Groups I and II, 44.2 per cent and 46.8 per cent, respectively; the Cumberland Plateau, 44.9 per cent; and the Unaka Range 40.2 per cent. Excepting the alluvial soils found along rivers and small streams, the soils of these areas are among the lowest in natural fertility in the State. The relatively rugged topography in large parts of these areas, of course, is an important factor in the high proportion of woodland.⁽⁸⁾

In contrast to these areas, four soil groups have 10 per cent or less of the farm land in forests. These are: Mississippi Bottom, 4.4 per cent; Central Basin, 5.3 per cent; Loess and LaGrange (combined), 9.7 per cent; and the LaGrange, 10.0 per cent. Each of these areas is comparatively fertile and productive, and is adapted to the production of a wide range of farm crops.

The poorest part of West Tennessee is represented by the McNairy Sand group, which has 27.0 per cent of the farm land in forests, compared to the next highest group in West Tennessee, the Loess, which has only 10.7 per cent of the farm land in forests.

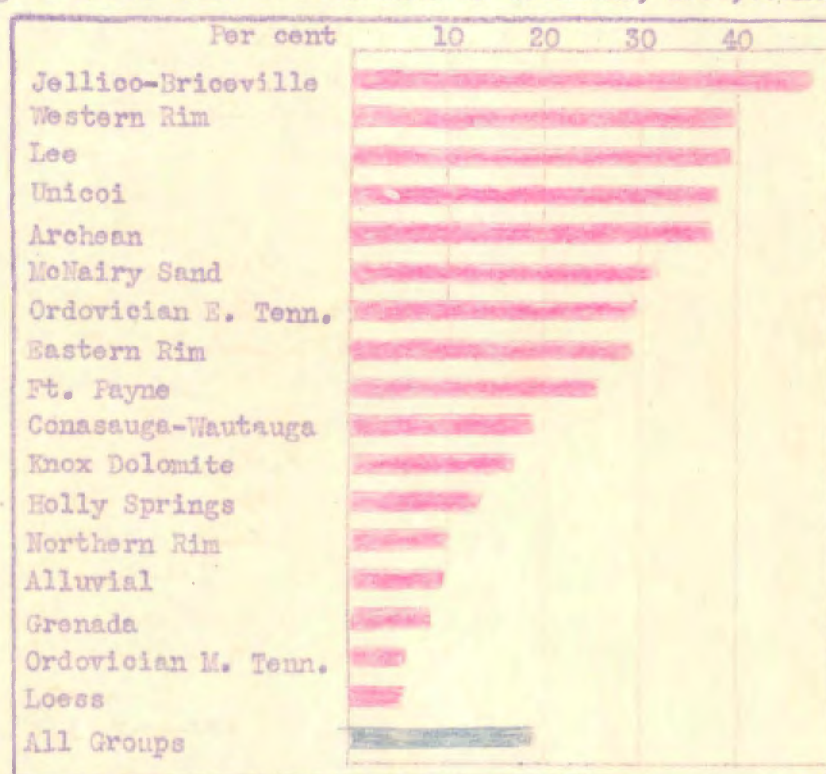
A study of the civil district groups further substantiates the fact

(8) In the Cumberland Plateau this is particularly true of the northeastern part.



Source: Based on Table I.

Fig. 13. Per cent of farm land in woodland, 1930, county groups



Source: Based on Table II.

Fig. 14. Per cent of farm land in woodland, 1930, civil district groups

that forests tend to occupy principally the poorer soils. Six of the civil district groups have 30 per cent or more of the farm area in forests (Figure 14). These ranked from high to low in order are: Jellico-Briceville, Chester-St. Louis of the Western Rim, Lee, Unicoi, Archean, and the McNairy Sand. The Jellico-Briceville and Lee formations are found on the Cumberland Plateau; the Archean and the Unicoi are found on the Unaka Range; and the McNairy Sand group is found in the Water-Shed area of West Tennessee. On the other extreme, four groups have less than 10 per cent of the farm land in forests. These are: Loess, Ordovician of the Central Basin, Grenada of the Western LaGrange soil area, and the Alluvial of the Mississippi Bottom. These soils rank from fertile to very fertile. Within the LaGrange area, the soils derived from the Grenada formation are superior to those derived from the Holly Springs formation. The latter group has 13.8 per cent of the farm land in forest compared to 8.8 per cent for the former.

The non-farm forests,⁽⁹⁾ like the farm forests, are found primarily in the poorer areas. For instance, 75.9 per cent of the total land area of the Cumberland Plateau is in commercial forests. On the Unaka Range 64.2 per cent of the total land area is in forests. On the Western Rim, 55.0 per cent and 41.1 per cent of the land of Groups I and II, respectively, is in non-farm forests. The next highest ranking group is the McNairy Sand group of West Tennessee with 32.4 per cent. These areas are representative of the poorest parts of the State.

(9) Non-farm forest area is commercial forest area minus farm woodland and woodland pasture.

(10)

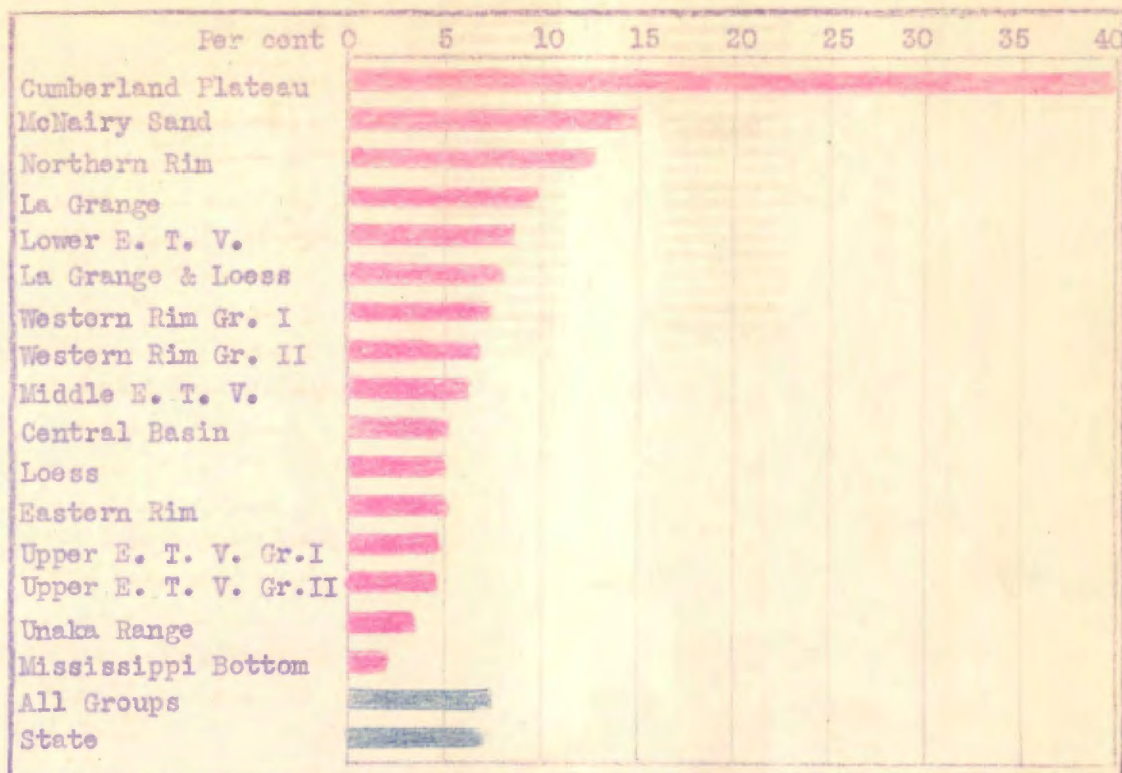
Other Farm Land

While it is possible that under the heading of "other farm land" there may be included some of the best land on the farm, it is most likely that the greater proportion of such land is waste land, having no present value from the standpoint of immediate returns. On the individual farm the waste land is usually the poorest land. It is most likely, therefore, that regions having the largest proportion of poor land would have a comparatively large acreage of the land under this classification. To some extent this is true in Tennessee. On the Cumberland Plateau, 39.1 per cent of the farm land is classified as "other farm land". The McNairy Sand group has 15.0 per cent of its farm area under this classification. With the exception of these two groups, however, the poorer areas do not have a greater proportion of the farm land classified as "other farm land". In fact the group ranking third in the proportion of land classified as "other farm land" is the Northern Rim, which has some of the most productive soils in the State (Figures 15 and 16).

The data presented in the civil district study are fairly representative of the county groups in this respect.

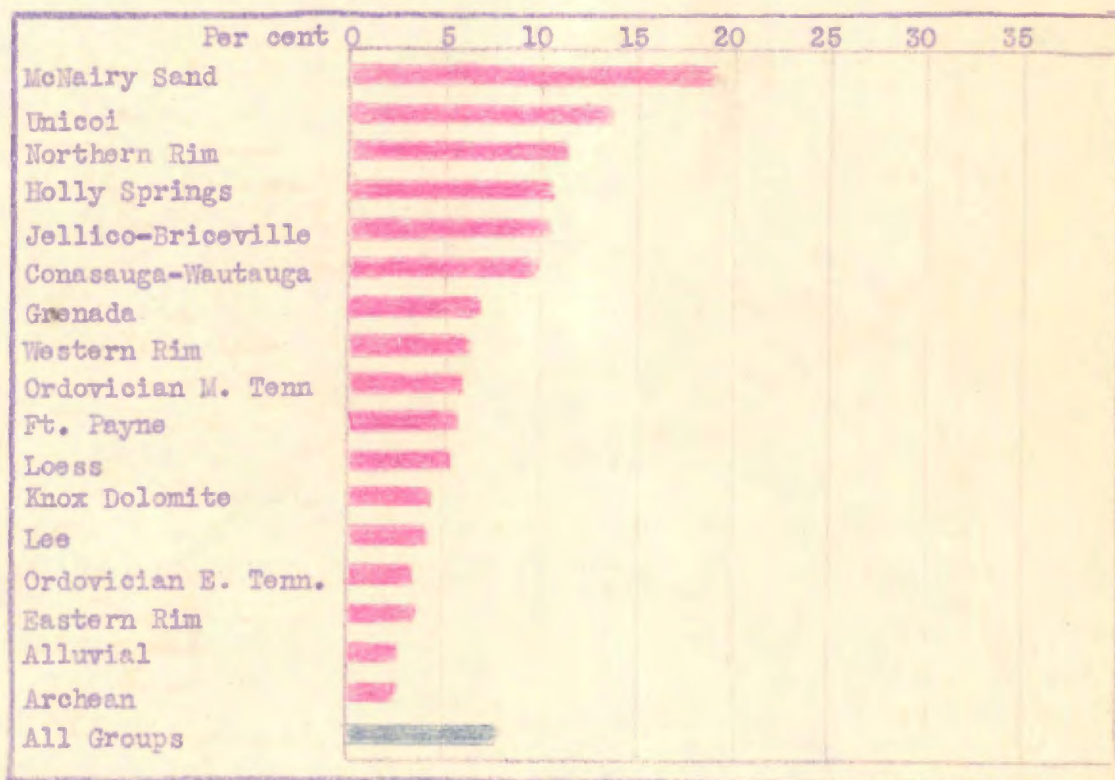
Since a large proportion of "other farm land" is used for the homesteads, there should obviously be a small relationship between soil types and the percentage of land in this class.

(10) Other farm land includes all rough swampy, or waste lands not in forest pasture, or crops; and also the land occupied by buildings, barnyards, feed lots, roads, ditches, etc.



Source: Based on Table I.

Fig. 15. Per cent of farm land classified as "other farm land", 1930
county groups



Source: Based on Table II.

Fig. 16. Per cent of farm land classified as "other farm land", 1930,
civil district groups

Summary of Land Utilization

Wide ranges in the intensity of use of land for the various soil areas has been shown in the above discussion. In certain parts of West Tennessee a large percentage of the land is in farm land, and the farm land in turn, is used primarily for crop production. On the other hand, less than one-fourth of the land on the Cumberland Plateau is in farm land and less than 30 per cent of the farm land is used for crops. These variations in the intensity of use represent man's adjustments to the natural character of the land; also they represent the limitation which nature has set up, and which man is forced to recognize.

Needed Adjustment in Land Utilization

Notwithstanding these facts, there are maladjustments in land use in various parts of Tennessee and other states. The eroding and gullying of large areas of rolling and hilly land by continuous cropping throughout the State, rendering such lands valueless for agriculture, is evidence of this fact. The low standard of living of the farm family in certain areas compared to the better economic and social conditions elsewhere in a time when fertile lands have been taken out of cultivation, raises the question as to how wisely man is using his resources.

These problems have been given public recognition through the work of the Land Planning Committee of the National Planning Board. Areas where the present land use is a problem have been mapped and recommendations made for the use of such lands. Three main causes of land use problems were reported by this body; namely, the uneconomic use of poor farm land

for agriculture, the use of agricultural land in such a manner as to facilitate its wastage by erosion, and the lack of productive uses of forest lands. The major adjustment measure recommended is the retirement of arable farming land from certain poor areas by public acquisition. Another type of measure in use in some states is state and local zoning. Zoning is a restriction on private property in land exercised under the police power. It has become a recognized tool in city planning. Although its use in rural land use planning has only begun, it is probable that it will ultimately become just as effective a tool in that field as it has in city planning. (11)

Governmental agencies have begun an approach to the solution of these problems. The Public Works Administration allocated the sum of \$25,000,000 to the Surplus Relief Corporation for the land retirement program, the administration of which was placed in the hands of a sub-marginal land committee. The land acquired is to be used for Federal or State forests or parks or for State or Federal upland game refuges, or a combination of such uses. As to how far this program will continue remains to be seen. However, it is recommended that it be continued for a period of 15 years, with a view of acquiring 5 million acres of land each year. (12)

The value of these land use programs in Tennessee cannot be predicted. Yet they do offer a partial solution to the many problems resulting from the maladjustment of land use in the poorer parts of the State.

(11) National Resources Board Report, December 1, 1934, p. 157.

(12) Ibid., pp. 181-183.

CHAPTER III

THE INFLUENCE OF SOIL TYPE ON AGRICULTURE

Agriculture occupies an important position in Tennessee. Approximately two-thirds of the State's gainfully employed population are engaged in farming. The total output of this group is equal to approximately 40 per cent of the total output of the three leading industries - agriculture, manufacturing, and mining - combined. In only sixteen of the 96 counties of the State the value of wealth added by manufacturing exceeds the value added by agriculture.⁽¹⁾

Influence on Early Agricultural Developments

In the days of the frontiersmen, among the first questions asked returning explorers were: "What of the soils?" "What do they produce?" "Could we master the land there by the tricks of the trade we have learned here at home?" Waterways and mountain barriers largely determined the movements of the frontiersman. The fertility of the soil, however, was the factor which determined whether or not an area developed into a prosperous farming region.⁽²⁾

Thus, early in Tennessee history the Central Basin and the limestone valleys of East Tennessee developed into prosperous farming regions largely because of superior soils. As early as 1820 the population of the State,

(1) Allred, C. E., and Atkins, S. W., Tennessee: Economic, Social, and Civic, p. 194.

(2) Hulbert, A. B., Soil, Its Influence on American History, p. 69.

which was predominately a farm population, was concentrated mainly in the Basin. Maury County, at that time, ranked first among the counties of the State in total population, with 22,089 inhabitants. In contrast, the counties of the Cumberland Plateau and Unaka Range were sparsely populated, indicating little agricultural development. With the movement of the population westward, the counties of West Tennessee became of agricultural importance, soon after settlement began about 1820. They produced cotton, corn, tobacco, and livestock. ⁽³⁾

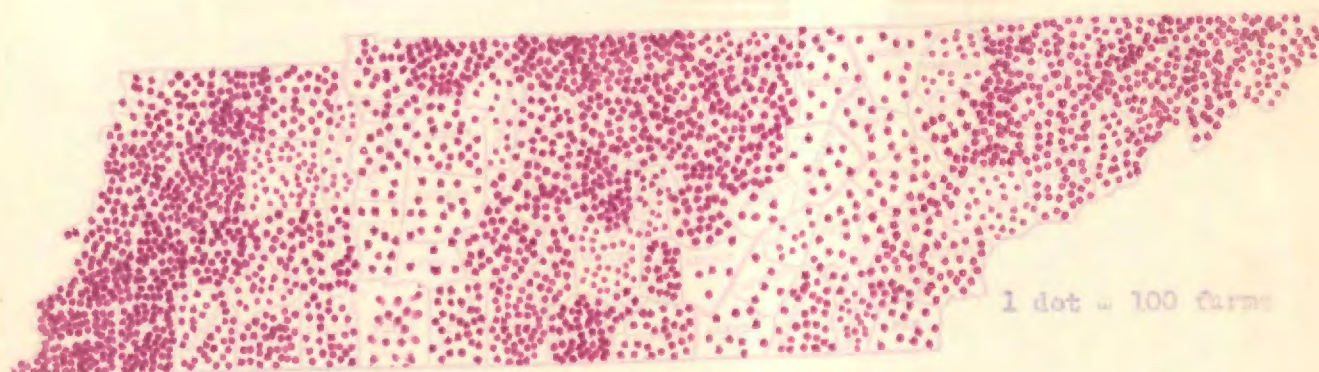
Influence of Soil on Number of Farms

There are comparatively few farms today, as in 1820, in the poor areas of Tennessee. As shown in Figure 17, the Cumberland Plateau and the Unaka Range have the fewest farms in relation to total land area. There are relatively few farms on the Western Rim, also. ⁽⁴⁾ This is due primarily to the large proportion of the land area which is not suitable for farming because of the comparatively poor soil and rough topography. On the other hand, the Central Basin, the Northern Rim, and the East Tennessee Valley have a relatively large number of farms. The greater the fertility of the soils and the more favorable topography accounts for the higher density of farms in these regions.

In West Tennessee, the large number of farms as indicated by Figure 17 is somewhat misleading. A large number of these farms are operated by cropper tenants, who are distinguished from hired labor only in that they are paid a portion of the crop for their labor instead of wages in the form

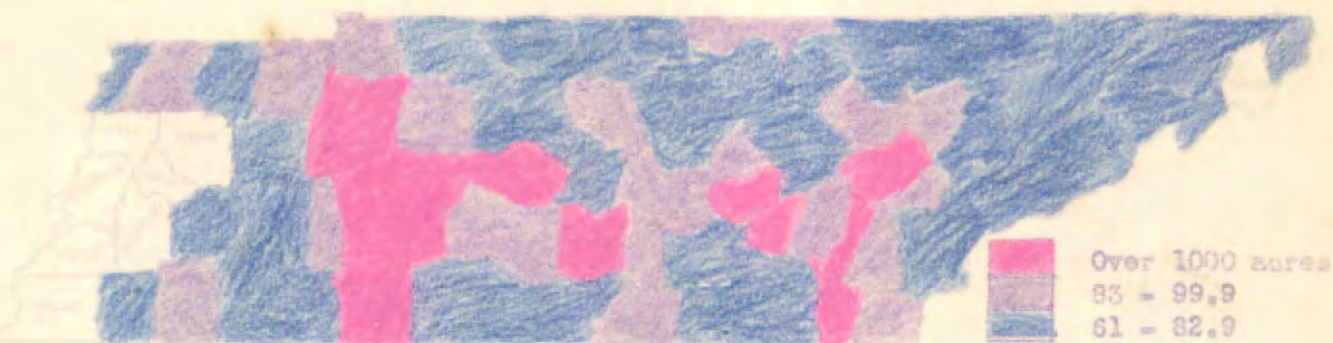
(3) Strickler, Paul A., History of Agriculture In Tennessee to 1870, p. 223. Thesis. University of Tennessee, 1935.

(4) The farms in the Western Rim and Plateau are above the State average in size, particularly in the Western Rim, where the farms average about 50 per cent larger than the State average.



Source: 15th U. S. Census of Agri., 1930, Tennessee,
Series 1, p. 7

Figure 17. Number of farms, Tennessee counties, 1930



Source: 15th U.S. Census of Agri., 1930, Tennessee,
Series 1, p. 7.

Figure 18. Average size of farms by counties, Tennessee,
1930

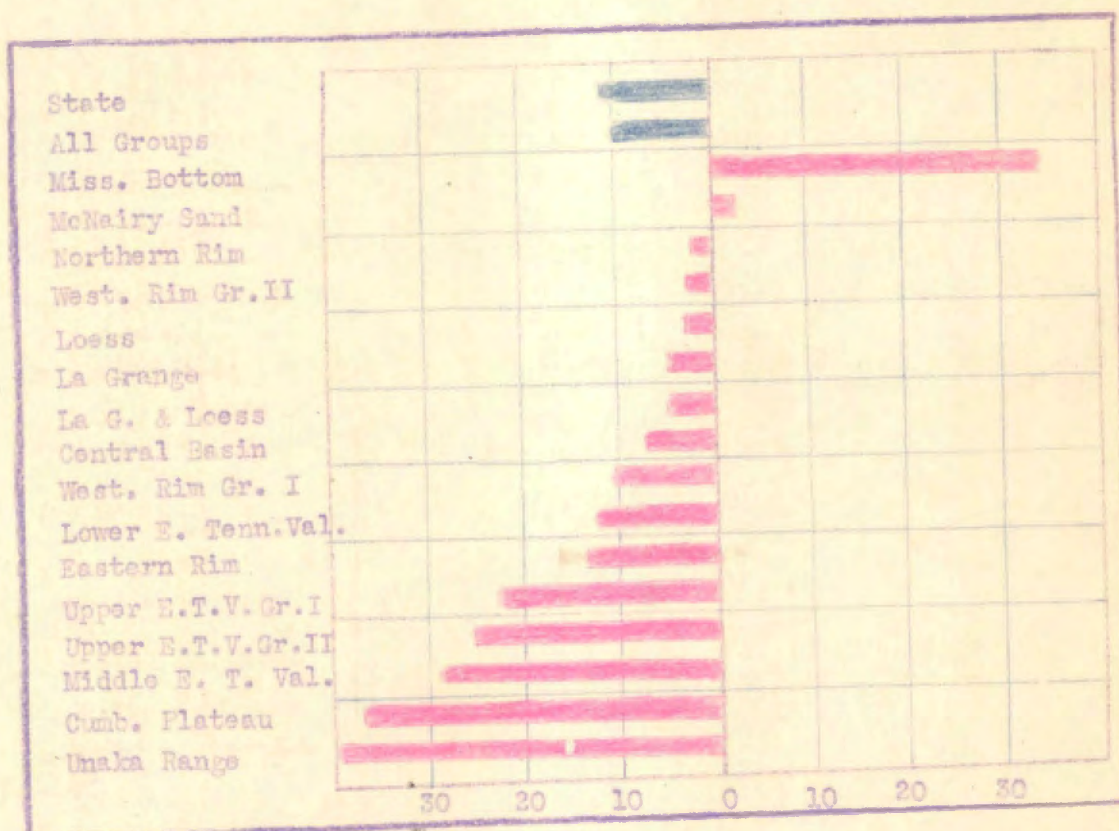
State ave. 73.3

of cash or its equivalent. Neither the cropper tenant nor the wage earner has any control over the management of the land and equipment which he uses. Yet one is paid a portion of the crop and listed for census purposes as a farmer; whereas the other receives wages and is not listed as a farm operator. Nevertheless, there is a tendency for the greatest number of farms to be in areas having the best soils. For instance, there are fewer farms in the eastern counties of West Tennessee than in the other cotton producing counties, all of which have a large number of farms operated by cropper tenants.

Change In Number of Farms, 1930-1935

According to the Bureau of the Census the number of farms in Tennessee increased from 245,657 in 1930, to 273,785 farms, in 1935. In Tennessee, as in other states, the increase in number of farms was the result of large numbers of industrial workers returning to the farm in a period of depression.

In general, the largest increases in number of farms were found on land of relatively low producing capacity and where farmers in past years have received low return for their efforts. As shown in Table V and Figure 19, the Unaka Range and the Cumberland Plateau had the highest percentage increase. In contrast to these two comparatively poor areas, the Northern Rim, the Loess and LaGrange groups, and the Central Basin all reported relatively little increase. The East Tennessee Valley reported a comparatively large increase in number of farms, but this was due primarily to urbanization influences within that area. That is, there has been a tendency for unemployed industrial workers to settle on either poor land or on land close to



Source: Based on Table V.

Figure 19. Per cent change in number of farms, 1930-1935

the city during the depression years.

TABLE V. PER CENT CHANGE IN NUMBER OF FARMS, 1950 TO 1935

Soil Region	Per Cent Change	Soil Region	Per Cent Change
Unaka Range	39.4	Western Rim Group I	10.3
Upper East Tennessee Valley		Group II	2.4
Group I	22.3	McNairy Sand	- 2.4
Group II	23.1	LaGrange	4.6
Middle East Tenn. Valley	23.2	LaGrange & Loess	4.8
Lower East Tenn. Valley	12.5	Loess	2.7
Cumberland Plateau	36.9	Mississippi Bottom	-34.4
Central Basin	7.4		
Eastern Rim	13.4	All Groups	10.4
Northern Rim	1.9	State	11.4

Source: Census of Agriculture, 1935, Tennessee.

In only two groups was there a decrease in number of farms; the Mississippi Bottom which showed a decrease of 34.4 per cent, and the McNairy Sand group which had a decrease of 2.4 per cent. These decreases were probably due to several reasons, but the reduced acreage of cotton under the Bankhead Act eliminated a large number of share cropper tenants, especially in the Mississippi Bottom, and to some extent in the McNairy Sand area.

Size of Farms

The size of farms, as shown in Figure 18 is somewhat misleading due to the high rates of tenancy in West Tennessee. It is generally believed that the larger farms usually have the better soils. An examination of 814 completed farm appraisals of farms in East Tennessee shows this to be true (Table VI). The average size of farms for all of twelve groups, classified as to soil type, was 121.7 acres per farm. Yet only five of the twelve

groups averaged over 100 acres per farm. These five, basing fertility on the value of land per acre, were above the average in fertility. The smallest farms were found principally on ridge gravel soils, on limestone with rock outcropping, and on slates and shale soils. The clay soils were an exception in this case.

TABLE VI. AVERAGE SIZE AND VALUE PER ACRE OF 814 EAST TENNESSEE FARMS

Soil Type	Acres Per Farm	Value Per Acre	Soil Type	Acres Per Farm	Value Per Acre
River bottom	159.6	\$33.32	Clay knob	91.8	\$14.03
Sandy loam	130.1	24.16	Ridge gravel	89.9	20.12
Limestone clay	123.4	33.40	Gravel	87.5	15.79
Clay loam	120.6	36.26	Slates and		
Gravel clay	106.1	25.37	shales	75.7	19.65
Silts and loams	95.7	25.10	Clay	72.7	38.35
			Limestone (rocky)	58.1	21.28
			All Groups	121.7	30.07

Source: Farm appraisals made by representatives of Tennessee Valley Authority, 1938.

Influence of Soil on Farm Tenure

Of the four classes of farm operators in Tennessee, farm tenants rank first in number, with 113,520; full owners rank second, with 109,853; part owners, third, with 21,673; and farm managers fourth, with only 611. Of these four groups, farm managers and part owners combined comprise less than 10 per cent of the total number. The selected county groups combined are fairly representative of the State in per cent of farm operators by classes (Table VII).

The influence of soils on the percentage of farm operators by tenure

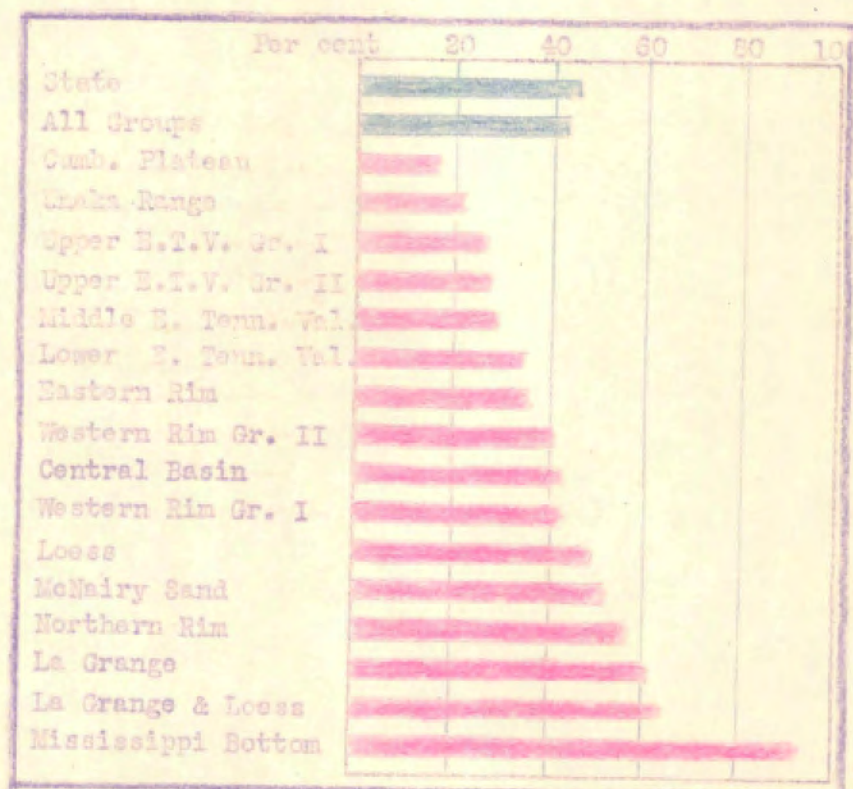
is best shown by a study of the extreme groups. On the one extreme, the proportion of farm operators classified as full owners on the comparatively poor land of the Cumberland Plateau is 77.3 per cent (see Figure 20). On the other extreme, the proportion on the fertile land of the Mississippi Bottom is only 5.3 per cent. The soil region ranking second highest in proportion of farms operated by full owners is the Unaka Range with 68.2 per cent. On the other hand, only 45.7 per cent of the farms of the Central Basin and only 36.7 per cent of the farms of the Northern Rim are operated by full owners.

Tenancy is considerably higher in West Tennessee than in either Middle or East Tennessee, due primarily to the type of farming. Crop production, especially cotton and tobacco, is better suited for tenant farming than livestock farming. Livestock farming requires fixed investment in barns, fences and equipment which the tenant is hesitant to make because he does not have legal title to improvement made on the farm; and the landlord ordinarily is reluctant about making such expenditures to be exposed to the average tenant's lack of care and interest.

Notwithstanding, there is a tendency for tenants to occupy the better grades of land, particularly those which are adapted to cash crop production. While the farm owner will continue to operate a farm even though profits are low, a tenant will move to a better farm. Lewis explains the reason for this as follows:

In order for tenants to succeed, the land must be sufficiently productive to yield a living to the tenant after a part of the receipts have been paid to the landlord. If a tenant makes a mistake and rents a poor farm, he usually leaves soon; but if he buys such a farm he may stay for years, hoping to sell. (5)

(5) Lewis, A. B., An Economic Study of Land Utilization In Tompkins County, New York, p. 30.



Source: Based on Table VII.

Figure 20. Per cent of Farm Operators Tenants, 1930

However, tenancy is too high in some of the poorer areas of this State.

TABLE VII. FARMS BY TENURE: PER CENT OF ALL FARMS, 1930

Soil Region	All Farms	Full Owner	Part Owner	Managers	Tenants
	Number	Pct.	Pct.	Pct.	Pct.
Unaka Range	860	68.2	8.7	.1	22.9
Upper East Tenn. Valley					
Group I	9,224	63.6	9.4	.1	26.9
Group II	11,170	60.4	11.6	.3	27.6
Middle East Tenn. Valley	7,675	60.7	7.9	.6	29.4
Lower East Tenn. Valley	5,047	56.4	7.9	.4	35.2
Cumberland Plateau	3,232	77.3	4.3	.3	17.9
Central Basin	15,384	46.7	10.2	.3	43.2
Eastern Rim	14,877	51.0	12.0	.2	36.8
Northern Rim	8,456	36.7	6.3	.2	56.8
Western Rim: Group I	4,627	48.8	7.7	-	43.7
Group II	5,213	47.7	8.4	.1	41.8
McNairy Sand	8,595	39.7	7.8	.1	52.4
LaGrange	17,579	30.0	8.6	.1	61.4
Loess	3,315	41.7	8.9	.6	48.8
LaGrange & Loess	29,121	26.7	7.6	.1	65.6
Mississippi Bottoms	1,120	5.3	2.1	.4	92.2
All Groups	124,601	46.1	8.8	.2	44.6
State	245,657	44.7	8.8	.2	46.2

Source: 15th Census of Agriculture, 1930, Tennessee, Series 1, p. 6

Type of Farming

Farms are classified by the Bureau of the Census according to their dominant source of income. If as much as 40 per cent or more of the total value of all products of the farm is derived from any one product the farm is classified as being of that type. The census report lists twelve major types of farms as follows: general, cash-grain, cotton, crop specialty, fruit, truck, dairy, animal-specialty, stock-ranch, poultry, self-sufficing, and abnormal farms.

The influence of soil on the type of farming is shown by a study of the distribution of each of the various types of farms (see Table VIII).

General Farms. General farming, according to Warren, usually means that one grows the usual animal and field crops of the region.⁽⁷⁾ Therefore, one would not expect great variation in the proportion of farms classified as general for the soil regions except to the extent that certain areas are especially well adapted to a particular type of farming, thereby reducing the proportion of general type farms. Hence only to the extent that soils are especially favorable to a particular type of farming, is the influence of soils on general type of farming shown. For instance, the soil and the related factor of topography, on the Cumberland Plateau, because of its poor fertility and rugged nature, is especially conducive to a subsistence type of farming. Hence 55 per cent of the farms there are classified as self-sufficing, 25 per cent as part-time farms, and only 9 per cent as general farms. In the case of the Northern Rim, the soils are especially favorable to tobacco. Hence crop-specialty farms tend to crowd out general farms.

Cash-Grain Farms. The crops included within the cash-grain type⁽⁸⁾ of farming are for the most part rich land crops.⁽⁹⁾ Too, they are well adapted to the use of modern farm machinery, and therefore to moderately level land. For these reasons (as well as climatic) the North Central

(7) Warren, G. F., Farm Management, p. 106.

(8) Cash grain type of farm refers to farms on which 40 per cent or more of the farm income is derived from the sale of any one or group of the following: corn, wheat, oats, barley, flax, rye, spelt, buckwheat, rice, and grain sorghum.

(9) Richey, F. D., Corn Culture, U. S. D. A. Farmer's Bulletin No. 1714, p. 1.

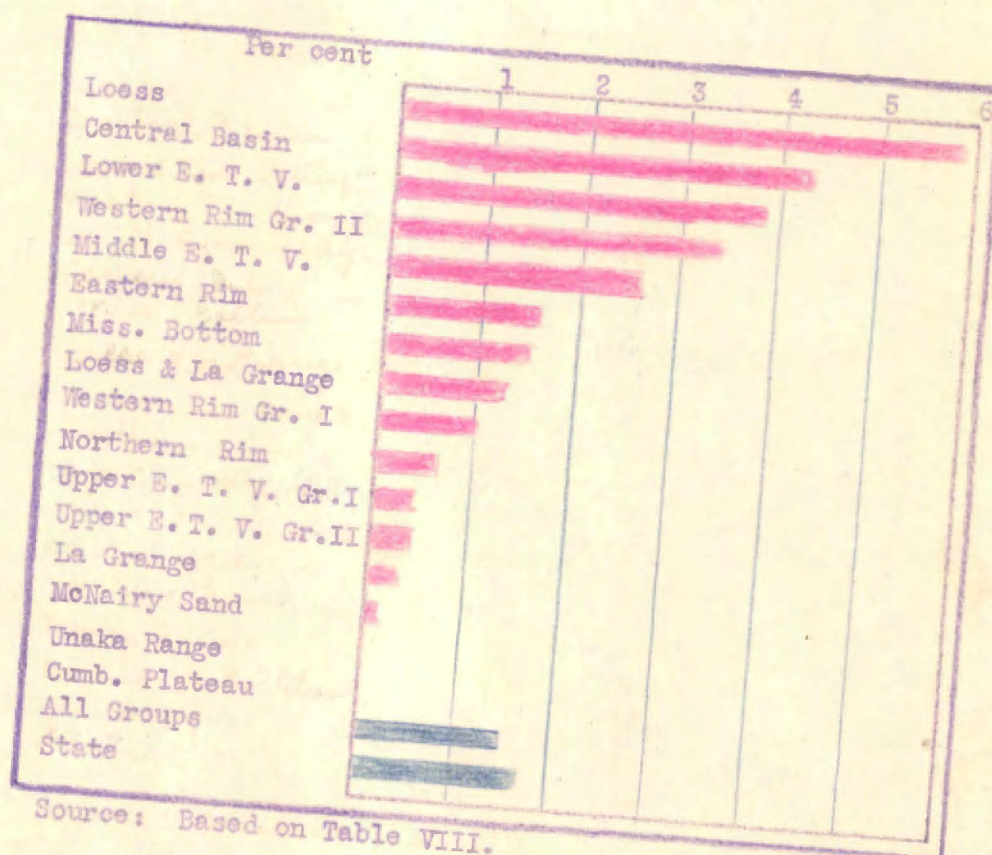


Figure 21. Per cent of Farms Cash Grain, 1930

TABLE VIII. PERCENTAGE DISTRIBUTION OF FARMS BY TYPES, COUNTY SOIL AREAS, 1930

Soil Region	General		Cash Grain		Cotton		Crop Special-		Fruit		Truck		Dairy		Animal Special-		Stock Ranch		Poultry		Self Suffic-		Abnormal (part time)	
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	
Unaka Range	14.8	-	-	-	-	-	10.5	-	-	-	-	0.2	0.2	0.8	-	-	-	-	-	-	45.5	17.4	-	
Upper East Tennessee Valley	29.0	0.4	-	-	-	-	11.4	0.1	0.2	0.3	0.3	1.0	2.8	3.7	-	-	-	-	1.1	39.3	7.4	-		
Group I	31.1	0.4	-	-	-	-	22.9	0.1	0.3	0.3	0.3	2.8	2.2	2.2	-	-	-	-	2.7	24.0	8.0	-		
Group II	29.9	2.6	-	-	-	-	8.3	-	-	0.5	0.5	3.9	5.7	5.7	-	-	-	-	0.6	25.3	14.4	-		
Middle E. Tennessee Valley	30.4	3.8	-	-	4.9	-	2.3	5.7	0.5	0.5	0.5	4.2	3.7	3.7	-	-	-	-	0.5	27.8	9.0	-		
Lower E. Tennessee Valley	9.5	-	-	-	-	-	0.5	0.1	-	-	-	0.3	2.4	2.4	-	-	-	-	0.2	55.3	25.4	-		
Cumberland Plateau	27.9	4.3	-	-	5.3	-	9.2	0.1	0.2	0.2	0.2	6.6	14.1	14.1	-	-	-	-	1.5	16.9	8.7	-		
Central Basin	21.7	1.6	-	-	3.2	-	1.1	-	-	-	-	1.3	5.5	5.5	-	-	-	-	0.9	46.9	10.8	-		
Eastern Rim	4.8	0.6	-	-	-	-	4.6	0.2	-	-	-	0.6	0.7	0.7	-	-	-	-	0.2	7.8	2.0	-		
Northern Rim	22.2	1.0	-	-	8.7	-	10.2	-	0.1	0.1	0.1	0.6	3.8	3.8	-	-	-	-	0.2	31.1	4.9	-		
Western Rim: Group I	21.9	3.4	-	-	0.6	-	26.9	-	-	-	-	0.3	5.0	5.0	-	-	-	-	-	31.5	5.7	-		
Group II	10.9	0.1	-	-	77.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.3	1.3	-		
McNairy Sand	21.0	0.3	-	-	52.4	-	8.5	0.3	0.2	0.2	0.2	1.0	1.6	1.6	-	-	-	-	0.1	4.1	1.9	-		
LaGrange	24.5	5.8	-	-	34.7	-	5.1	0.2	0.1	0.1	0.1	1.8	11.6	11.6	-	-	-	-	0.4	7.5	3.9	-		
Loess	15.9	1.2	-	-	61.2	-	6.3	0.4	2.4	2.4	2.4	0.9	3.0	3.0	-	-	-	-	0.2	3.9	1.8	-		
LaGrange & Loess	-	1.5	-	-	39.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	.6	-		
Mississippi Bottom	20.6	1.5	-	-	22.5	-	12.6	0.3	0.9	0.9	0.9	2.6	4.1	4.1	-	-	-	-	0.8	20.9	6.7	-		
All Groups	19.5	1.7	-	-	25.7	-	9.6	0.5	0.7	0.7	0.7	2.4	4.4	4.4	-	-	-	-	0.7	21.9	6.6	-		
State																								

Source: 15th Census of Agriculture, 1930, Tennessee, Series 3.

and Midwestern United States are of great importance in the production of corn, wheat, and other small grains. In northwestern Tennessee, the Loess type of soil, which in many respects is similar to the soils of the Corn Belt, is well suited to grain farming. Approximately 6 per cent of the farms in the Loess region (Obion County) are of the cash-grain type. In the Central Basin, though the soils differ in type from those in Obion County, they, nevertheless, are fertile, and for the most part the topography of the Basin is level to gently sloping. Here 4.5 per cent of the farms are classified as cash-grain farms. On the other hand, neither the Cumberland Plateau nor the Unaka Range groups have as many as one cash-grain farm. In the McNairy Sand type of soil these farms constitute only one-tenth of 1 per cent of the farms in the area. In these areas unfavorable soils and the rough topography (particularly in many parts of the Plateau) are major causal factors (Figure 21).

(10)

Cotton Farms.

It is stated by O. E. Baker, U. S. Department of Agriculture, that

The boundaries of the Cotton Belt are wholly climatic, but within these boundaries density of production is determined by the surface of the land and by the soils. --- Cotton is grown on practically all well-drained types of soil, but in general the yield on unfertile, sandy, upland soil is small, and in wet seasons also the heavy clays and some bottom land soils give low yields - although producing large vegetable growths. (11)

In Tennessee cotton production is largely confined to West Tennessee because of favorable climatic conditions - long growing season and relatively low rainfall during summer and early fall. A few counties in

(10) Any farm on which cotton represents 40 per cent or more of the total value of all products of the farm is classified as cotton farm.

(11) Baker, O. E., "Agricultural Regions of North America", Economic Geography, January 1927, p. 71.

in southern Middle and southern East Tennessee grow cotton. The major exception is Rutherford County, in the central part of Middle Tennessee, where 25 per cent of the farms are classified as cotton farms. In this county a combination of favorable soil (red soil which warms up relatively early) and climatic conditions probably accounts for cotton production. However, using these type of farming data, it cannot be shown that any particular soil is especially favorable to cotton farming in Tennessee. In most cases differences in the proportion of cotton farms are principally accounted for by differences in climatic conditions.

(12)
Crop-Specialty Farms. In Tennessee, five crops falling within the crop specialty group are grown on a commercial scale; namely, hay, tobacco, sweet potatoes, white potatoes, and peanuts. Soil type is an important factor in the distribution of each of these crops and, consequently, in the distribution of crop-specialty farms. In the case of hay, however, very little is grown for sale in Tennessee, and therefore few farms receive as much as 40 per cent of the income from this crop. In the case of the other four crops, there are distinct production areas, the boundaries of which are limited by soil type.

First, consider sweet potatoes (Figure 22). The ideal sweet potato soil is a well drained sandy loam with a clay subsoil. On very fertile soil the crop tends to run to vines.⁽¹³⁾ Thus it happens that the coun-

(12) Crop-specialty farms includes those farms on which 40 per cent or more of the sales were represented by any of the following crops: sweet sorghum for sirup, sugar cane, sugar beets, maple sugar and sirup, soybeans, cowpeas, velvet beans, ripe field peas and beans, tobacco, hay, peanuts, white potatoes, sweet potatoes, mushrooms, and other minor field crops.

(13) Miller, F. E., Beattie, J. H., and Zimmerly, H. H., Sweetpotato Growing, U.S.D.A. Farmers' Bulletin No. 999, p. 2-3.

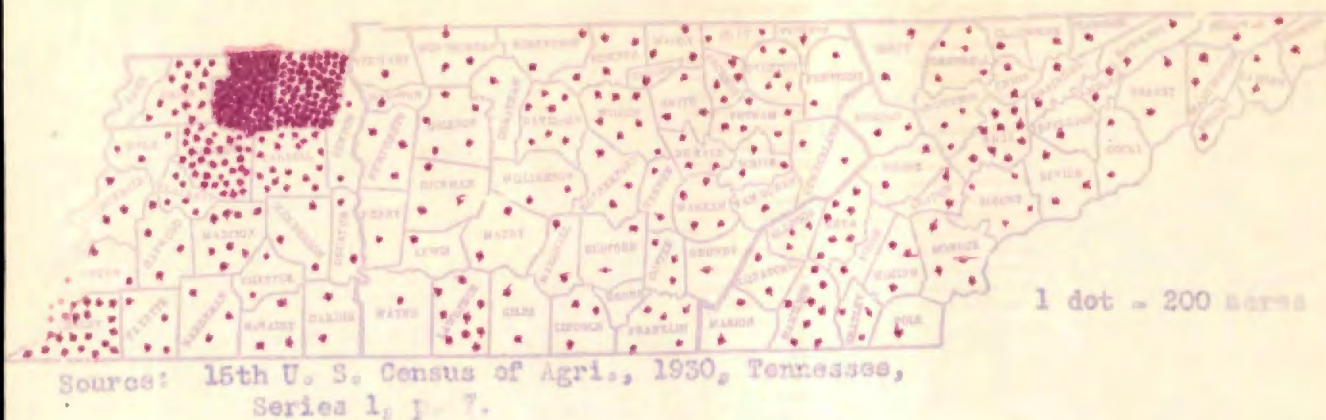


Figure 22. Acres of sweet potatoes, Tennessee counties, 1930

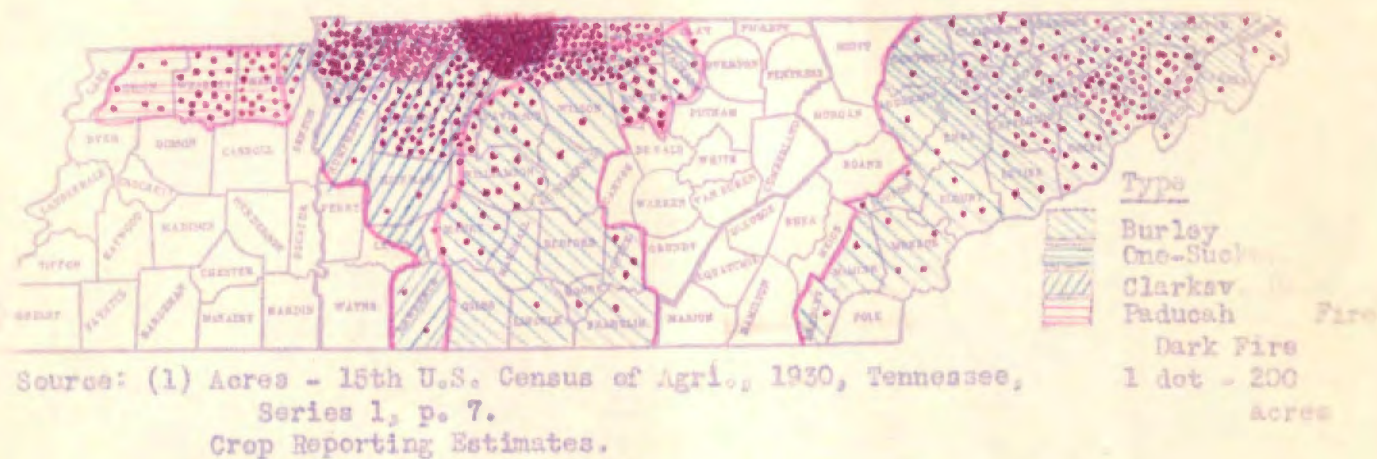


Figure 23. Acreage and type of tobacco grown, Tennessee counties, 1930

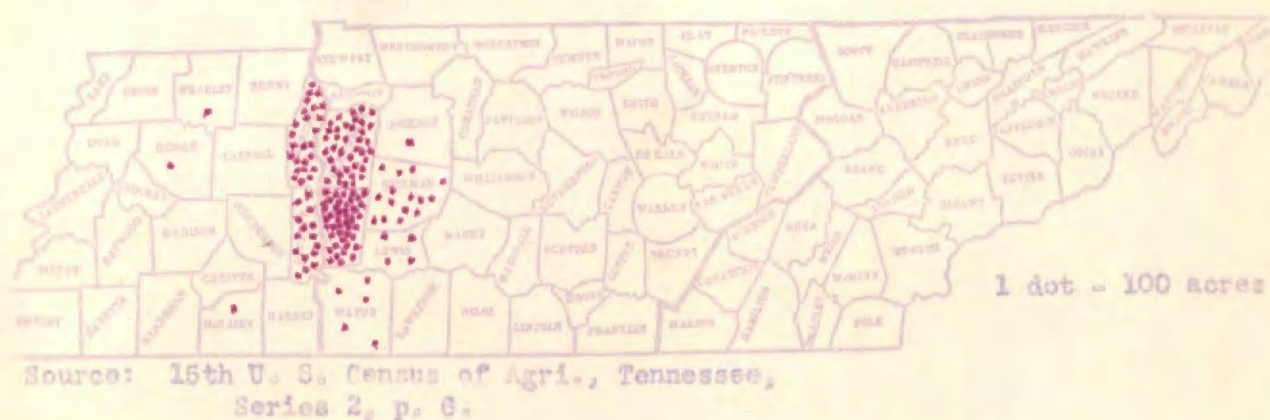


Figure 24. Acres of peanuts, Tennessee counties, 1930

ties within the soil groups under study, which lead in sweet potato production (Weakley and Gibson), have a light loamy soil. Crop-specialty farms comprise 24.4 per cent of the farms of Weakley County. In the other counties within the LaGrange area the production of cotton tends to crowd out the production of other crops; too, in the case of Gibson County, which is one of the leading counties of the State in sweet potato production, it is probable that this crop is produced largely on farms falling within the truck type of farming classification.

In the case of tobacco, the soil is distinctly an influence in its distribution. The most important factor influencing the development of certain qualities, such as color of leaf, texture and aroma, is the physical and chemical properties of the soil.⁽¹⁴⁾ Thus the soils of the Northern Rim are noted for the quality of dark fire-cured tobacco, which they produce. The importance of tobacco in that area is shown by the fact that 74.6 per cent of the farms are classified as crop-specialty farms (Table VIII). Burley tobacco production is restricted almost entirely to the limestone soils of the Central Basin and of the East Tennessee Valley (see Figure 23). On the poor cherty soils of Macon County one-sucker tobacco is the prevailing type grown. In Henry County, the prevailing type of tobacco grown on the LaGrange soils is the Paducah dark fire-cured. Beginning with a line running south and north through the center of the county and extending eastward, there is a change from the Paducah dark fire-cured to the Clarksville dark fire-cured. This change runs

(14) Garner, W. W. Moss, E. G., Yoke, H. S., Wilkinson, F. B., and Stine, O. C., "History and Status of Tobacco Culture", U. S. D. A. Yearbook of Agriculture, 1922, p. 417.

parallel to the change in soil type in that county. Two of the most important tobacco-producing areas are the Northern Rim and Group II of the Upper East Tennessee Valley, in which areas the dominant type of farming is crop specialty.

Peanuts is the other crop, falling within the crop-specialty group, that is grown in Tennessee. This crop can be grown on almost any type of soil though it does best on light sandy loams. Soils having sufficient lime usually give a peanut crop that is better filled, that has whiter shells, and that has a greater weight per bushel.⁽¹⁵⁾ The important areas in peanut production - the Western Rim groups - do have considerable soil derived from rock that is relatively high in calcium. Whether or not soil is the most important factor in the production of peanut in the Western Rim counties cannot be determined, but at any rate, there are comparative large areas of soil within the region that are well adapted to the growing of peanuts. Hence, the production of peanuts is reflected in the comparatively high percentage of crop specialty farms within the Western Rim area. All of the crop-specialty farms within this area do not produce peanuts, however; a comparative large acreage of tobacco is produced in Dickson, Stewart, and Houston counties, and some in Humphreys County, which partially accounts for the crop-specialty farms of the region (Figure 24). However, in the major peanut producing area, tobacco is of relatively little importance.

(16)

Fruit Farms.

Moore refers to certain soils which are well suited to orchards and small fruits.⁽¹⁷⁾ One of these is the ridge land

(15) Beattie, W. R., and Beattie, J. H., Peanut Growing, U.S.D.A. Farmers' Bulletin No. 1656, pp. 1-6.

(16) Farms receiving 40 per cent or more of the income from the sale of tree or other fruits.

(17) Moore, C. A., Soils of Tennessee, p. 2.

of the Knox Dolomite formation, found in large areas in the Lower East Tennessee Valley. Meigs County, which falls within this group, has 15.7 per cent of its farms classified as fruit farms. Bradley County, which lies within the same division, is the second leading county of the groups under study in percentage of farms classified as fruit, with 1.1 per cent. In other counties considered in this study, fruit farms are very few in number. In fact, for the State as a whole, only 0.46 per cent of the farms fall in this classification.

Truck Farms. ⁽¹⁸⁾ Most vegetable crops thrive best on a well drained, light sandy loam soil. However, if land is favorably located in relation to market or transportation facilities, soils may be modified to meet the most favorable conditions. ⁽¹⁹⁾ In Tennessee, each of the urban counties have a considerable number of truck farms. However, Gibson is the leading county in the State in the percentage of truck farms. This evidently is not due to soil alone, nor to the county's advantageous location in regard to market. It is possibly due to a combination of factors -- favorable climatic and soil conditions, accessibility to market, and in no small measure to the impetus of an early start and to the efforts of farm leaders of the county. They have set up marketing machinery without which the profitable production of truck crops would be impossible.

Dairy Farms. ⁽²⁰⁾ Dairying regions are determined by a number of

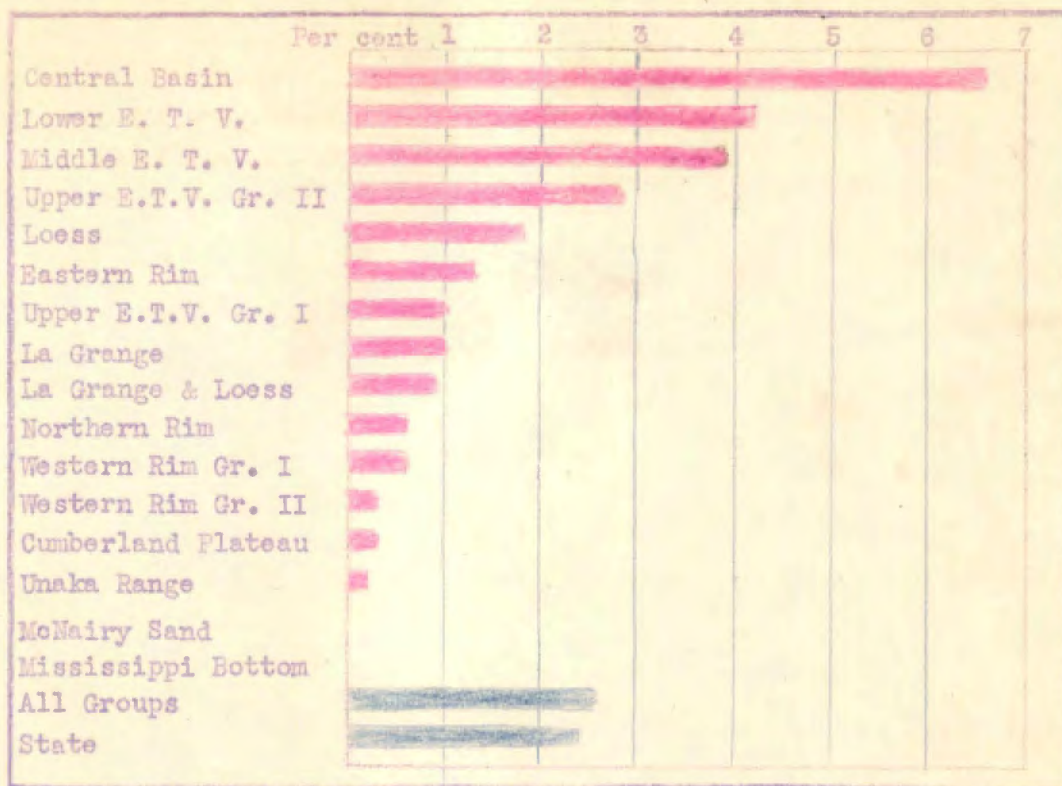
(19) Thompson, H. C., Vegetable Crops, p. 22.

(20) Farms receiving 40 per cent or more of the income from sale of milk, cream, butterfat, butter, dairy cows and calves.

factors, chief of which are proximity to whole milk market, transportation facilities, feed supplies, pasture land, and feed crops. The soil has a direct bearing on the availability of feed and suitable pasture land. Thus, the Central Basin, because of its phosphatic-limestone soil, is the leading dairying region in Tennessee, with 6.6 per cent of its farms classified as dairy farms. The limestone valleys of East Tennessee Valley are also adapted to dairying. In contrast, to these leading dairying areas, the Cumberland Plateau and Unaka Range report only 0.3 per cent and 0.2 per cent respectively of the farms classified as dairy farms. In these areas the land is not suitable for pasture, except under range conditions; nor is it suitable for the economical production of feed crops. In West Tennessee, the production of crops tends to crowd out other uses of the land and therefore dairy and livestock farms are relatively few, except for dairy farms in the Memphis milk shed area. However, one reason for the comparatively few dairy farms lies in the fact that the soil is not as suitable for the production of grass as are the soils of limestone origin found in the Central Basin and East Tennessee (Figure 25).

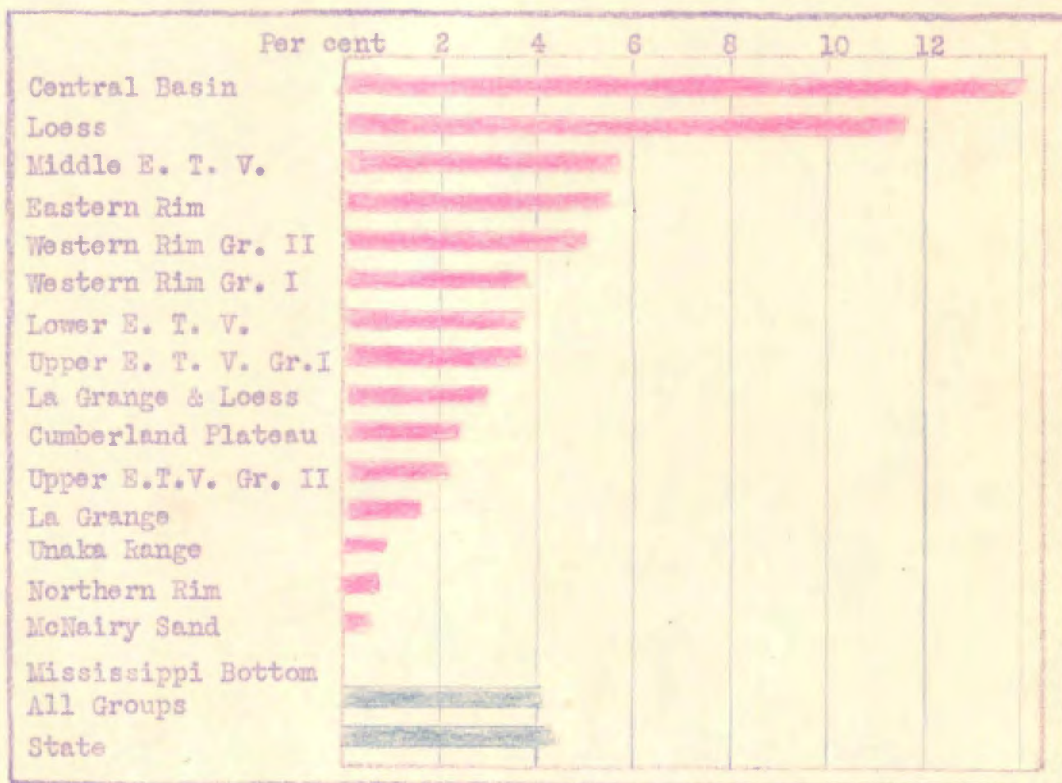
(21)
Animal Specialty. In livestock farming, as in dairy farming, an abundance of feed crops, particularly roughages and pasture, is necessary for livestock production. Thus, the Central Basin is the leading area of the State in percentage of livestock farms, with 14.1 per cent. Also the East Tennessee Valley, because of its many fertile val-

(21) Farms deriving 40 per cent or more of income from the production of all classes of beef cattle, sheep, hogs, wool, mohair, and slaughtered animals. A farm on which emphasis is placed on the production of crops and feeding of livestock.



Source: Based on Table VIII.

Figure 25. Per cent of all farms that are dairy farms, 1930



Source: Based on Table VIII.

Figure 26. Per cent of all farms that are animal specialty farms, 1930

leys interspersed by ridge land, is conducive to livestock farming. In the Loess region of West Tennessee, the extensive production of corn is conducive to hog production. As was explained in the section on cash grain farms, soil fertility is a primary factor in the production of corn, and indirectly accounts for the fact that 11.6 per cent of the farms of the Loess area are classified as animal-specialty farms. In other areas of the State, competition of crops, which indirectly may be attributed to the soils, tends to reduce the percentage of farms classified as animal-specialty farms (Figure 26).

Stock-Ranch Farms. ⁽²²⁾ Normally one would expect to find the stock ranches in relatively rough areas of poor fertility - areas unadapted to the production of crops. Thus in the United States they are found principally in the Far-West. In Tennessee, they are of relatively little importance, only 53 of the 246,657 farms in Tennessee being classified as stock ranches. ⁽²³⁾

Poultry Farms. ⁽²⁴⁾ Directly, soils play a minor part in poultry production. It is true that poultry specialists recommend certain characteristics of the soil as being favorable for the poultry range; but, for the most part, the type of soil is relatively unimportant so long as it is well drained. Considering the fact that poultry-keeping fits in with good farm management practices, it follows that indirectly

(22) A farm on which emphasis is placed on the production of livestock by grazing. Where acreage in pasture is 5 times acreage in crops.

(23) U. S. Census of Agriculture, 1930, Vol. IV, p. 881.

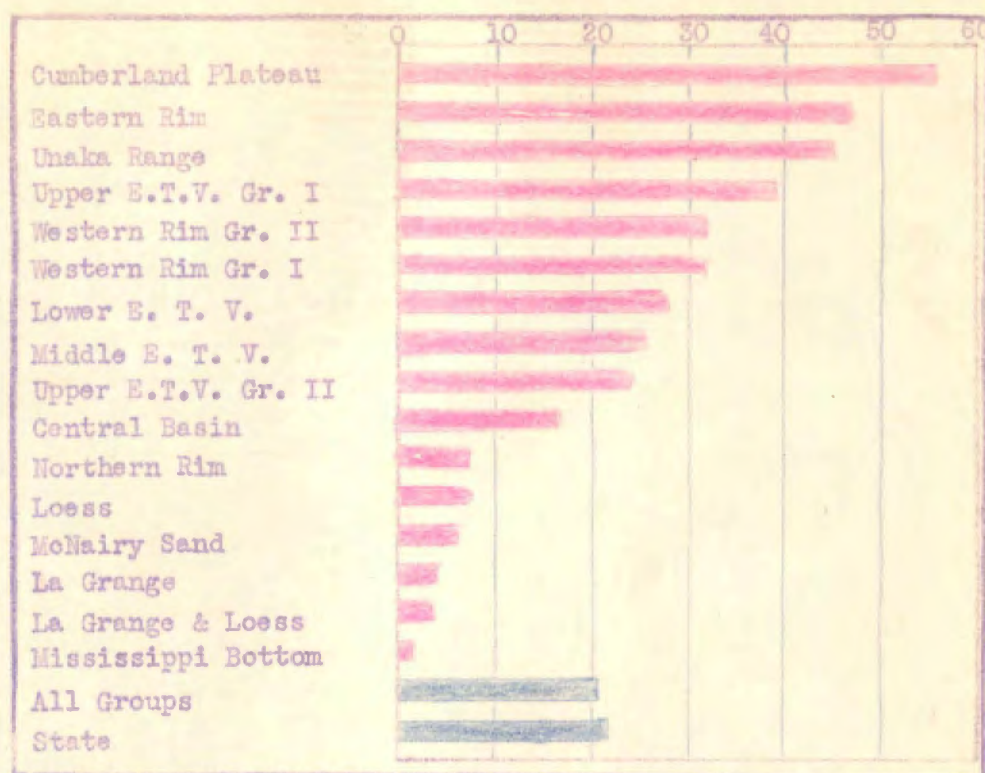
(24) Farms deriving 40 per cent or more of their income from poultry or poultry products.

the selective influence of the soil on the quality of the farmer who tills it does tend to encourage poultry production. Areas producing an abundance of corn and small grain are conducive to poultry farming. Thus for these reasons Group II of the Upper East Tennessee Valley and the Central Basin are the two leading regions of the State in poultry production from the standpoint of the percentage of farms classified as poultry farms.

(25)

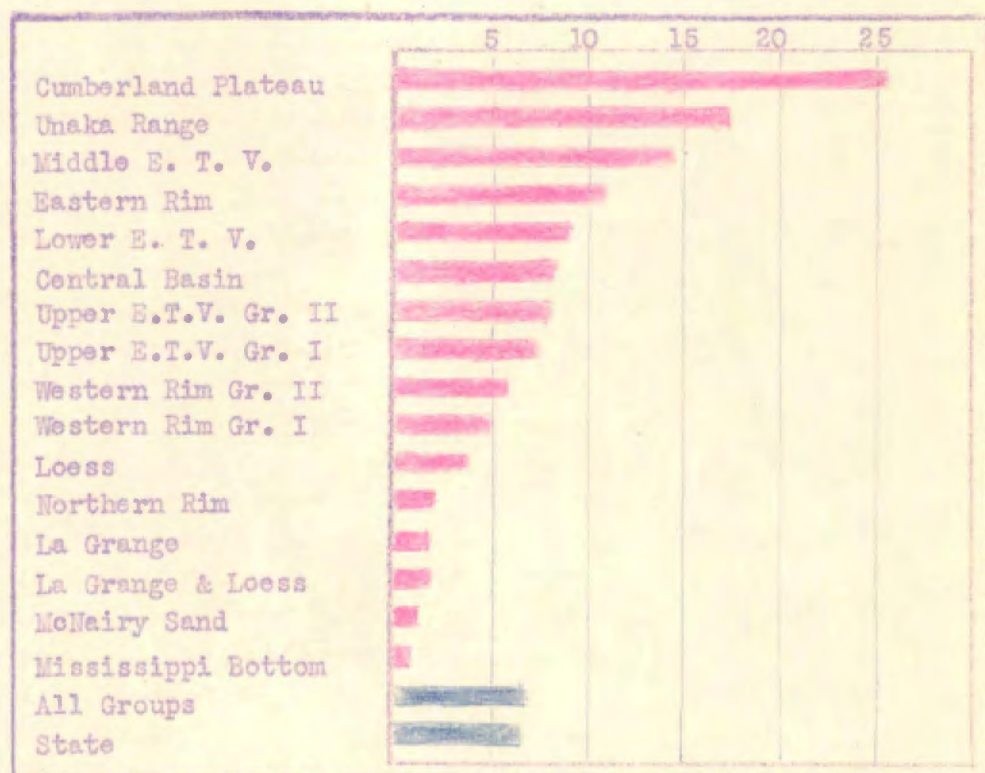
Self-Sufficing Farms. The self-sufficing type of farming was the earliest type practiced. Before agriculture became an industry -- that is, was carried on on a commercial scale -- the farm supplied practically all of the necessities of life. With changes and improvements in farming the commercial farm has to a considerable extent replaced the subsistence type of farming in many regions. Only in areas which have not been able to make use of modern farm machinery, either because of rough topography or poor soil, is the self-sufficing farm found in large numbers. For instance, in Tennessee, the subsistence farm is closely associated with the comparatively unproductive soils and rugged topography of the Cumberland Plateau and the Unaka Range, in which areas 55.3 per cent and 45.5 per cent, respectively, of the farms are classified as self-sufficing. The Eastern Rim, too, is high in percentage of self-sufficing farms, 46.9 per cent being classified as such -- particularly in the northeastern Rim. Within this area

(25) Where the value of farm products used by the operator's family was 50 per cent or more of the total value of all products of the farm it was classified as self-sufficing.



Source: Based on Table VIII.

Figure 27. Per cent of all farms that are self sufficing, 1930



Source: Based on Table VIII.

Figure 28. Per cent of all farms that are part time, 1930

there is a wide variation in soil fertility. Coffee and Franklin, the two most productive counties within the area, have only 37.5 per cent and 30.6 per cent of self-sufficing farms, compared with 64.0 per cent for Overton, one of the poorer counties in the area. In the more fertile areas, commercial types of farming have largely replaced the self-sufficing farm. In the Central Basin, for example, only 16.9 per cent of all farms are classified as self-sufficing, compared with 1.2 per cent in the fertile Mississippi Bottom (Figure 27).

Part-Time Farms. (26) Farming in many of the poorer areas of the United States can hardly be justified except where non-farm employment is available for a part of the year. In the Cumberland Plateau lumbering and mining combined with part-time farming, help to increase low farm incomes. Here, 25.4 per cent of the farms are classified as part-time farms. In the Unalca Range part-time farms comprise 17.4 per cent of all the farms. Part-time farming is most likely to be prevalent in relatively poor farming areas that offer non-farm employment. However, any area offering non-farm employment is conducive to part-time farming, as is shown by the fact that 19.8 per cent of the farms of the urban county, Knox, are of this type (Figure 28).

Influence of Soils on the Quality of Farming

The relative merits of different farming areas is not easily determined, except for the extremely poor areas and the extremely fertile

(26) Any farm where the operator spent 150 days or more off the farm, in other than farm work, or reported an occupation other than farming, provided the value of products does not exceed \$750.00.

areas. For instance, the advantage offered by fertile soil in a given area may be overcome by the high price of land, or by other factors. To determine the relative merits of farming practices in two areas having several varying conditions is even more difficult, for as already shown in this chapter, farming practices have been adapted for the most part to the natural character of the land. Thus a farm practice that might be adapted to one region possibly would not be profitable in other regions.

There are, however, some important factors that may be considered in comparing the relative advantages of various areas for farming. Such factors as intensity of land use, crop yields, the use of modern farm machinery, and the use of fertilizer have frequently been used to measure the relative merits of various areas for farming.

Intensity of land use was shown in the previous chapter, in which it was pointed out that soil is fundamental in determining the uses to which land is adapted. Only under exceptional conditions, is it profitable to use land intensively if the soil does not have at least average natural fertility.

Crop Yields. The yield per acre of crops is one of the most important factors determining the profits from farming. If all the land within an area were used for crops, the average yield would be a satisfactory index of the average soil fertility of that area. However, since the most fertile land on the farm is commonly used for crops, data on crop yields are inadequate as a basis for determining the soil fertility of the entire land area. For instance, in areas having poor



Fig. 29. Crop yield indices, Tennessee counties

(27)

TABLE IX. CROP YIELD INDEX IN TENNESSEE

County	Index Pct.	County	Index Pct.	County	Index Pct.
Anderson	90.23	Hamilton	87.93	Morgan	73.37
Bedford	105.71	Hancock	85.88	Obion	121.68
Benton	92.78	Hardeman	74.82	Overton	69.56
Bledsoe	85.64	Hardin	97.42	Perry	116.98
Blount	92.23	Hawkins	100.08	Pickett	75.09
Bradley	83.17	Haywood	87.05	Polk	85.88
Campbell	84.07	Henderson	93.57	Putnam	84.61
Cannon	106.26	Henry	96.88	Rhea	88.15
Carroll	93.67	Hickman	109.78	Roane	90.63
Carter	106.41	Houston	106.80	Robertson	112.26
Cheatham	113.58	Humphreys	119.16	Rutherford	100.86
Chester	90.22	Jackson	100.86	Scott	75.28
Claiborne	92.68	Jefferson	105.46	Sequatchie	89.07
Clay	92.50	Johnson	115.07	Sevier	88.76
Cocke	92.43	Knox	99.52	Shelby	84.30
Coffee	96.83	Lake	148.63	Smith	119.49
Crockett	105.01	Lauderdale	109.67	Stewart	105.37
Cumberland	87.00	Lawrence	96.68	Sullivan	109.13
Davidson	122.21	Lewis	101.70	Sumner	109.47
Decatur	95.62	Lincoln	101.29	Tipton	97.44
DeKalb	106.48	Loudon	99.83	Trousdale	109.89
Dickson	98.52	McMinn	84.96	Unicoi	85.86
Dyer	133.89	McMurry	86.63	Union	82.97
Fayette	69.53	Macon	83.69	Van Buren	77.66
Fentress	82.56	Madison	89.44	Warren	87.05
Franklin	97.40	Marion	99.11	Wayne	94.65
Gibson	109.18	Marshall	99.11	Washington	108.41
Giles	106.42	Mauzy	116.65	Weakley	104.33
Grainger	90.96	Meigs	88.50	White	82.00
Greene	95.89	Monroe	81.08	Williamson	116.13
Grundy	91.31	Montgomery	107.91	Wilson	107.19
Hamblen	109.22	Moore	96.98	State average	100.00

Source: Census of Agriculture, 1890, 1900, 1910, 1920, 1925 and 1930.

(27) Note: 100 per cent = State average yield for census periods 1889-1929 for the following crops combined: corn, wheat, oats, barley, rye, hay, sweet potatoes, white potatoes, tobacco, cotton, strawberries, and peanuts. To obtain county index the actual yields for each commodity in each county was graduated in percentages above or below 100 according as the yield for the given county is above or below the State average. Then the acreage of each crop was applied as weights.

soils, the crop land might be very small in relation to the total area, yet comparatively fertile. Hence, the crop yields may be far from representative of the fertility of the soil type as a whole. Although inadequate as an absolute index of soil fertility for this reason, a comparison of crop yields in different areas indicates to some extent the relative fertility of the soils. A low crop yield index of a given area is a good indication of low average fertility in the entire area; a high index, however, is not so likely to indicate a high average fertility throughout the area. (28)

The average yield of twelve major crops combined in a percentage of the average for the State is shown by counties in Table IX and Figure 29. In general the crop yields compare with other factors previously mentioned as indicators of differences between soil types. The Cumberland Plateau ranks low in crop yields, the indices for the representative counties being: Cumberland, 87.0; Morgan, 73.3; and Scott, 75.3. On the other hand, the fertile Mississippi Bottom, represented by Lake County, has a crop yield index of 148.6, and the Loess soils represented by Obion County, has a crop yield index of 121.0. That the counties of the Central Basin have crop yield indices above the State average is to be expected in view of the fact that these counties rank high in the other factors studied. In the Western Rim group of counties, the crop yield indices do not represent the average fertility of the soils of this region since the fertile alluvial soil in the river valleys comprises a large percentage of

(28) Hill, F. F., and Blanch, G. T., An Economic Study of Land Utilization in Montgomery County, New York, 1932. Cornell Agri. Exp. Station Bulletin No. 613, p. 22.

the total crop land. Since corn is the principal crop grown in these valleys, high corn yields result in a relatively high crop index for these counties. In the case of the McNairy Sand group the low crop yield index is more representative of the fertility of the area because a larger percentage of the land is used for crops and a relatively small percentage of the crop land is in river bottoms.

Farm Machinery. The ability to use farm machinery accounts for the fact that certain areas engage in a commercial type of farming, while other areas continue to practice subsistence types of farming. There are probably two reasons why poor areas do not make extensive use of farm machinery. In the first place, the topography of the land is not suitable for the use of modern farm machinery. In the second place, the income of the farm is not large enough due to low yields and the small size of the farming business to afford expenditures for farm improvements. Thus the ability of an area to use farm machinery is a fair index of the merits of farming in that area. The farmers of the more fertile areas have the advantage over farmers in poor areas in having not only higher yields per acre, but they are able to cultivate a larger acreage at a lower cost by using more and better farm equipment. For instance, in the Cumberland Plateau, there is an investment in farm machinery of only \$1.57 per farm acre compared to an investment of \$2.67 in the Central Basin (Table X and Figure 30). In the Western Elm the per acre value is \$1.29 and \$1.33 for Group I and Group II respectively. On the other hand, Group II of the Upper East Tennessee Valley (Greene, Sullivan and Washington counties) reports an investment in farm machinery of \$4.02 per farm acre. This latter group comprises the best farming land in the

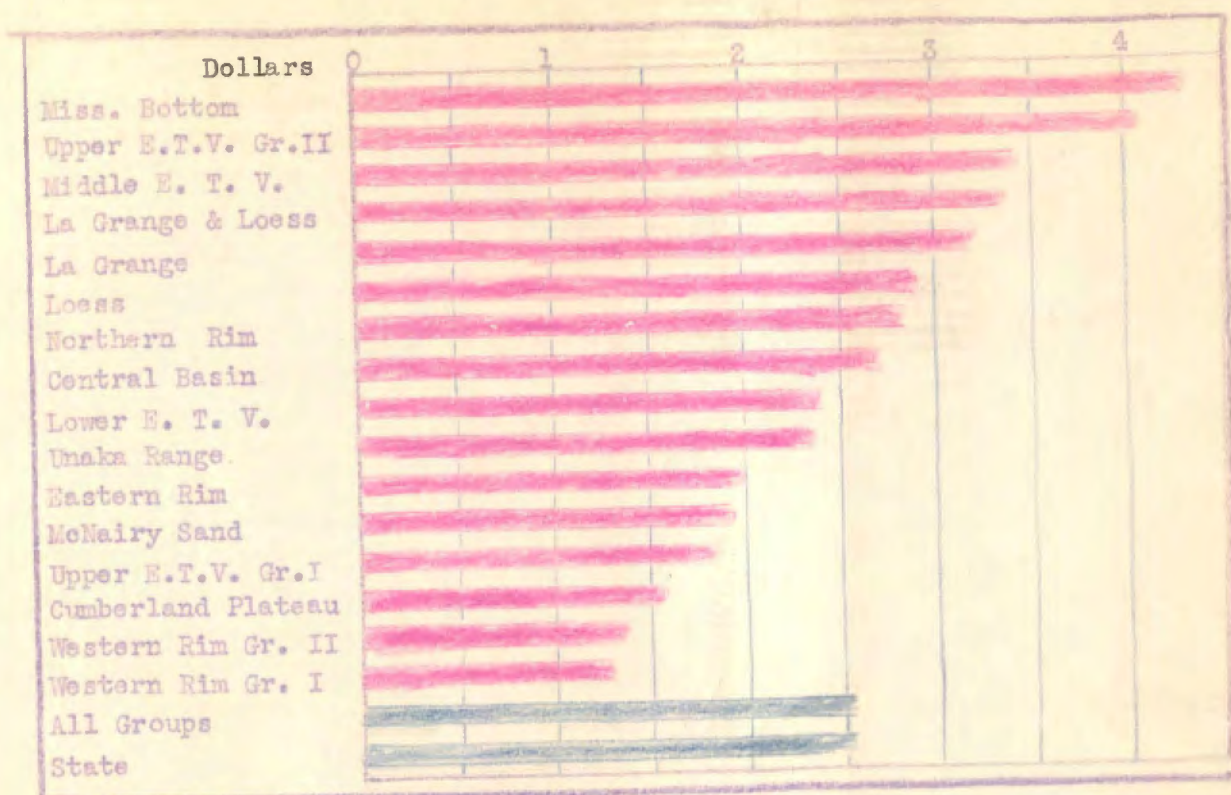
East Tennessee Valley. All of the West Tennessee groups report a relatively large investment per farm acre in farm equipment. There, of course, the fact that a larger proportion of the land is in crops necessitates a greater expenditure in equipment per farm acre. Nevertheless, the fertility of the soil is reflected in the investment in farm equipment. The poor sand soils of McNairy Sand area had an investment of \$1.95 per farm acre in 1930 compared with \$2.92 in the Loess area - the second lowest in this respect in West Tennessee (Table X).

TABLE X. VALUE OF FARM IMPLEMENTS PER ACRE AND NUMBER OF FARMS PER TRACTOR, 1930

Soil Region	Value of Farm Im- plements Per Farm Acre	Farms Per Tractor	Soil Region	Value of Farm Im- plements Per Farm Acre	Farms Per Tractor
	Dollars	Number		Dollars	Number
Unaka Range	2.35	86.0	Western Rim		
Upper E. Tenn. Valley			Group I	1.29	44.9
Group I	1.91	61.5	Group II	1.38	23.7
Group II	4.02	33.7	McNairy Sand	1.95	61.1
Middle E. Tenn. Valley	3.45	21.8	LaGrange	3.20	44.6
Lower E. Tenn. Valley	2.38	22.7	LaGrange & Loess	3.32	36.0
Cumberland Plateau	1.57	75.2	Loess	2.92	16.2
Central Basin	2.87	25.6	Mississippi Bot- tom	4.51	53.9
Eastern Rim	1.97	62.8			
Northern Rim	2.83	14.0	All Groups	2.55	32.6
			State	2.54	37.5

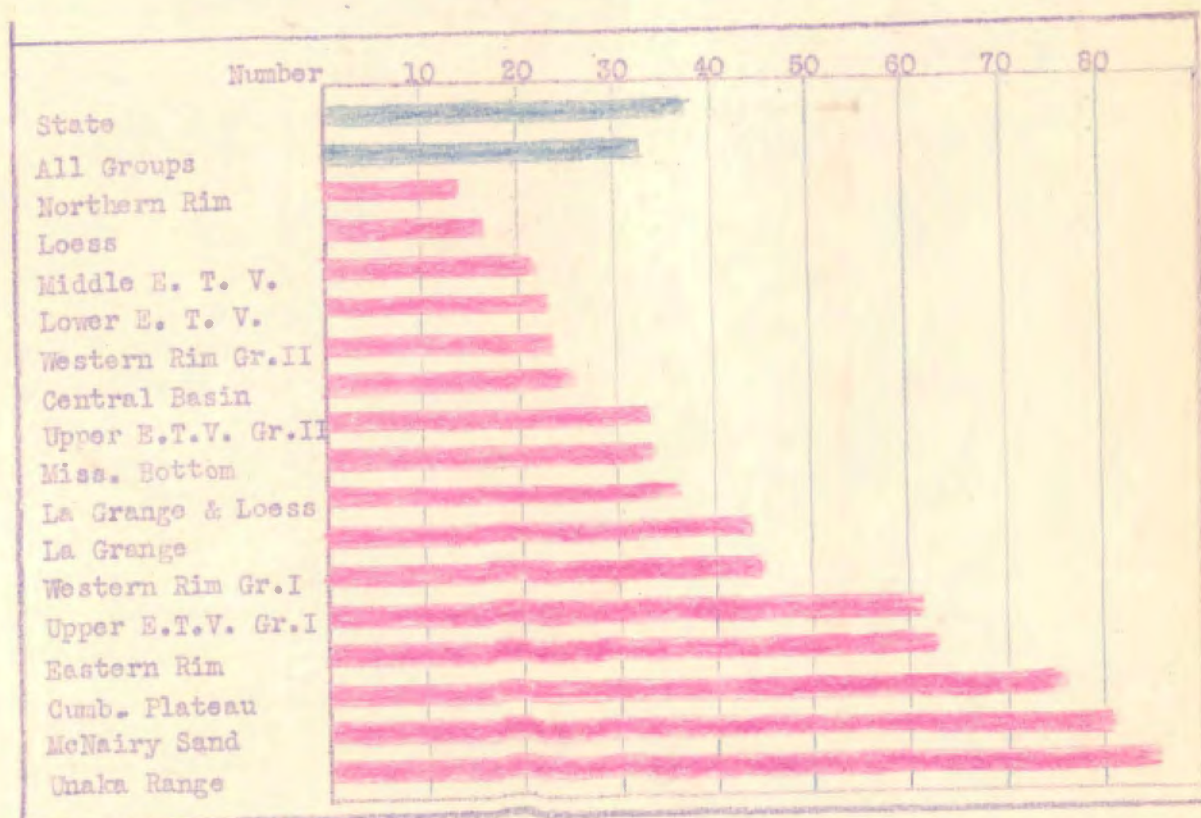
Source: 15th Census of Agriculture, 1930, Tennessee, Series 2.

The farm tractor, which has done much to revolutionize agriculture, is not used extensively except in regions having comparatively large farms with level and fertile land for the most part. The Loess area (Obion County) has one tractor for 1347 acres of land or 16.2 farms. On the other



Source: Based on Table X.

Figure 30. Value of farm machinery per farm acre, 1930



Source: Based on Table X.

Figure 31. Number farms per tractor, 1930

hand, the McNairy Sand area has 6,539 acres of farm land and 81.1 farms per tractor. Both the Central Basin and the Northern Rim report a comparatively large number of tractors in relation to farm land and number of farms. Both of these regions have fertile soils and rolling topography in the main. In contrast, the Cumberland Plateau reports 5,786 acres of farm land and 75.2 farms per tractor (Figure 31).

CHAPTER IV

INFLUENCE OF SOIL TYPES ON FARM INCOME

The measure for the agriculture of any nation is the standard of living it affords for those engaged in it, and the wealth basis it supplies for rural community welfare. The standard of living of the farm population is determined primarily by the annual income it receives and the wealth it is able to accumulate. The comforts, conveniences, health, education, recreation, and the future security of the farm family depends largely on the net farm income, and the savings that the family is able to make. Wealth and income are also the surest basis for rural social welfare, using welfare in its truest sense. Schools, churches, roads, public health, agricultural extension services, farmers' recreation centers, and other community improvements are limited by the economic resources of the farming population. (1)

Net Farm Income

Warren says, "The area in crops and the natural yielding power of the soil are the most important factors in determining profits in farming". (2) The relationship between soils and the area in crops was shown in Chapter II. The regions having fertile soils have a larger proportion of the land area in crops than do regions having poor soils. The influence of soils on crop yields was also shown in Chapter III.

A study of soil, as it relates to the income of farmers, shows considerable areas of certain land types in which practically all the farms have low incomes and other areas in which high incomes are generally obtained. Incomes of farmers on poor, rough, stony land are generally low, compared with the incomes of farmers on the better kinds of land. For

(1) Yoder, Fred R., Introduction to Agricultural Economics, p. 454.

(2) Warren, G. F., Farm Management, p. 518.

example, the average net income per farm was only \$205 in the Unaka Range and only \$357 in the Cumberland Plateau in 1929 (see Table XI and Figure 32). In contrast to these relatively poor areas the average net farm income in the Central Basin, where the soils are fertile, was \$505.

TABLE XI. FARM INCOME, CASH-RENT, AND WAGES BY REPRESENTATIVE SOIL AREAS, 1929

Soil Region	Farm Income				Cash- Rent Per Farm Acre	Farm Wages Per Day's Labor
	Gross Total	Net Farm Income				
		Total	Per Farm	Per Farm Acre		
	(\$1000)	(\$1000)	Dols.	Dols.	Dols.	Dols.
Unaka Range	409	177	205	4.07	1.62	1.72
Upper E. Tenn. Valley						
Group I	7,606	4,309	467	6.45	2.20	1.11
Group II	11,416	6,932	621	9.85	2.40	1.52
Middle E. Tenn. Valley	8,510	3,491	461	6.22	3.20	1.48
Lower E. Tenn. Valley	4,552	2,416	479	4.49	1.58	1.33
Cumberland Plateau	1,952	1,155	357	4.64	0.46	1.57
Central Basin	16,665	7,769	505	5.93	2.71	1.24
Eastern Rim	10,333	5,785	389	4.80	1.61	1.22
Northern Rim	10,630	6,756	799	11.53	2.16	1.56
Western Rim: Group I	3,611	2,313	600	4.95	0.84	1.26
Group II	4,649	3,166	607	5.21	2.58	1.28
McNairy Sand	7,959	5,803	675	8.37	1.40	1.26
LaGrange	17,380	14,086	801	14.52	2.84	1.36
Loess	4,535	3,020	911	10.94	4.65	1.55
LaGrange & Loess	29,819	23,441	805	14.55	3.46	1.38
Mississippi Bottom	2,257	2,104	1,879	32.95	9.37	1.67
All Groups	120,166	75,616	607	8.13	3.19	1.38
State	232,711	145,926	594	8.09	2.89	1.38

Source: Computations based on 15th Census of Agriculture: 1930, Tennessee.

The average net income per farm for the State was \$594, or higher than for the Central Basin. This is due to the fact that farm incomes in West Tennessee, because of the greater intensity of farming in that section, are much higher than in either Middle or East Tennessee. Land is

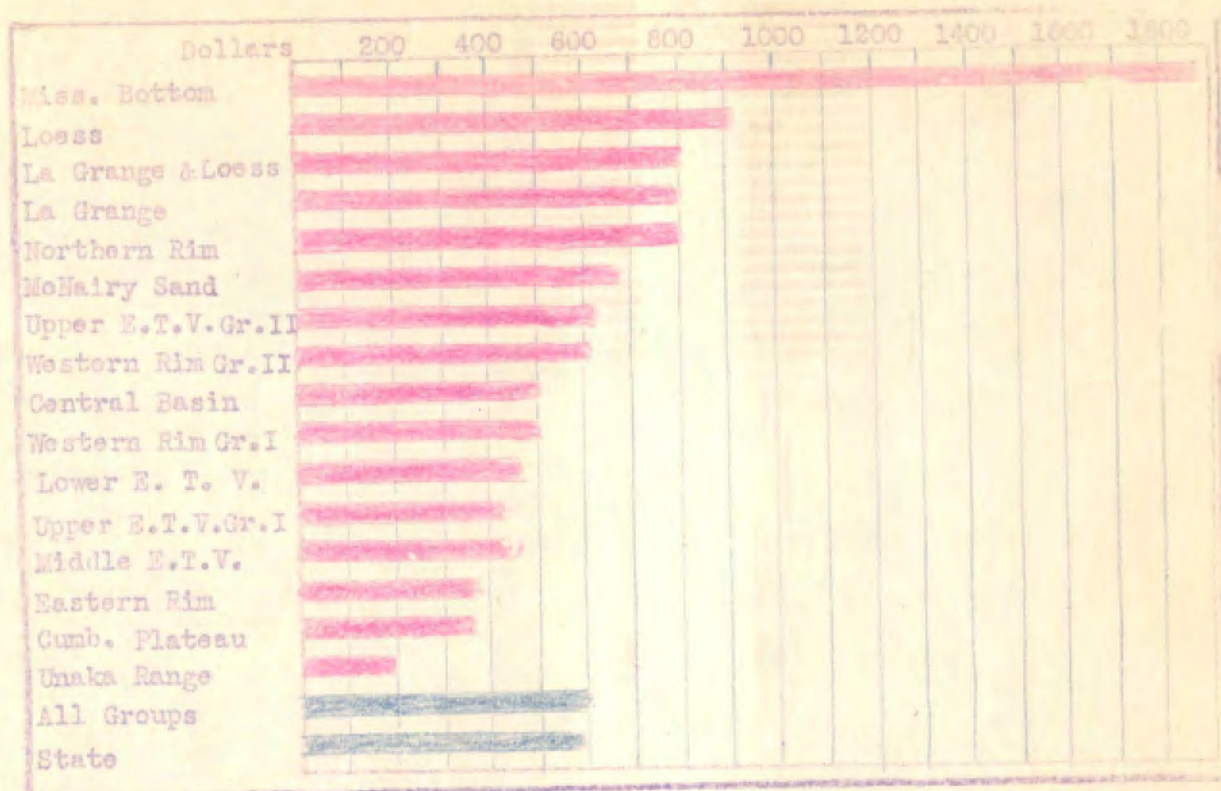
only one factor in production. Other factors are labor and capital. An increase in the application of any one of these factors results in greater returns until the point of diminishing returns is reached. Thus, some crops require more labor than others, and when successful, bring higher returns.

(3) In West Tennessee the leading crop is cotton, which, according to Warren, requires an average of 12 man work units and 8 horse units for the production of an acre compared with an average of 3 man work units and 5 horse work units required in the production of an acre of corn husked from the standing stalk.⁽⁴⁾ Therefore, because of the high acreage production of cotton in West Tennessee income per farm is much higher than in other parts of the State. This is true even though the farms in West Tennessee are much smaller than farms in other parts of the State (that is, using acres per farm operator).

Within West Tennessee, however, there is a rather close relationship between soil fertility and farm income. The Mississippi Bottom (represented by Lake County), for instance, has a net income per farm of \$1879; the Loess area, \$911; the LaGrange and Loess (combined), \$805; and the LaGrange, \$801; and the McNairy Sand \$675. These areas decrease in fertility successively from the Mississippi Bottom to the McNairy Sand group. The difference in farm income between the LaGrange and the combination group, the LaGrange and Loess, is probably not as great as one would expect after seeing the much higher income for the Loess area alone. In the combination group, however, the addition of Haywood County with an income of only

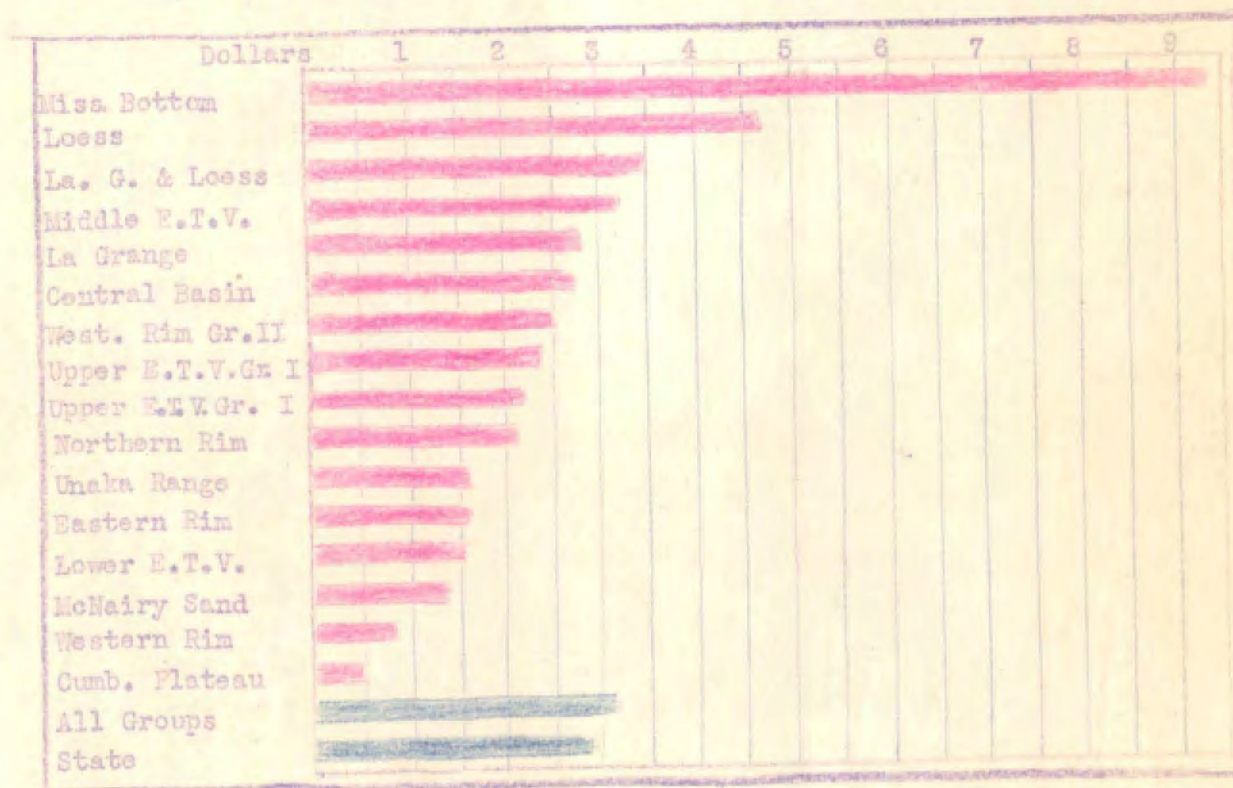
(3) Ibid., p. 145.

(4) Ibid., p. 351.



Source: Based on Table XI.

Fig. 32. Net income per farm, by county soil areas, 1929



Source: Based on Table XI.

Figure 33. Cash rent received per acre of land, by county soil areas, 1929

\$678 keeps the average for the group lower than one might expect.

The average net income per farm in the Western Rim is high in comparison with other groups in Middle and East Tennessee, even though the Western Rim ranks relatively low in soil fertility. In this area, however, it is to be recalled that the size of farms averages about 50 per cent larger than for the State as a whole. This factor tends to offset the disadvantage of the poor soil. On the basis of net income per acre it is to be noted that both of the Western Rim groups rank relatively low.

Cash Rent Value of Land

Rent represents more nearly the returns for the use of land than does farm income. The application of both labor and capital (other than capital invested in land) is reflected in farm income, whereas rent is the income for the use of land separate from the returns from the application of fertilizers, good management, etc.

However, rent is determined chiefly by the income from land. The least desirable land in use at a given time is thought of as being rent free, or no-rent land. Rent then is measured by the difference in the value of the products resulting from a given outlay of labor and capital on a given piece of land and on the no-rent land. Rent, therefore, is highest on the most productive land and lowest on the least productive. (5) This fact is shown in a comparison of rents in the various soil areas. In the Cumberland Plateau the cash rent of farm land was only \$0.46 per

(5) Taylor, Henry C., Outline of Agricultural Economics, pp. 238-9.

acre, in 1930, compared with \$2.71 per acre in the Central Basin (see Figure 33). Group I of the Western Rim had a cash rent value of \$0.84 per acre compared with \$2.16 in the Northern Rim. In the Mississippi Bottom, the cash rent value was \$9.57 per acre. The second highest West Tennessee group was the Loess, with \$4.65 cash rent per acre. Following these were the LaGrange and Loess (combined) with \$3.46, the LaGrange with \$2.84, and the McNairy Sand with \$1.40 cash rent per acre. As stated above, these West Tennessee soil groups decrease successively in fertility from the Mississippi Bottom to the McNairy Sand group.

Farm Wages

Warren says that the individual farmer is always better off in periods when labor is high, because much of the farmer's profits are on the labor that he and his family do.⁽⁶⁾ For the same reason, farmers in regions where wages are high usually are better off than farmers in regions where wages are low.

Ordinarily one would expect farm wages to be highest in areas where farming is most profitable, since farmers in such areas are able to pay higher wages than those in poorer areas. Yet opportunities for outside employment also affect farm wages. If a comparison is made of the West Tennessee areas it is very noticeable that wages are highest on the better land (Table XI). In fact, farm wages increase successively from the McNairy Sand group, on the eastern side of West Tennessee, to the Mississippi Bottom. In East Tennessee and on the Cumberland Plateau, opportunities for outside employment are more numerous and, therefore, tend to raise farm wages. Thus, while the relationship between soil type and

(6) Warren, op. cit., p. 331.

income and rent cannot be attributed entirely to soil type, farm incomes are low on soils of low productivity, with few exceptions, regardless of other factors.

Soils influence the other factors which in turn affect farm incomes. Henry C. Taylor says, "Soils affect receipts and expenditures through the selective influences they exert on the farmers operating those soils, and through the farmers by their effect on efficiency of operation and management. The better soils are believed to attract the better farmers."⁽⁷⁾ Observations limited to a single community indicates that the best land is usually occupied by the most intelligent and thrifty farmers, whereas the less desirable land in the community is occupied by men not so well endowed by nature to put the land to its highest use.⁽⁸⁾ Whether or not this is true of much larger areas is questionable. Nevertheless, it remains that whereas a poor farmer may make a living on good soil, even a good farmer finds real difficulty making a living on poor soil.

Relationship of Ratio of Farm Income to Value of Farm

Land and Buildings

The per cent that the value of farm products sold, traded, or used by the farm family is of the value of farm land and buildings is shown for the average of all farms and for five types of farms by counties in Table XII and Figure 34. The most important factor influencing the per cent that the value of products is of the value of land and buildings seems to be type of farming and the value of the land. In the most intensive

(7) Taylor, op. cit., p. 140.

(8) Ibid., p. 140.

farming areas and in areas of low land values, the value of agricultural production tends to be high in relation to land values.

Thus in West Tennessee, where cotton farming is the prevalent type, the percentage that the value of agricultural production was of the value of land and buildings was high in comparison with the rest of the State. This was true of all counties except Shelby, in which county land prices are high due to urban influences. Within West Tennessee, the percentages were highest in the southern counties. It is to be recalled that the soils of these counties are poorer than the soils of the counties in the northern half of West Tennessee. It is also true that a larger percentage of the farms in the southern half of West Tennessee are of the cotton type than in the northern half, which factor is perhaps more important than soils in accounting for the higher percentages in the southern half.

The percentages that value of agricultural production was of value of land and buildings was below the State average of 30 per cent in most of the Central Basin counties. In the East Tennessee Valley the percentages were higher in Campbell, Claiborne, Union, Grainger, Roane, and Polk counties than in the other counties of that area. These are among the poorest counties of the East Tennessee Valley. For the area as a whole, the percentages were low. This, possibly, is due to the fact that land values are high in the East Tennessee Valley because of urban influences and the high percentage of part-time type of farming. The fact that many farms serve as a home for part-time workers in industry tends to cause land values to be high even on poor soils.

On the Cumberland Plateau the percentage that value of agricultural production was of the value of land and buildings was much higher, as a



A. All types of farms



B. General farms



C. Self-sufficing farms

Figure 34. Per cent that value of farm products sold, traded, or used by farm family was of value of land and buildings, by types of farms, 1930
(continued on next page)



D. Animal specialty farms

State Ave. - 34.17



E. Crop specialty farms

State Ave. 36.2



F. Cotton farms

State Ave. - 44.7

Source: Based on Table XII.

Figure 34. Per cent that value of farm products sold, traded, or used by farm family was of value of land and buildings, by types of farms, 1930 (Cont'd)

TABLE XII. PER CENT VALUE OF FARM PRODUCTS SOLD, TRADED, OR USED BY
FARM OPERATOR'S FAMILY IS OF VALUE OF LAND
AND BUILDINGS, 1930

County	All Farms	General Type Farms	Self- Suffic- ing Farms	Animal Special- ty Farms	Crop Spec- ialty Farms	Cotton Farms
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Anderson	26	20	28	18	21	-
Bedford	24	25	19	25	23	32
Benton	33	34	28	26	28	41
Bledsoe	27	32	24	26	32	-
Blount	18	19	16	19	24	-
Bradley	24	25	13	20	27	27
Campbell	33	36	39	39	37	-
Cannon	33	32	34	34	35	-
Carroll	44	39	32	59	40	47
Carter	14	17	17	16	24	-
Cheatham	36	26	22	31	45	-
Chester	57	45	36	60	-	62
Glaiborne	30	33	33	24	28	-
Glay	31	29	33	25	58	-
Cocke	23	21	24	18	37	-
Coffee	27	26	26	28	24	39
Crockett	42	32	15	36	40	45
Cumberland	34	29	34	42	27	-
Davidson	17	16	12	13	30	-
Decatur	53	53	43	35	30	45
DeKalb	28	31	27	29	51	38
Dickson	44	32	24	32	63	-
Dyer	36	32	22	36	34	39
Fayette	51	27	15	26	-	56
Fentress	51	43	53	48	-	-
Franklin	27	26	25	28	39	34
Gibson	41	37	22	29	26	42
Giles	33	28	24	32	23	39
Grainger	30	32	29	27	39	-
Greene	25	22	21	26	29	-
Grundy	35	35	29	53	52	-
Hamblen	22	21	19	24	23	-
Hamilton	16	15	14	27	25	21
Hancock	29	28	29	34	37	-
Hardeman	55	41	35	40	-	63
Hardin	45	37	38	38	-	52
Hawkins	27	23	24	36	31	-
Haywood	46	23	19	29	23	51

(continued)

TABLE XII. PER CENT VALUE OF FARM PRODUCTS SOLD, TRADED, OR USED BY
FARM OPERATOR'S FAMILY IS OF VALUE OF LAND
AND BUILDINGS, 1930 (cont.)

County	All Farms	General Type Farms	Self- Suffic- ing Farms	Animal Special- ty Farms	Crop Spec- ialty Farms	Cotton Farms
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Henderson	55	41	36	57	-	61
Henry	38	38	34	33	40	46
Hickman	30	29	29	30	45	-
Houston	40	36	35	58	55	-
Humphreys	25	26	25	25	27	-
Jackson	29	28	31	29	32	-
Jefferson	23	22	24	19	26	-
Johnson	17	16	18	16	24	-
Knox	16	14	11	19	13	-
Lake	39	-	13	-	-	41
Lauderdale	37	22	19	39	22	44
Lawrence	38	35	29	34	40	45
Lewis	29	30	25	34	53	40
Lincoln	29	26	21	27	23	42
Loudon	21	23	18	15	22	-
McMinn	26	26	23	31	25	33
McNairy	58	53	35	47	-	63
Macon	37	38	32	32	54	-
Madison	38	27	12	35	26	46
Marion	22	23	21	22	26	27
Marshall	26	23	18	29	22	35
Maury	24	23	19	26	31	29
Meigs	26	23	19	25	-	43
Monroe	26	28	27	27	27	-
Montgomery	37	26	24	31	42	-
Moore	29	28	28	31	33	-
Morgan	40	30	41	56	23	-
Obion	30	27	15	31	34	37
Oberton	34	32	35	46	-	-
Perry	26	23	22	26	28	35
Pickett	39	35	41	25	-	-
Folk	29	24	24	26	21	38
Putnam	25	24	25	29	22	-
Rhea	30	33	22	39	70	-
Roane	29	29	23	28	45	-
Robertson	38	22	17	17	43	-
Rutherford	28	27	19	29	19	33
Scott	41	40	41	68	-	-
Sequatchie	29	28	27	28	-	-

(continued)

TABLE XII. PER CENT VALUE OF FARM PRODUCTS SOLD, TRADED, OR USED BY FARM OPERATOR'S FAMILY IS OF VALUE OF LAND AND BUILDINGS, 1930 (cont.)

County	All Farms	General Type Farms	Self-Sufficing Farms	Animal Specialty Farms	Crop Specialty Farms	Cotton Farms
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Sevier	23	22	22	27	29	-
Shelby	25	18	12	31	21	30
Smith	31	30	24	33	41	-
Stewart	41	29	34	38	49	-
Sullivan	18	16	19	17	17	-
Sumner	27	24	24	23	34	-
Tipton	50	32	17	46	44	55
Trousdale	28	25	17	29	32	-
Union	19	24	18	14	25	-
Union	32	32	32	20	34	-
Van Buren	25	22	25	39	-	-
Warren	32	37	27	39	36	46
Washington	18	17	14	22	24	-
Wayne	38	32	29	32	26	45
Weakley	37	38	24	45	39	41
White	25	31	26	27	14	-
Williamson	24	20	22	22	28	-
Wilson	29	28	21	31	31	75
Average	30	26	25	34	36	45

Source: Calculations based on 15th Census of U. S., 1930, Agriculture, Tennessee, Series 3, pp. 12-31.

rule, than the State average. It is possible that these high percentages are due to high farm prices in that area. Because of the large percentage of part-time farming and the relatively poor soils, the Plateau is a deficit area. That is, it does not produce as much agricultural products as it uses. Therefore farm prices in the Plateau are relatively high. The high price of farm products combined with low land values, possibly, accounts for the high percentages that value of agricultural production is of value of land and buildings in that region.

CHAPTER V

INFLUENCE OF SOILS ON FARM WEALTH

In his study, "The Handicaps of Poor Soils", Huntington uses the value of land and buildings as the basis of determining soil fertility. (1) While value is not always a true index of the fertility of the soil, the two are closely related. The fertility of the soil is one of the prime factors in determining the value of the land, and in turn the value of improvements upon the land. The more fertile the soil, the greater is the value of the land. The more valuable the land, the greater is the investment in barns, dwellings and farm implements, as a rule.

Value of Land, Alone

The most productive land in Tennessee is the Mississippi Bottom (Lake County). There the census value of farm land in 1930 was \$70.34 per acre (see Figure 35). On the Cumberland Plateau, the value of farm land per acre was \$10.92, or only 15.5 per cent of the value in Lake County. Even though the average size of farms in Lake County was only 57 acres compared to 77 acres per farm in the Plateau, the value of land per farm was \$4,010 compared with \$840 for the Cumberland Plateau (see Table XIII).

For the West Tennessee groups, the value of farm land per acre was as follows: McNairy Sand, \$12.82; LaGrange, \$27.86; LaGrange and Loess (combined), \$31.49; Loess, \$38.54; and Mississippi Bottom, \$70.34. There

(1) Huntington, E., "Handicaps of Poor Soil", Economic Geography, July 1926, p. 335.

TABLE XIII. VALUE OF ALL FARM PROPERTY AND OF FIXED FARM PROPERTY BY CLASSES FOR SOIL REGIONS,
BY COUNTY GROUPS, 1930

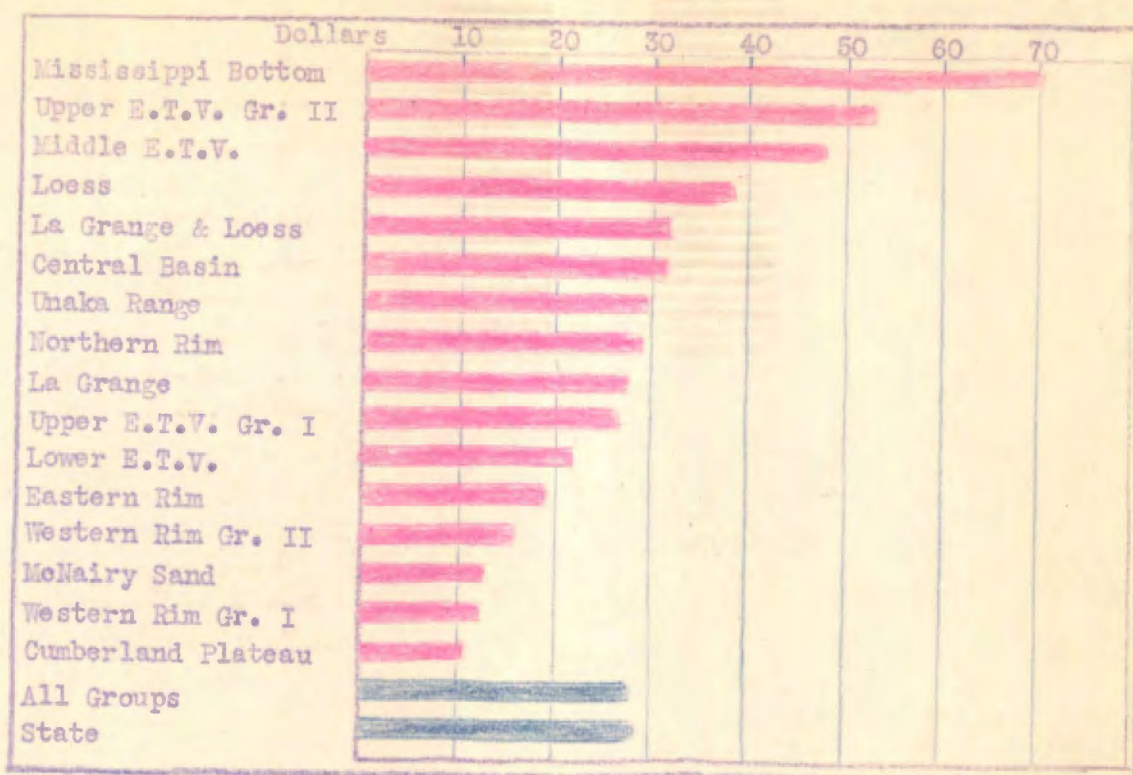
Soil Area	All Farm Property			Land and Buildings			Land			All Buildings			Dwellings		
	Per Farm		Per Acre	Per Farm		Per Acre	Per Farm		Per Acre	Per Farm		Per Acre	Per Farm		Per Acre
	Dols.	Dols.		Dols.	Dols.		Dols.	Dols.		Dols.	Dols.		Dols.	Dols.	
Unaka Range	2,644	52.42		2,324	46.07		1,478	29.30		846	16.77		595	11.79	
Upper East Tenn. Valley: Group I	3,255	45.00		2,704	35.80		1,977	26.16		728	9.64		452	5.24	
Group II	5,489	86.35		4,718	74.88		3,345	53.10		1,373	21.79		984	15.61	
Middle East Tenn. Valley	6,296	85.01		5,574	68.17		3,895	47.91		1,679	20.26		1,016	12.22	
Lower East Tenn. Valley	4,056	37.90		3,335	30.82		2,314	21.74		1,021	12.02		616	5.58	
Cumberland Plateau	2,020	26.24		1,503	19.50		840	10.92		665	8.54		459	5.92	
Central Basin	4,818	56.64		3,884	46.46		2,602	31.05		1,281	15.41		843	10.05	
Eastern Rim	2,880	35.58		2,321	28.57		1,540	19.00		781	9.58		499	6.10	
Northern Rim	3,578	51.61		3,072	44.59		2,005	29.14		1,066	15.44		608	8.79	
Western Rim: Group I	2,338	23.16		1,840	18.29		1,239	12.28		603	6.00		393	3.97	
Group II	3,167	27.15		2,596	21.58		1,905	15.70		690	5.70		442	3.50	
McMairy Sand	2,039	25.28		1,572	19.50		1,034	12.82		538	6.67		389	4.83	
LaGrange	2,835	51.37		2,282	41.64		1,532	27.86		750	13.68		515	9.38	
LaGrange and Loess	3,062	55.55		2,481	46.16		1,691	31.49		790	14.67		534	10.72	
Loess	5,386	64.66		4,447	53.39		3,210	38.54		1,237	14.85		752	9.15	
Mississippi Bottom	5,441	95.42		4,834	84.78		4,010	70.34		823	14.44		452	7.93	
All Groups	3,652	48.90		3,466	46.42		2,078	27.83		946	12.70		619	8.29	
State	3,639	49.65		3,025	41.26		2,099	28.64		926	12.64		602	8.21	

Source: Computations based on 15th Census of Agriculture, 1930, Tennessee.

TABLE XIV. VALUE OF FARM PROPERTY BY SOIL TYPES, BY CIVIL DISTRICT GROUPS, 1930

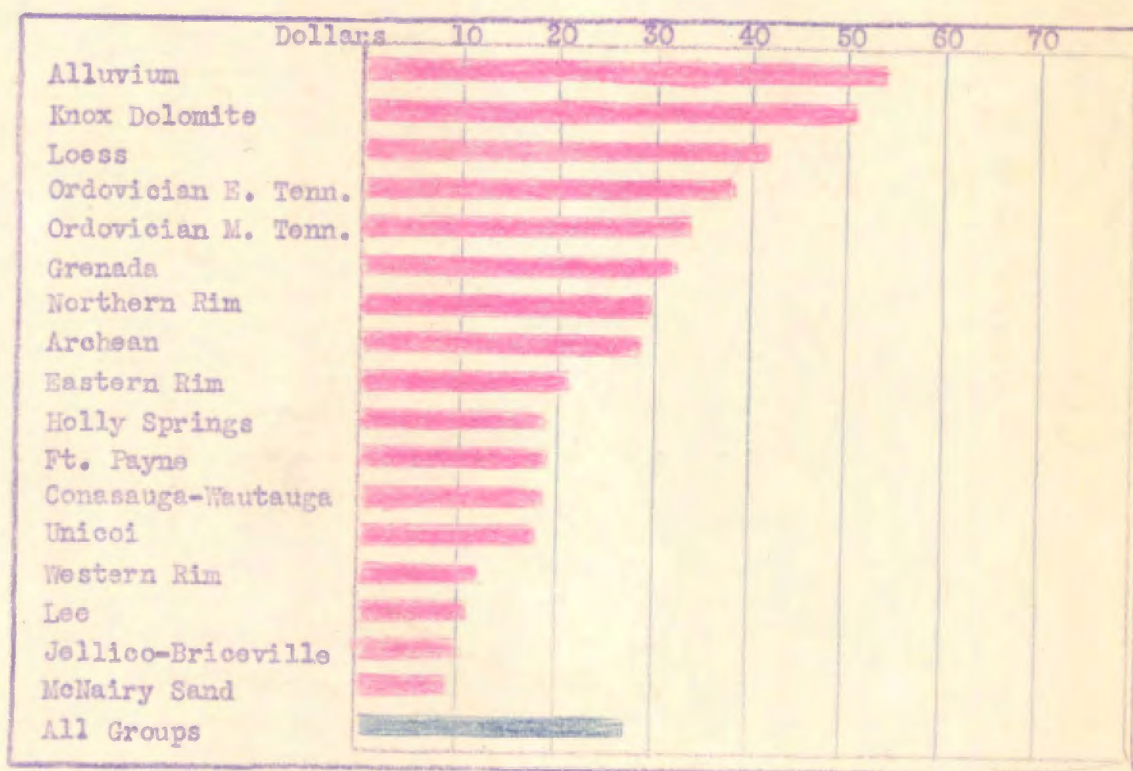
Soil Type	Land and Buildings			Land			All Buildings			Dwellings			Implements and Machinery		
	Per Farm		Per Acre	Per Farm		Per Acre	Per Farm		Per Acre	Per Farm		Per Acre	Per Farm		Per Acre
	Dols.	Dols.		Dols.	Dols.		Dols.	Dols.		Dols.	Dols.		Dols.	Dols.	
Archean	2,305	46		1,633	29		872	17		648	13		79	1.57	
Unicof	1,897	27		1,817	18		579	8		373	5		74	1.03	
Comsauga-Wautauga	1,984	30		1,229	19		755	12		485	7		157	2.40	
Ordovician															
East Tennessee	3,472	48		2,661	37		811	11		476	7		172	2.39	
Middle Tennessee	4,653	48		3,254	34		1,398	14		890	9		268	2.76	
Knox Dolomite	4,803	71		3,423	51		1,379	20		894	13		307	4.53	
Jellico-Briceville	1,163	18		657	10		505	8		390	6		106	1.62	
Lee	1,463	18		916	11		486	7		349	4		115	1.39	
Chester-St. Louis- Warsaw:															
Eastern Rim	2,847	30		1,948	21		899	10		538	6		235	2.53	
Western Rim	1,826	17		1,257	12		570	5		308	3		138	1.30	
Northern Rim	2,976	44		2,002	30		973	14		540	8		178	2.63	
Ft. Payne	2,007	29		1,338	19		670	10		533	8		130	1.86	
McNairy Sand	1,311	14		815	9		434	5		355	4		144	1.56	
Holly Springs	2,124	28		1,501	19		623	8		438	6		160	2.07	
Grenada	2,451	47		1,617	32		793	15		545	10		175	3.33	
Loess	3,113	59		2,205	42		903	17		586	11		227	4.27	
Alluvial	3,542	68		2,848	54		695	13		397	8		215	4.10	
All Groups	2,789	39		1,960	27		829	12		536	8		181	2.53	

Source: 15th Census of Agriculture, 1930, Tennessee, Minor Civil Divisions.



Source: Based on Table XIII

Fig. 35. Value of farm land per acre,
by county soil areas, 1930



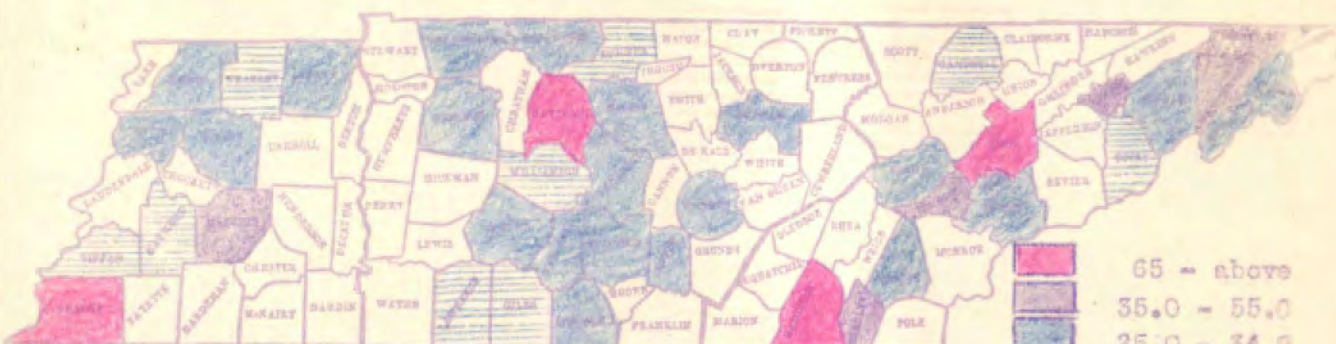
Source: Based on Table XIV.

Fig. 36. Value of farm land per acre, by civil district soil areas, 1930

is also an increase in soil fertility successively from the McNairy Sand group to the Mississippi Bottom. Value of land per farm, likewise, increases from east to west.

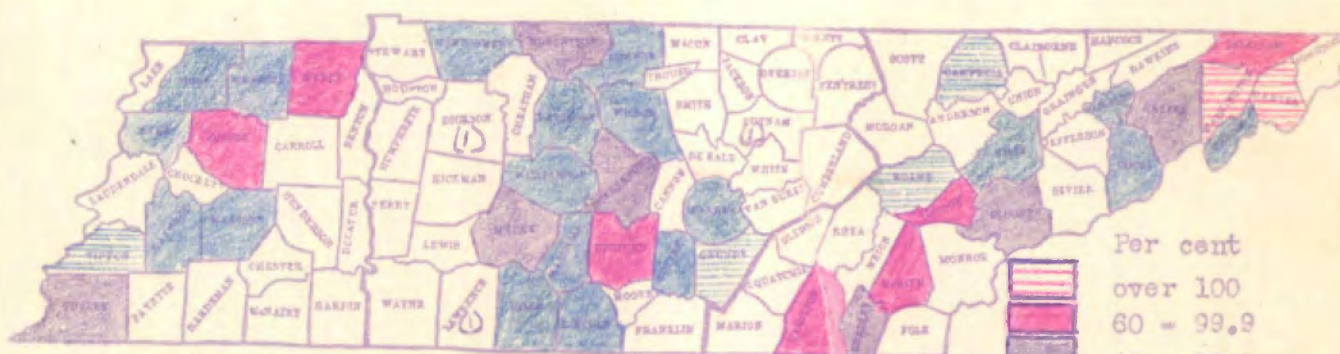
The influence of soils on the value of land is also shown by a comparison of soil types on a civil district basis (Table XIV and Figure 36). On this basis, soil differences are more closely defined, and by careful selection of the districts, urban influences have been eliminated for the most part. The land of the Jellico-Briceville and Lee groups, located on the Cumberland Plateau, had a value per acre of \$10 and \$11 respectively, in 1930. These soils, representatively of the Plateau, are among the poorest in the State in natural fertility. On the other hand, the value of the Ordovician soils was \$37 and \$34 per acre for East and Middle Tennessee, respectively. These soils are among the most fertile in the State. In West Tennessee, the value of land per acre ranged from \$9 for the McNairy Sand soil group to \$54 for the Alluvial group. There again, the value of land per acre and per farm increased successively from the McNairy Sand group, on the east, to the Alluvial group, on the west.

Factors other than soils, of course, influence the value of land. Considering the value of land in relation to the productivity of the soils, all of the East Tennessee Valley is far out of line with the rest of the State, probably due to urban influences. Within the selected groups of counties, the influence of urbanisation is most marked in the Middle East Tennessee Valley counties, within which area Knoxville lies (see Figures 37 and 38). In the Upper East Tennessee Valley,



Source: Computations based on 15th U.S. Census, 1930
Tennessee, Population Population

Fig. 37. Per cent of population urban,
Tennessee counties, 1930



Source: Computations based on U.S. Census, 1920 and 1930
Tennessee, Population Bulletin

Fig. 38. Per cent increase of urban population,
Tennessee counties, 1920 - 1930

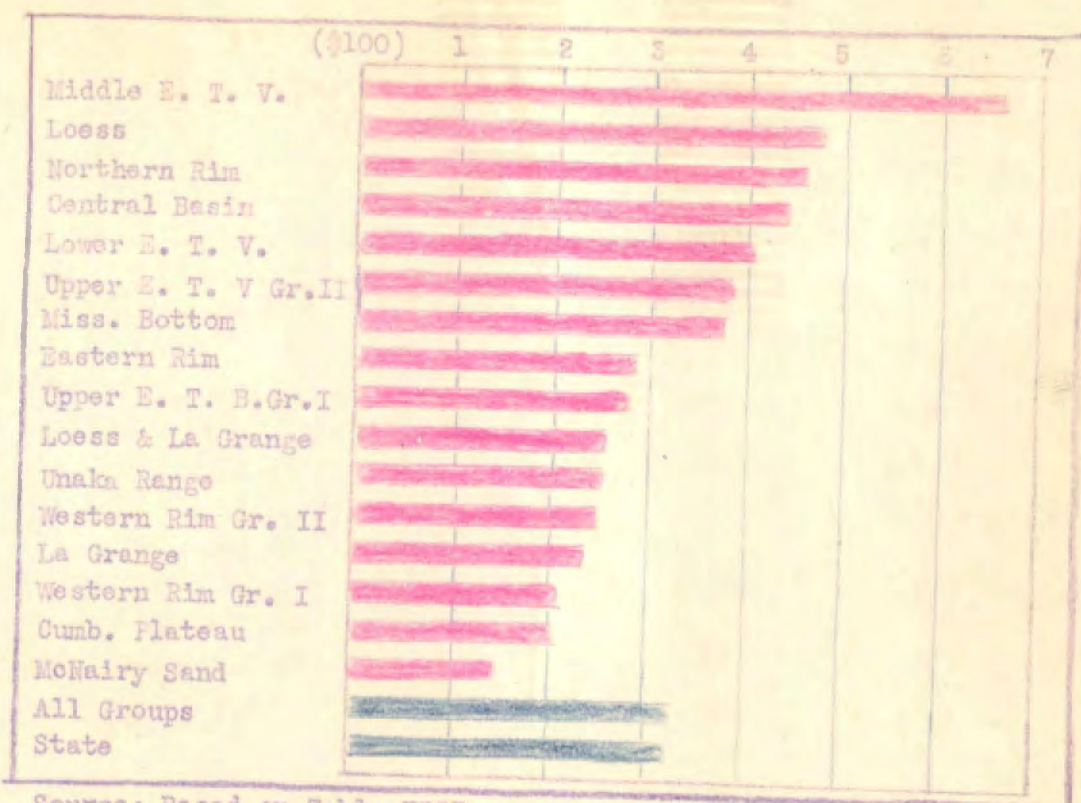
particularly in Sullivan and Washington counties, the development of manufacturing and the increase in urban population is reflected in relatively high land values. However, soil is a more important factor than in either the middle or lower part of the East Tennessee Valley, as indicated by the crop yield index (see Figure 29).

All Farm Buildings

The value of land alone is determined principally by the returns received from its use, while the value of buildings, in the long run, is a product of both use and cost of erection. The cost of buildings often has little relation to the value of these buildings on the farm. Consequently, the estimated valuation of a building is a product of both costs and use value.

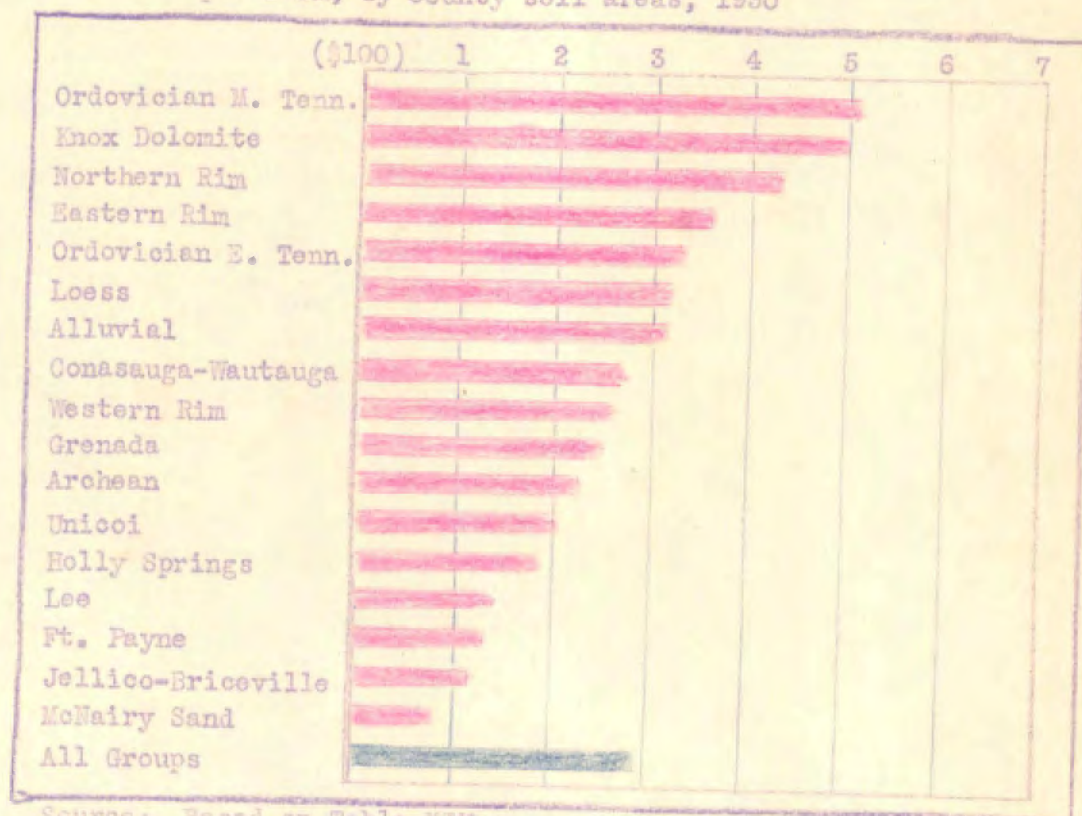
The value of farm buildings is for the most part in line with the value of farm land. That is, where land is valued high per farm, or per acre, the investment in buildings is high; and, on land that is valued low, there is little investment in buildings. On the Cumberland Plateau where land values are low the value of buildings per acre of farm land was only \$8.54 in 1930 (Table XIII). On the Northern Rim, where the soil is fertile and land values are relatively high, the value of farm buildings was \$15 per acre of farm land.

Perhaps equally as important as the direct influence of soil productivity on the value of buildings per farm, is the type of farming. The investment in buildings, other than the dwelling, are determined largely by the need of the buildings on the farm. Thus in livestock



Source: Based on Table XIII.

Fig. 39. Value of buildings (other than dwellings) per farm, by county soil areas, 1930



Source: Based on Table XIV.

Fig. 40. Value of buildings (other than dwellings) per farm, by civil district soil areas, 1930

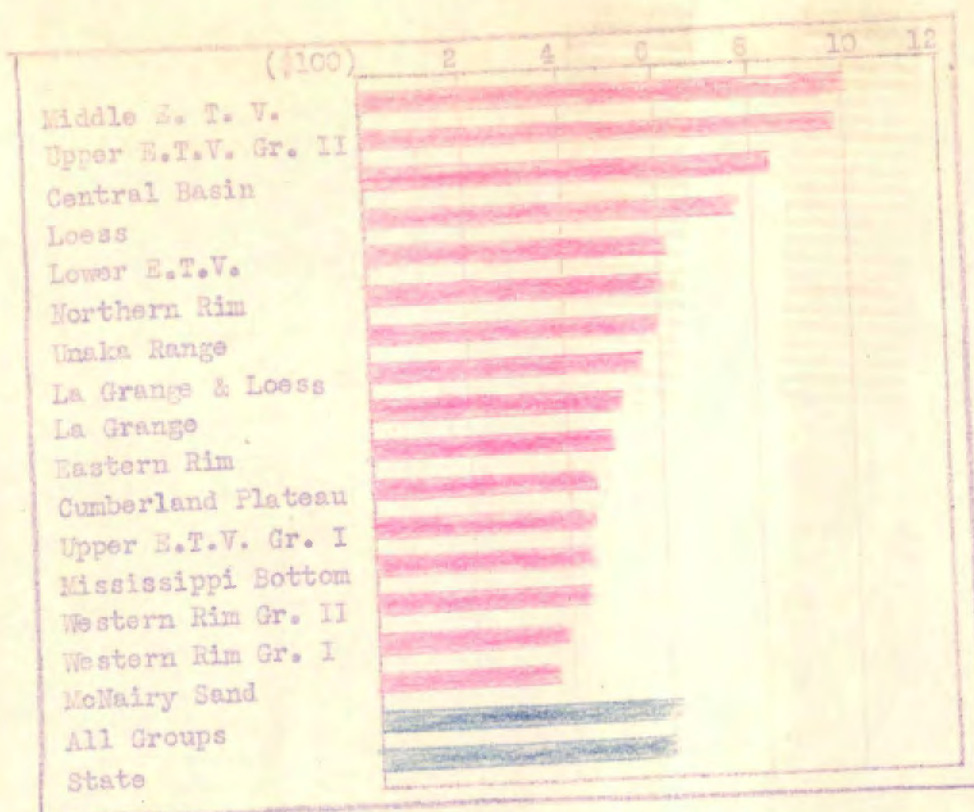
producing areas, there is a comparatively large investment in barns and storage facilities for feed. In the Central Basin, while the fertility of the soil, no doubt, accounts for a large proportion of the investment in buildings, livestock farming has necessitated relatively large expenditures for this purpose. There the value of buildings per farm was \$1281. In a similar way, type of farming has affected building values in the Loess group (Obion County), where the value of buildings per farm was \$1237 in 1930. There too, the excellence of the soils combined with livestock farming, account for the relatively high valuation (Figure 39).

Excluding the Loess area, the value of buildings per farm in West Tennessee increases as the fertility of the soil increases. The value of buildings per farm is as follows: McNairy Sand, \$538; LaGrange, \$750; and Mississippi Bottom, \$823. In relation to the average of all groups, these areas rank low in this respect. Three factors account for this: first, crop production is the principal type of farming; second, the average size of farms is smaller than the State average; and third, the proportion of tenancy is excessively high.

The soil, through its direct influence on tenancy and type of farming, is indirectly responsible for the investment in farm buildings.

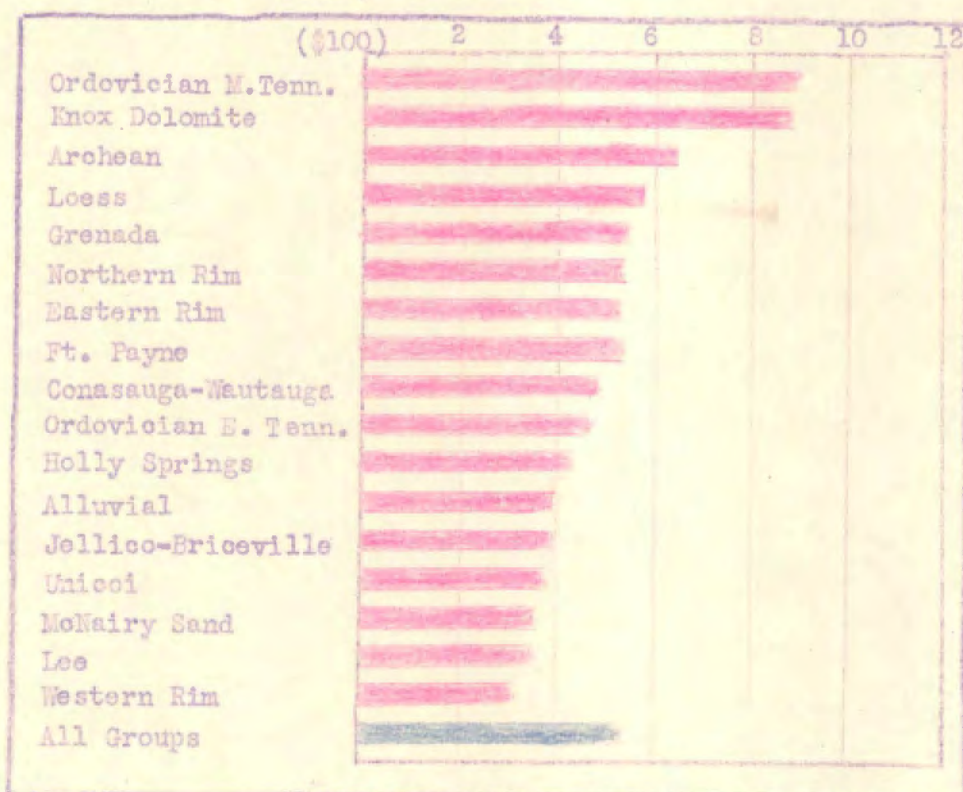
Dwellings Alone

While the value of farm dwellings, like the value of other buildings, is determined in part by cost, usefulness on the farm is the major factor. Its usefulness is dependent to a considerable degree upon the value of the farm upon which the building is located. If an expen-



Source: Based on Table XIII.

Fig. 41. Value of dwellings per farm,
county soil areas, 1930



Source: Based on Table XIV.

Fig. 42. Value of dwellings per farm, by
civil district soil areas, 1930

sive building is constructed on a farm of low value and this farm is later sold, its cost is usually discounted, and its sale value tends to reach the proportions that the value of the farm land would justify. In general, the value of dwellings is much lower on poor land than on fertile land. The value per farm in three relatively low fertility areas in 1930 were: Cumberland Plateau, \$459 per farm; Group I of the Western Rim, \$393; and the McMairy Sand group, \$389. In the last group, the cotton type of farming with the accompanying high proportion of tenancy tends to accentuate the effect of poor soil. The values of dwelling per farm in three relatively fertile areas were as follows: Upper East Tennessee Valley Group II, \$984; Central Basin, \$843; and the Loess soil group, \$762 (Figure 41). In the Mississippi Bottom area, 1033 of the 1120 farms were operated by tenants. Therefore, the average value of dwellings per farm was low (\$452), for tenants do not occupy as good houses, as a rule, as do farm owners.

Using the civil district groups, the influence of soils on the value of farm dwellings shows the same general tendencies as indicated by data for the county groups (Table XIV). That is, poor soil areas have dwellings of lower value as a rule. However, the influence of type of farming with the accompanying factor of tenancy still prevails as an important factor in the valuation of farm dwellings.

Farm Implements and Machinery

The investment in farm implements is determined by the ability to make such investments and by the need for such investments. The need for farm implements is dependent principally upon the types of farming,

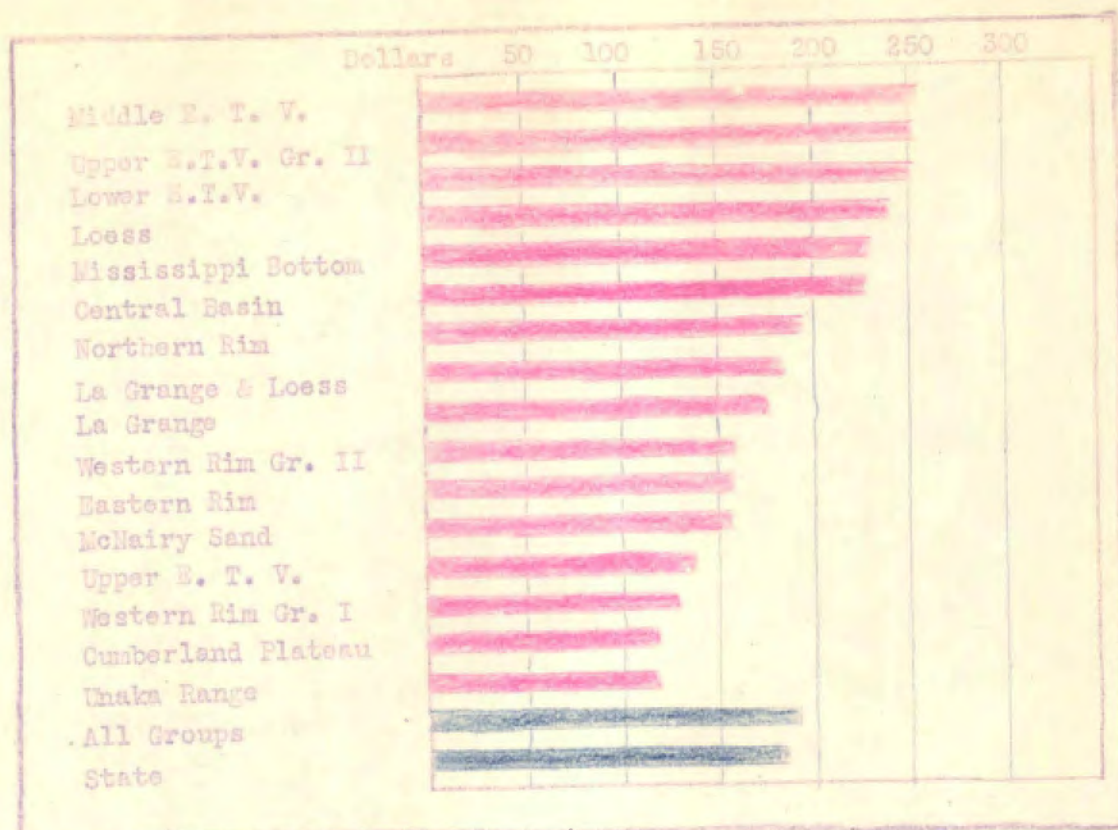
area in crops, topography, and the size of the farm. Thus to the extent that soil influence these factors, it indirectly influences the investment in farm implements.

TABLE XV. FARM OPERATING CAPITAL: VALUE OF IMPLEMENTS AND MACHINERY, AND LIVESTOCK BY SOIL AREAS IN COUNTY GROUPS, 1930

Soil Areas	Implements and Machinery		Livestock	
	Per Farm	Per Acre	Per Farm	Per Acre
	Dols.	Dols.	Dols.	Dols.
Unaka Range	118	2.35	202	4.00
Upper East Tenn. Valley				
Group I	138	1.91	413	5.70
Group II	254	4.02	469	7.44
Middle E. Tenn. Valley	236	3.45	466	6.29
Lower E. Tenn. Valley	253	2.38	447	4.20
Cumberland Plateau	121	1.57	385	5.12
Central Basin	228	2.67	707	8.31
Eastern Rim	159	1.97	401	4.96
Northern Rim	196	2.83	310	4.47
Western Rim: Group I	130	1.29	365	3.62
Group II	161	1.38	411	3.52
McNairy Sand	157	1.95	309	3.83
LaGrange	177	3.20	376	6.81
LaGrange and Loess	184	3.32	398	7.19
Loess	243	2.92	695	8.35
Mississippi Bottom	230	4.31	377	6.62
All Groups	191	2.55	435	5.83
State	186	2.54	427	5.82

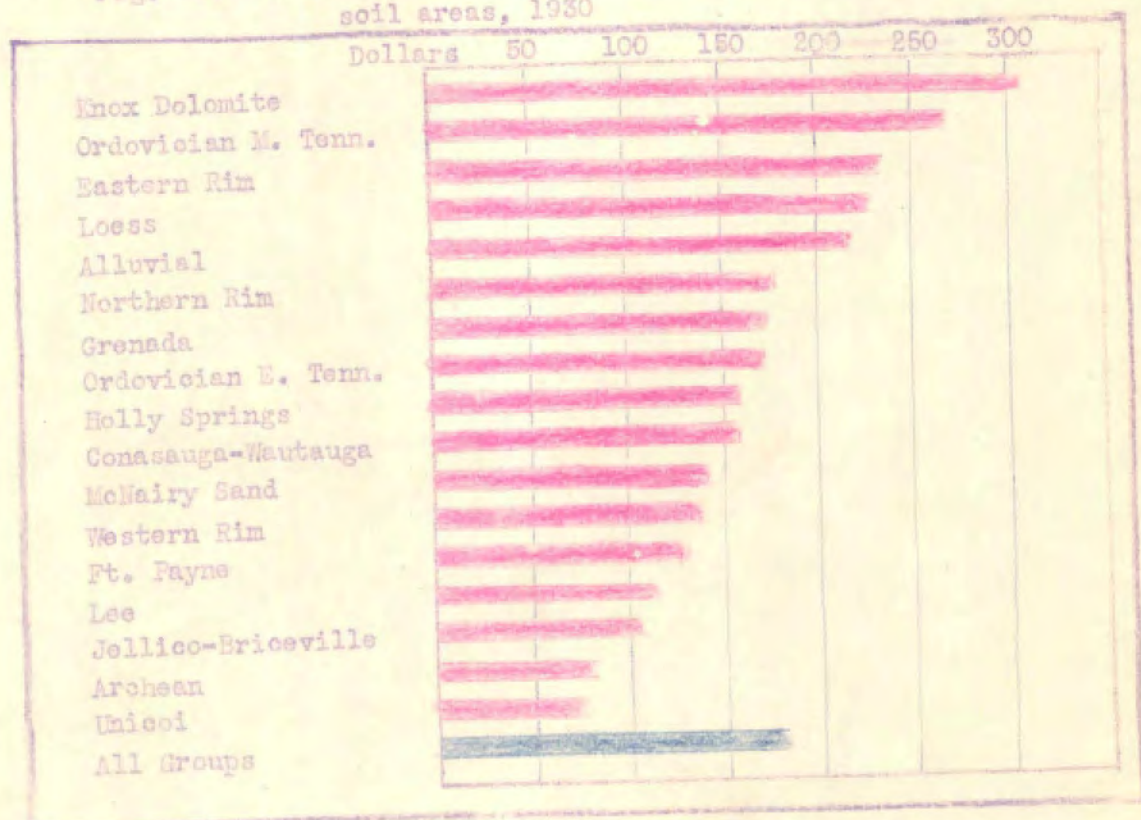
Source: Computations based on 15th U. S. Census of Agriculture: 1930, Tennessee.

In the poorest regions the investment in farm implements is small; in fertile regions the investment is relatively high, as a rule. For instance, the value of implements and machinery per farm in 1930 amounted to only \$118 and \$121 for the Unaka Range and Cumberland Plateau, respec-



Source: Based on Table XV.

Fig. 43. Value of farm implement per farm, by county soil areas, 1930



Source: Based on Table XIV.

Fig. 44. Value of farm implements per farm, by civil district soil areas, 1930

tively, whereas the value was \$228 and \$243 per farm for the Central Basin and the Loess soil region, respectively. On the Western Rim, where the soil in the region as a whole is poor the investment in equipment per farm was only \$130 and \$161 for Group I and Group II, respectively (Figures 43 and 44).

Livestock

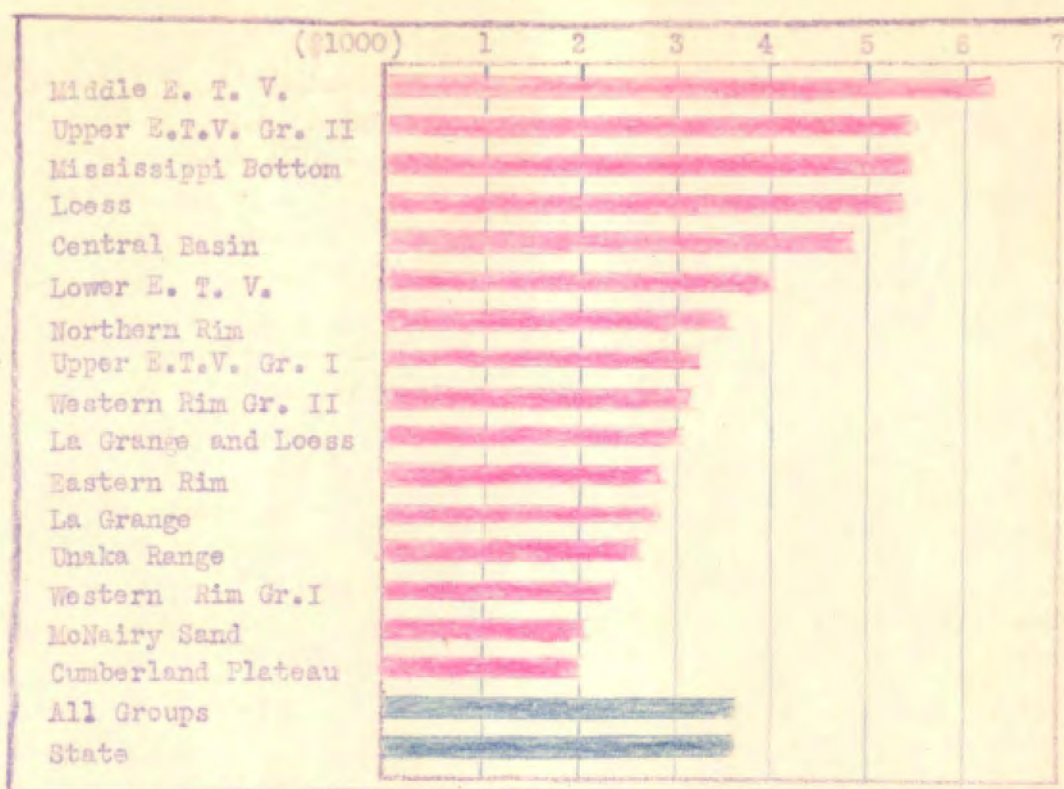
The value of livestock, by soil areas, of course, is dependent primarily upon the importance of livestock type of farming. In previous sections of this study, the relationship of soil to livestock farming was shown (Chapter III). Livestock values per farm and per acre of farm land, of course, are highest in the areas having favorable soil for livestock production such as the Central Basin, the northwestern Loess soil area, and the East Tennessee Valley (Table XV).

All Farm Property ⁽²⁾

An idea of the influence of soils on the value of all farm property may be had by a summary of all the items composing the farm property. In the value of all farm property per farm the comparatively poor areas - Cumberland Plateau, Unaka Range, Group I of the Western Rim, and the McNairy Sand group - rank low (Figure 45). The value of property per farm for the Central Basin, Loess, and the Mississippi Bottom groups are relatively high, as well as in the Middle East Tennessee Valley and in the Upper East Tennessee Valley groups of counties.

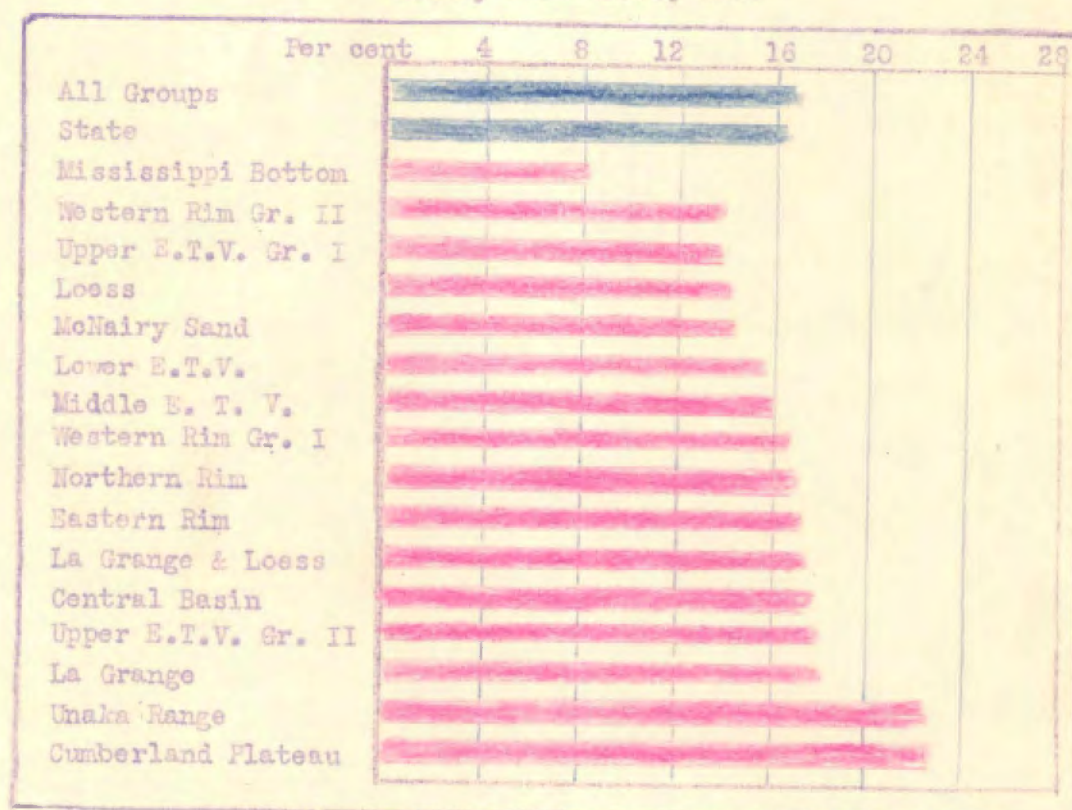
Value of property in itself is of little significance, but the fact is that the size of the farm business, which is best determined by capital value of the farm, is a very fundamental factor in farm income and consequently in farm success or failure. Other factors being equal,

(2) Land and buildings, implements and machinery, and livestock.



Source: Based on Table XIII.

Fig. 45. Value of all property per farm, by county soil areas, 1930



Source: Based on Table XVI.

Fig. 46. Per cent that value of dwellings is of all farm property, by county soil areas, 1930

the greater the volume of business the greater is the profit per farm or per farmer. Studies of profits made by farmers in New York show that the farms having capital value of \$2000 or less had an average annual labor income of only \$192. Farms having capital ranging from \$4,001 to \$6,000 had average annual labor incomes of \$399, whereas farms with capital amounting to \$10,000 had labor income of \$370. ⁽³⁾

The Distribution of Farm Capital

The proper distribution of the farm capital varies with the price of land and equipment. ⁽⁴⁾ As far as possible it is desirable to have a comparatively large percentage of the total investment in working capital. ⁽⁵⁾ If one's capital is limited, it is usually more profitable to invest it in working capital, and rent land and buildings. This is true because the percentage returns from working capital are usually greater than from fixed capital. Especially is this true in regard to buildings which constitute 25 per cent of the farm wealth in Tennessee.

In general on small farms, or those located on land of little value, a relatively large proportion of the capital is in buildings. Though the farm dwellings are of poorer quality, they constitute a greater proportion of the farm capital on poor farms than on good farms. ⁽⁶⁾ The same is true of barns and other buildings. On the Cumberland

(3) Warren, Farm Management, p. 291.

(4) Ibid., p. 294.

(5) By working capital is meant investment in farm equipment, live-stock, or cash on hand to be used for the purchase of fertilizer, seeds, etc. By fixed capital is meant investment in land and buildings.

(6) Warren, op. cit., p. 260-261.

TABLE XVI. FARM CAPITAL: PERCENTAGE DISTRIBUTION BY CLASSES OF PROPERTY, 1930

Soil Region	Value of All Prop-erty Dollars	Distribution of Farm Property				
		Land	All Bldgs.	Dwel-ings	Imple-ments	Live-stock
		Pct.	Pct.	Pct.	Pct.	Pct.
Unaka Range	2,274,220	55.9	32.0	22.5	4.5	7.6
Upper E. Tenn. Valley						
Group I	30,025,557	60.7	22.4	13.9	4.2	12.7
Group II	60,762,917	61.5	25.2	13.1	4.7	3.6
Middle E. Tenn. Valley	47,692,051	61.9	26.7	16.1	4.1	7.4
Lower E. Tenn. Valley	20,367,968	57.3	25.3	15.8	6.3	11.1
Cumberland Plateau	6,529,375	41.6	32.9	22.7	6.0	19.5
Central Basin	74,127,123	54.0	26.6	17.5	4.7	14.7
Eastern Rim	42,848,085	53.5	27.1	17.3	5.5	13.9
Northern Rim	30,253,863	56.1	29.8	17.0	5.5	8.7
Western Rim: Group I	10,820,951	53.0	25.3	16.8	5.6	15.6
Group II	16,509,029	60.2	21.8	13.9	5.1	13.0
McNairy Sand	17,522,360	60.7	23.4	14.4	4.6	13.2
LaGrange	49,830,113	54.0	26.5	18.2	6.2	13.3
LaGrange & Loess	89,171,321	55.2	25.8	17.4	6.0	13.0
Loess	17,853,340	59.6	23.0	14.2	4.5	12.9
Mississippi Bottom	6,093,368	73.7	15.1	8.3	4.2	6.9
All Groups	454,998,188	56.9	25.9	16.9	5.2	11.9
State	893,842,483	57.7	25.5	16.5	5.1	11.7

Source: Computations based on 15th U. S. Census of Agriculture, 1930, Tennessee.

Plateau and Unaka Range, for example, all buildings constitute 32.9 per cent and 32.0 per cent respectively of the total farm capital. In the Central Basin only 26.6 per cent of the farm capital is in buildings and in the Mississippi Bottom only 15.1 per cent (Table XVI). Twenty two per cent and 23 per cent of the farm capital is invested in dwellings in the Unaka Range and the Cumberland Plateau, respectively, compared with 17.5 per cent and 14.2 per cent in the Central Basin and the Loess area respectively - two fertile regions (Figure 46). In the Mississippi Bottom,

dwellings constitute only 8.3 per cent of all farm capital. The value of dwellings per farm is very low in relation to the value of the land (see Table XII).

In regard to the distribution of capital on the farm, factors other than soil are of importance. Both tenancy and type of farming affect the investment in barns, dwellings, and other improvements. In the West Tennessee groups, a high rate of tenancy combined with cotton farming, in which little livestock is kept and where needs for barns are low, causes the proportion of farm capital in building to be relatively low.

Because of the influence of type of farming and other factors, it is difficult to establish a relationship between the fertility of the soil and the relative proportion of the farm capital invested in implements and in livestock. In the case of the Cumberland Plateau, however, it is noticeable, even though the value of implements per farm ranks very low in comparison with the rest of the State, that the proportion of the farm capital in implements is relatively high.

Trends in Value of Land and Buildings

Until after the World War the trend in land prices throughout Tennessee and other states was upward. Beginning in 1880 land prices increased steadily to 1920 in reaction to the period of land development and later in reaction to the inflationary period from 1915 to 1920. In reaction to the period of deflation following the War and continuing through 1935, land prices took a sharp fall (Table XVII).

In contrast to the rest of the groups and to the State average as a whole, land values on the Cumberland Plateau and the Unaka Range continued to rise through the deflationary period of the early 20's, falling

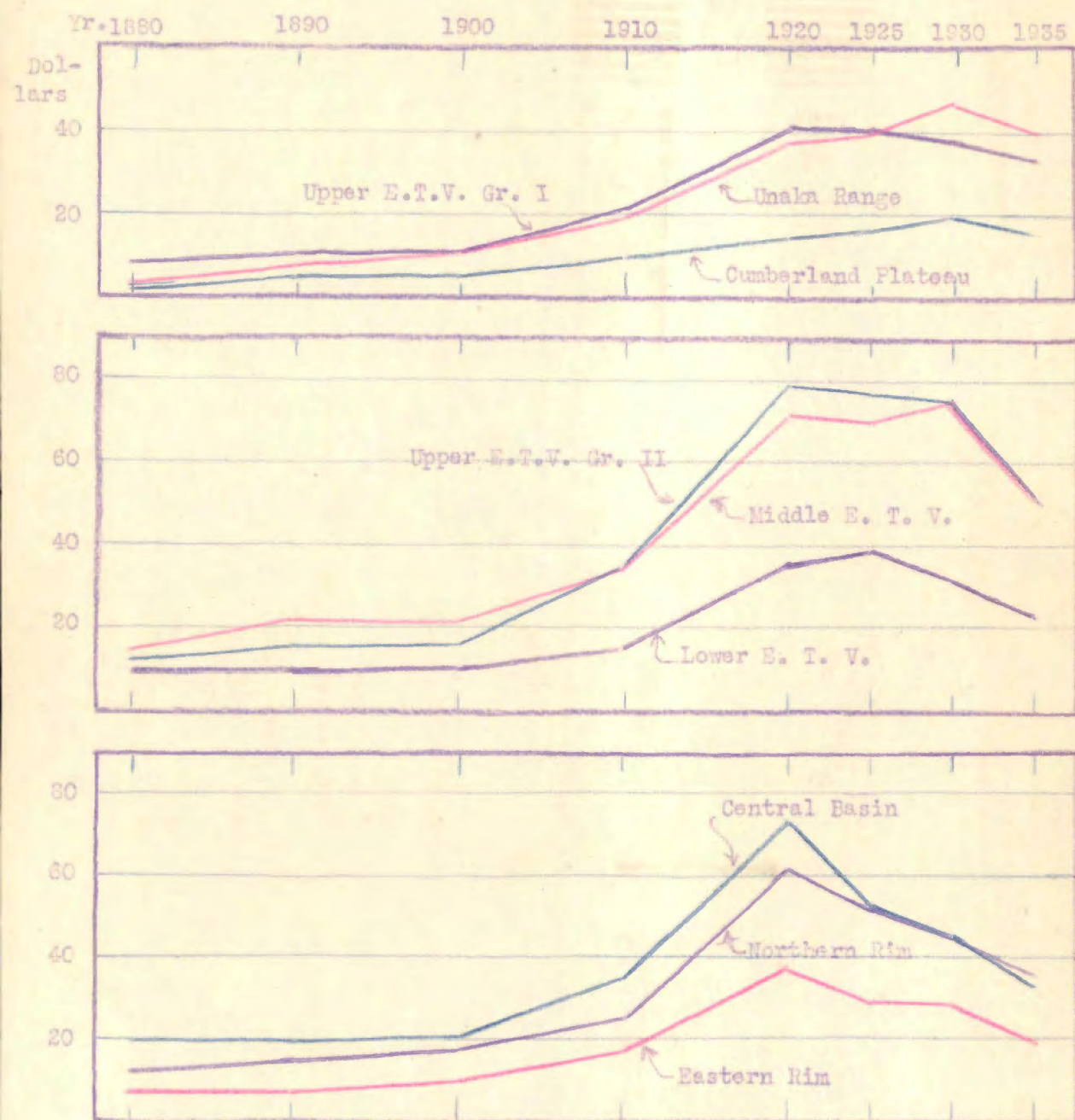
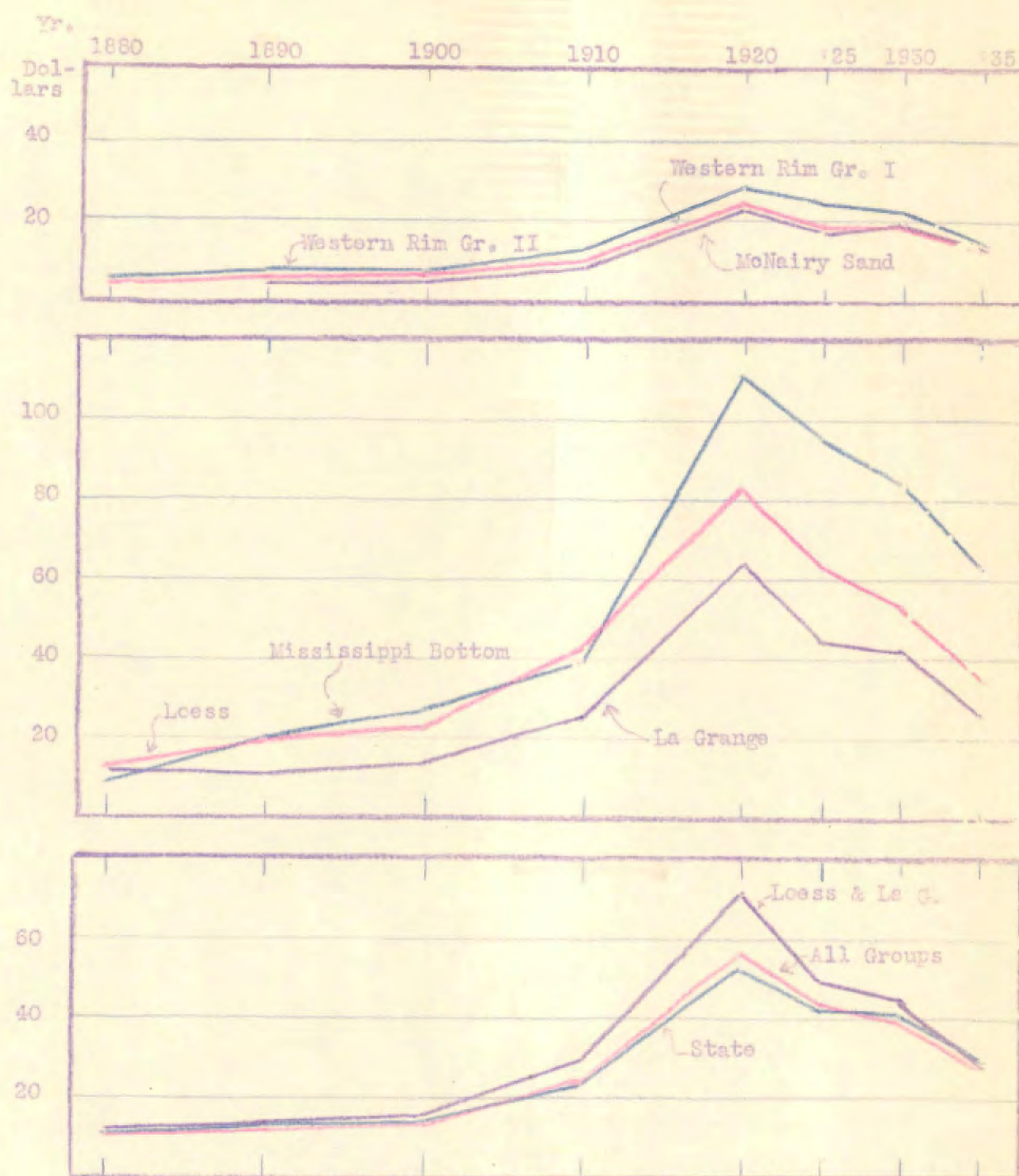


Fig. 47. Trends in value of land and buildings per acre, by county soil areas, 1880 - 1935 (cont'd. on next page)



Source: Based on Table XVII.

Fig. 47. Trends in value of land and buildings per acre, by county soil areas, 1880 - 1935 (continued)

TABLE XVII. TRENDS IN VALUE OF FARM LAND AND BUILDINGS PER ACRE,
1880 - 1935

Soil Region	1880	1890	1900	1910	1920	1925	1930	1935
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.
Unaka Range	3.09	6.90	10.96	18.35	36.88	38.93	46.07	39.61
Upper E. Tenn.								
Valley: Group I	8.13	10.09	10.72	20.67	40.45	39.50	37.39	32.75
Group II	11.84	15.43	15.67	34.79	78.62	76.37	74.89	51.43
Middle E. Tenn.								
Valley	14.02	21.38	20.64	34.15	71.21	69.69	75.27	51.49
Lower E. Tenn.								
Valley	9.11	9.86	10.50	14.78	35.73	38.28	31.33	23.58
Cumberland Plateau	2.16	4.78	4.86	9.50	14.90	16.61	19.54	15.41
Central Basin	19.08	19.22	20.60	35.73	73.20	52.97	45.65	32.28
Eastern Rim	7.24	7.14	9.12	16.32	37.06	29.78	28.67	19.67
Northern Rim	11.63	14.81	17.59	25.83	61.42	50.89	44.31	34.25
Western Rim:								
Group I	4.46	5.95	6.56	10.60	24.85	18.63	18.26	12.98
Group II	5.66	6.67	7.60	13.73	28.43	25.03	22.28	14.98
Mollairy Sand	-	4.79	3.87	8.36	23.24	17.13	19.50	13.00
LaGrange	11.78	11.32	13.35	25.18	63.66	44.87	41.35	25.89
LaGrange & Loess	11.92	12.29	14.69	28.92	70.95	49.98	44.84	28.76
Loess	13.68	19.60	22.59	43.79	92.93	63.95	53.39	34.04
Mississippi Bottom	9.27	20.50	27.16	49.76	110.84	95.18	84.78	63.96
All Groups	10.49	11.89	13.58	24.33	56.44	43.30	39.95	27.86
State	10.00	12.04	13.03	23.98	52.53	42.42	41.28	29.12

Source: U. S. Census of Agriculture, 1880, 1890, 1900, 1910, 1920, 1925, 1930, and 1935.

only during the period 1930-1935. On a percentage basis land prices in these poor areas increased as rapidly as in the better areas before the War. The sharpest decline in land prices after 1920 was in two of the most fertile areas, if not the two most fertile areas of the State, the Mississippi Bottom and the Loess soil regions in northwestern West Tennessee (Figure 47).

As to whether or not there was a general tendency for prices of poor land to follow trends similar to those of the Cumberland Plateau and

for good grades of land to fall in value as did values in the Mississippi Bottom cannot be ascertained without further data. However, to the extent that self-sufficing farms are most frequently found in poor soil regions, land values in poor areas tend to react to changing prices of farm products in a different way than in commercialized farming areas. In commercial farming areas, even though the soil was poor, land values declined during periods of low prices of farm products. This is shown in the case of the McNairy Sand area, where cotton farms are the prevalent type. There land values fell from \$23 per acre in 1920 to \$17 in 1925. However, the decline in land prices from 1920 to 1935 was not as great in the McNairy Sand area, nor in the Western Rim, as in the best soil areas. Because land values in the poor areas, particularly the Cumberland Plateau, have always remained at such low levels, any numerical change in prices has necessarily been small.

CHAPTER VI

INFLUENCE OF SOIL TYPE ON FARM CREDIT

The Need and Basis of Credit

The farm business is largely dependent upon credit of one form or another. Ely and Morehouse say:

If the community had to wait until the farmer had accumulated enough capital to buy his farm outright, to pay for seed, fertilizer, equipment, and labor, and to provide his own upkeep while the crop is maturing, starvation might be the fate of those dependant upon the farmer's crops. . . In short, the demand for an immense amount of commodities and services which land alone can produce, coupled with the length of time necessary to produce those services, makes credit indispensable for an adequate utilization of land. Land utilization waits upon credit. We venture to say that if credit had not been available for the users of land, we should still be in an age of feudalism. (1)

Economists have defined credit transactions as the transfer of goods or funds for the promise of a future equivalent. One who makes a loan is most concerned that the loan will be repaid at the time stipulated. Therefore, it is important that one who lends, or borrows, be aware of the factors affecting the ability to obtain credit and to pay debts. These factors have been summarized as the "Three C's"; namely, character, capital, and capacity. There seems to be no invariable order of importance of these requisites. Persons without character are at a disadvantage in obtaining credit, and a man having character who does not possess the other requisites -- capacity or earning

(1) Ely, R. T., and Morehouse, E. W., Elements of Land Economics, p. 209.

power, and capital - is at a serious disadvantage. Capital is desirable because of its relationship to earning power, and because the lenders demand that the debtor's equity be sufficiently large to insure the safety of the debt.⁽²⁾

Percentage of Farms Mortgaged

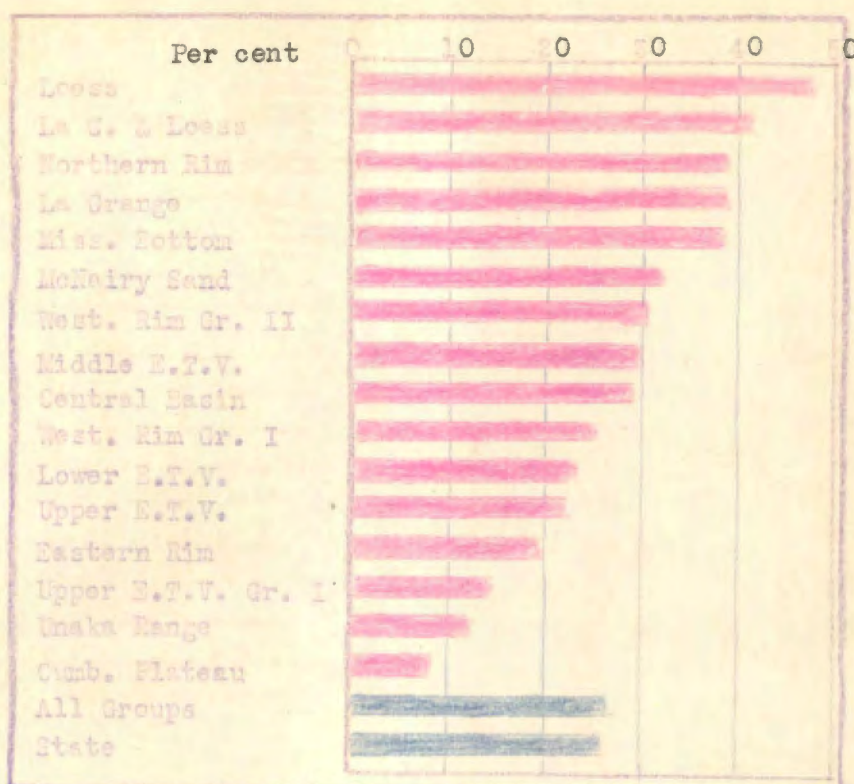
In the poor areas, a comparatively small percentage of the farms are mortgaged. For example, on the Cumberland Plateau and Unaka Range, only 8.4 per cent and 13.4 per cent, respectively, of the owner-operated

TABLE XVIII. FARMS MORTGAGED, AND AMOUNT OF DEBT BY COUNTY SOIL AREAS, 1930

Soil Region	Owner Operated Farms Mort- gaged	Full Owner Operated Farms	
		Debt per Acre	Ratio of Debt to Value
	Pct.	Dollars	Pct.
Unaka Range	13.4	20.43	31.72
Upper E. Tennessee Valley: Group I	14.4	14.50	33.65
Group II	22.2	26.48	30.00
Middle East Tennessee Valley	29.7	27.18	32.03
Lower East Tennessee Valley	23.3	11.85	31.84
Cumberland Plateau	8.4	6.27	25.49
Central Basin	29.1	21.72	42.88
Eastern Rim	19.6	12.29	37.17
Northern Rim	38.9	20.25	47.03
Western Rim: Group I	24.9	6.94	36.76
Group II	30.2	8.19	39.71
McNairy Sand	32.4	7.89	44.00
LaGrange	38.6	20.18	43.60
LaGrange and Loess	41.1	22.08	44.38
Loess	47.3	24.88	44.27
Mississippi Bottom	38.6	28.85	33.88
All Groups	26.9	17.19	38.31
State	26.2	17.57	38.40

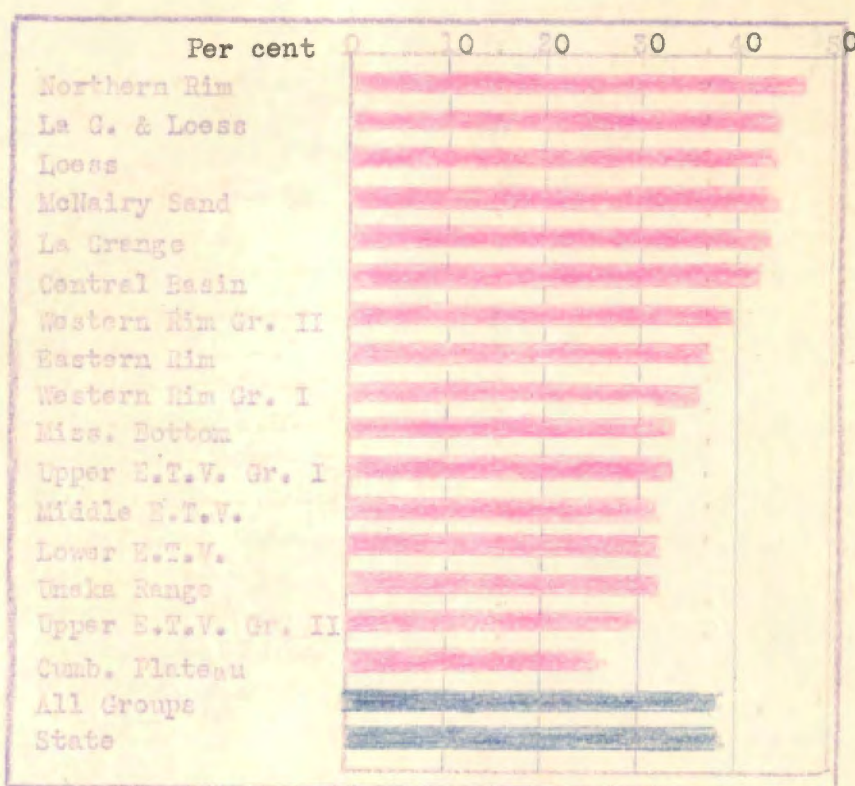
Source: 15th Census of Agriculture, 1930, Tennessee, Series 2, p. 83.

(2) Ibid., p. 209.



Source: Based on Table XVIII.

Figure 48. Per cent of owner operated farms mortgaged, 1930



Source: Based on Table XVIII.

Figure 49. Ratio of debt to value of mortgaged farms operated by full owners, 1930

farms were mortgaged compared to an average of 26.2 per cent for the State, in 1930 (see Table XVIII and Figure 48). These two areas had the lowest net incomes per farm of any of the soil groups (see Figure 30).

In contrast, there is a general tendency for the fertile areas to have a relatively high percentage of the farms mortgaged. The Central Basin, for example, had 29.1 per cent of its farms mortgaged, or nearly 3.5 times as many as the Cumberland Plateau in proportion to the number of farms.

The percentage of owner-operated farms having mortgages is higher in West Tennessee than in any part of the State. Yet within West Tennessee the McNairy Sand group (one of the poor soil areas of the State), had only 32.4 per cent of its farms mortgaged in 1930 compared with 38.6 per cent in the LaGrange area and 47.5 per cent in the Loess area.

The percentage of farms having mortgages in the fertile areas is higher than in the poor areas for several reasons, probably, chief of which is the larger amount of capital per farm in the fertile areas (see Figure 45).

Ratio of Debt to Value of Land and Buildings

A study of Table XVIII and Figure 49 shows that, in 1930, the ratio of debt to value of mortgaged farms by soil areas in Tennessee ranged from 25.5 per cent for the Cumberland Plateau to 47.0 for the Northern Rim. Judging by these two areas, alone, one might conclude that the debt-value ratios are higher in fertile areas than in poor areas. This, however, is not generally true. For example, Group I of the Upper East Tennessee Valley, which is one of the best farming areas in East Tennessee

had the second lowest ratio among all groups in the State. On the other hand, the McNairy Sand group, which is the poorest area in West Tennessee (and one of the poorer areas of the State), had a debt-value ratio of 44.0 per cent.

Several factors have been important in determining these ratios of mortgaged debt to value of land and buildings for the various soil areas. The marked decline in land values after 1920, accompanied by the increase in mortgage debt had the result of raising the debt ratio of mortgaged farms.⁽³⁾ On the Cumberland Plateau, however, land values continued to rise until 1930 in contrast with sharp declines in land values in most of the other parts of the State (see Figure 47). This factor, no doubt, partially explains the low debt-value ratio of mortgaged farms in the Cumberland Plateau, in 1930. On the Unaka Range, the comparatively low debt-value ratio probably is due to the same factor as in the Cumberland Plateau. In the East Tennessee Valley, however, land is highly valued in relation to its earning power, and this factor probably lowers the amount of credit obtainable for a given unit of value. In the McNairy Sand group, the opposite is true. That is, land is valued low in relation to its earning power. Therefore, a larger amount of credit is granted in relation to value. This factor, combined with the decreasing land value in that area accounts for a comparatively high ratio of debts to value of land and buildings for farms mortgaged in 1930.

(3) Wickens, David L., Farm Mortgage Credit, p. 51, U. S. D. A. Technical Bulletin No. 288, 1932.

Thus, factors other than soil have been of importance in determining the amount of credit granted per a given unit of value. There has been a general policy, in the past, of limiting farm mortgages to about one-half of the value of the farm property.⁽⁴⁾ Rapidly changing land values in the past decade have been influential in changing these ratios. Trends in land values, no doubt, have been influenced by soil type, but

TABLE XIX. INTEREST RATES ON FULL OWNER OPERATED FARMS
MORTGAGED, BY COUNTY SOIL AREAS, 1930

Soil Region	Interest Rate
Unaka Range	5.99
Upper East Tennessee Valley: Group I	6.24
Group II	6.10
Middle East Tennessee Valley	6.34
Lower East Tennessee Valley	6.52
Cumberland Plateau	6.39
Central Basin	6.20
Eastern Rim	6.25
Northern Rim	6.15
Western Rim: Group I	6.31
Group II	6.51
McNairy Sand	7.01
LaGrange	6.51
LaGrange and Loess	6.66
Loess	6.37
Mississippi Bottom	6.65
All Groups	6.53
State	6.39

Source: 15th U. S. Census of Agriculture: 1930, Tennessee,
Series 2, p. 33.

the overlapping of other factors makes it difficult to show a relationship between soil types and debt value ratios.

Cost of Credit. In a comparison of interest rates on good land and poor land in five northern and five southern states (Tennessee

(4) Ibid., p. 51.

included), the average charges were as follows: northern rich land, 5.54 per cent; northern poor land, 6.04 per cent; southern rich land, 6.80 per cent; and southern poor land, 7.20 per cent.⁽⁵⁾

In Tennessee, it is somewhat difficult to establish a relationship between high interest charges and poor land or between low charges and good land. As shown in Table XIX, interest charges on farm debts, on the Cumberland Plateau vary very little from the state average, and, on the Unaka Range the interest rates are lower than for any other soil group. They are not essentially lower in the fertile areas, considering the State as a whole. However, excluding West Tennessee, the four areas having the lowest interest charges are the Unaka Range, 5.99 per cent; Upper East Tennessee Valley, Group II, 6.10 per cent; the Northern Rim, 6.15 per cent; and the Central Basin, 6.20 per cent. Except for the Unaka Range, these areas support a very prosperous agriculture and the low rates are due partially to this factor. Of course factors other than soil help to keep these rates low. Therefore it is difficult to explain the reason for the low charges on the Unaka Range. This area is represented by only one small county, Unicoi, which despite its poor soils has a relatively high valuation per acre of land and building and a low debt-value ratio. These factors tend to insure the safety of credit transaction, possibly resulting in low rates of interest.

Interest charges in West Tennessee are higher than in either Middle or East Tennessee. In the comparison of southern and northern interest

(5) Huntington, Ellsworth, "The Handicaps of Poor Land", Economic Geography, p. 339, January, 1926.

rates, referred to above, the rates are 6.80 per cent for southern rich land compared with 6.04 per cent for northern poor land. While possible, one would not think that the higher rate on the southern good land than on the northern poor land was due to the superiority of the northern poor land. Huntington believed that this difference was due, not to difference in land quality, but to the fact that colored people who carry part of the southern mortgages help to keep the rates high.⁽⁶⁾ This factor combined with the risks of a one-crop type of farming tends to cause high interest charges in the South.⁽⁷⁾ A comparison of West Tennessee with Middle and East Tennessee reveals differences similar to those existing between the northern states and the southern states. In West Tennessee a high percentage of the farm population is colored, and the principal type of farming is cotton farming. In Middle and East Tennessee a higher percentage of the population is white and the agriculture is more diversified than in West Tennessee. Consequently there would tend to appear the same differences in interest rates between West Tennessee and the rest of the State as between the southern states and the northern states.

Within West Tennessee, interest rates are highest in the poorest area (the McNairy Sand), which had rates of 7.01 per cent in 1930 compared to 6.51 per cent for the LaGrange area.

Safety of Credit Transactions. Losses resulting from credit trans-

(6) Ibid., p. 340.

(7) Taylor, Henry C., Outline of Agricultural Economics, p. 216.

actions may be incurred by both the creditor and the debtor. As a result of foreclosures, the debtor loses part or all of the savings and money actually invested in the property. A summary of foreclosures in Tennessee shows that the debt held against foreclosed property has exceeded the sale price of each property (see Table XX). Hence, creditors have lost a part of the money loaned to farmers.

Studies in other states show that farm mortgage foreclosures have been more numerous and that losses have been greater on poor land than on good land.

In Alabama, although more than one-fourth of the total number of loans in five counties studied were on farms located on the Norfolk sandy loam, only one-tenth of the total number of foreclosures were on this soil type. In contrast, farms on the Susquehanna fine sandy-loam accounted for only 6 per cent of the total number of loans, but 14 per cent of the foreclosures. The average corn yield on the Norfolk sandy loam from 1920 to 1928 was 16.5 bushels compared to a yield of 13.9 bushels for the Susquehanna fine sandy loam. The losses to the creditor per \$1000 loaned were \$19 and \$152 for the Norfolk sandy loam and the Susquehanna fine sandy loam, respectively. ⁽⁸⁾

In New York similar studies show that lending activities are safer to both the debtor and creditor on good land than on poor land. The reason for this is explained by Hill as follows:

(8) Mereness, E. H., Farm Mortgage Loan Experience In Southeast Alabama, p. 5.

On the basis of what each grade of land produces, poor land tends to be over-valued with relation to good land. Hence the earning power behind each dollar loaned on low-grade land tends to be smaller than the earning power behind each dollar on high grade land. Valley farmers, whose farms were valued at \$68 per acre, made a return of 11.3 per cent on their investment in real estate, or \$7.68 per acre. If a loan of \$34 per acre, or 50 per cent of the estimated value of the farm, had been made it would have been backed by earnings of \$7.68, or \$0.23 per dollar loaned. Hill farmers in the same region, whose farms were valued at \$30 per acre, made an average return of 6 per cent on their investment, or \$1.80 per acre. A loan of \$15 per acre, or 50 per cent, would have been backed by earnings of only \$0.12 per dollar loaned. The majority of loans made were in amounts representing 40 to 50 per cent of the estimated market value of the farms. The percentage did not differ greatly for different grades of land. (9)

In Tennessee it is difficult to establish a relationship between soil type and losses from credit activities. This is due to several reasons. In the first place, the data available on farm foreclosures in Tennessee are limited to only a few counties, and in most cases these are not complete for the period studied. Too, data are not available except for the years 1929 to 1933 - a depression period.

Data showing the losses to lending agencies per \$100 debt held against foreclosed property (from 1929 to 1933) are presented in Table XX. (Because of the limitation of data, it was not possible to adhere to the original soil groups.) Contrary to the results in other states, the tendency in Tennessee has been for losses per \$100 debt held against foreclosed property to be greater on the good land than on the poor land from 1929 to 1933. Washington County, which is one of the

(9) Hill, F. F., An Analysis of the Lending Operations of the Federal Land Bank of Springfield, Cornell Bulletin 549, 1932, pp. 23-25.

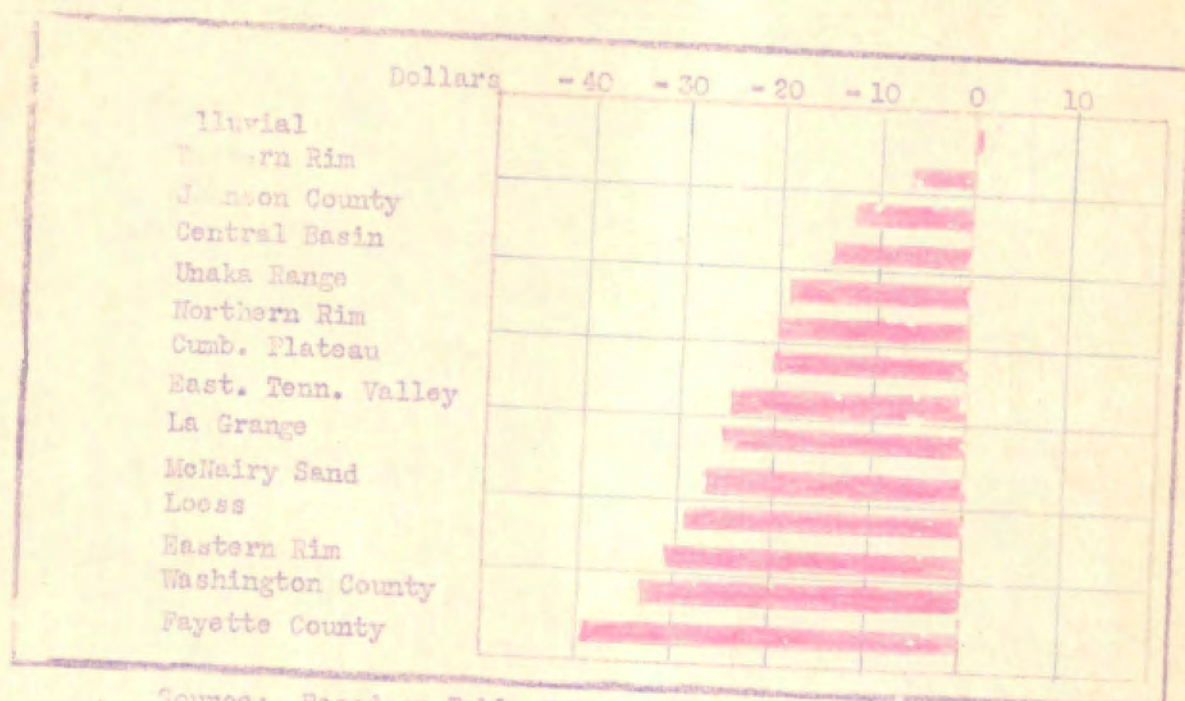
best farming counties in East Tennessee, had losses of \$33.29 per \$100 debt held against foreclosed property (see Figure 50). In the Central Basin the loss was \$30.76 and the Loess area had a loss of \$28.99 per \$100 debt. In contrast the loss on the relatively poor Western Rim area was only \$6.99 per \$100 debt. In Johnson County, which lies partially on the Unaka Range the loss was only \$12.05, and in the entire area designated as the Unaka Range (an average of civil districts lying within this area) the losses were \$18.91 per \$100 debt.

TABLE XX. AMOUNT SALE PRICE EXCEEDED OR WAS LESS THAN DEBT ON FORECLOSED FARMS, BY SOIL AREAS, TENNESSEE, 1927-1933

Area	Loss or Gain per Acre	Loss or Gain per \$100 Debt Against Farm	Area	Loss or Gain per Acre	Loss or Gain per \$100 Debt Against Farm
	Dols.	Dols.		Dols.	Dols.
Alluvial	0.10	0.25	Central Basin	- 9.03	- 14.26
Loess	-10.03	- 28.99	Eastern Rim	- 2.56	- 30.76
LaGrange	- 5.19	- 24.93	Cumb. Plateau	- .75	- 20.00
Fayette County (LaGrange)	- 5.52	- 39.04	Washington Co.	-11.81	- 33.29
Porter Creek and McNairy Sand	- 2.80	- 26.95	E. Tenn. Valley	- 7.22	- 24.33
Western Rim	- .90	- 6.99	Johnson County	- 1.63	- 12.05
Northern Rim	- 5.64	- 19.43	Unaka Range	- 1.50	- 18.71

Source: University of Tennessee, Department of Agricultural Economics, Real Estate Transfer Files.

There are exceptions to this tendency for good land to suffer the greatest losses in Tennessee during this period. In fact, the only area in which the sale price exceeded the debt held against foreclosed property was the Mississippi Bottom, where the sale price exceeded the debt by



Source: Based on Table XX.

Figure 50. Amount that sale price exceeded or was less than debt held against foreclosed property, for certain counties and areas, 1929 - 1933

\$0.25 per \$100 debt. The land in this area ranks among the most productive in the State. Fayette County, which has a crop yield index of only 69.5 per cent of the state average, had a loss of \$39.04 per \$100 debt.

In both Alabama and New York, the principal reason for losses being greater on poor land than on good land was that poor land was valued higher than good land with relation to the income from the land, and that loans were made in amounts directly proportional to the value of the land. In Tennessee the same is probably true within small and limited areas. However, for large areas or even counties, poor areas are not necessarily over-valued with relation to their earning power, and the number of loans and amount of credit granted has not been proportional to the value of the farms for Tennessee. Instead, the number of mortgages has been restricted in the poor areas to a relatively small percentage of the farms; and the amount of credit granted on these farms is a relatively small proportion of the value of the farms. These factors partially explain the reason for losses being greater on the good land than on the poor land in Tennessee in contrast to the results in Alabama and New York.

An additional factor is the depression which occurred during the period 1929 to 1933, a major factor causing foreclosures. Ordinarily the more productive regions suffer greater financial losses than the poorest regions during periods of depression because of the greater investment and larger debts. In contrast, farms in the poorer areas have relatively small debts, and by strict personal economy on the part of the farm operator and his family, interest payments can be met and foreclosures averted. (10)

(10) Mereness, op. cit., p. 13.

Data on foreclosures have been obtained for one county, Obion, for the years 1927 through 1933 (see Table XXI and Figure 51). In 1927, the sale price of foreclosed farm property exceeded the debt by \$3.20 per \$100 debt held against the property. In 1928 the debt held against such property exceeded the sale price by \$9.82 per \$100 debt, and the losses continued to increase, reaching \$42.55 in 1933. Data are not available for the poorer counties for this period. However, an analysis of the data for Obion County shows that farms of least value (assuming that the small farms have less value than the larger farms), suffered greater losses

TABLE XXI. AMOUNT SALE PRICE EXCEEDED OR WAS LESS THAN DEBT
ON FORECLOSED FARMS BY SIZE, OBION COUNTY,
1927-1933

Size Farm	1927	1928	1929	1930	1931	1932	1933	All Years
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.
0- 49 acres	- 9.18	-34.80	-51.86	-10.81	-24.63	-21.57	-14.61	-24.77
50- 99	-23.66	-26.03	-16.43	-26.25	-32.13	-29.60	-24.44	-26.19
100-149	10.55	-12.62	-30.44	-29.01	-30.37	-25.92	-21.89	-20.74
150-199	-30.03	0	-36.15	-	-45.44	-51.74	-62.50	-36.44
200 and above	9.05	-0.17	-24.98	-26.98	-34.93	-22.16	-66.25	-25.96
All sizes	3.20	- 9.82	-27.67	-27.48	-35.01	-25.72	-42.55	-26.38

Source: Univ. of Tenn., Dept. of Agri. Economics, Real Estate Transfer Files.

than the large farms prior to the collapse in prices in 1929 and less losses beginning with 1930 and continuing through 1933. Although a small farm does not necessarily have poorer soil than do large farms, there is a general tendency for small farms to be located on poorer land than large farms, as shown in Table VI. Too, within a given area, acres per farm is

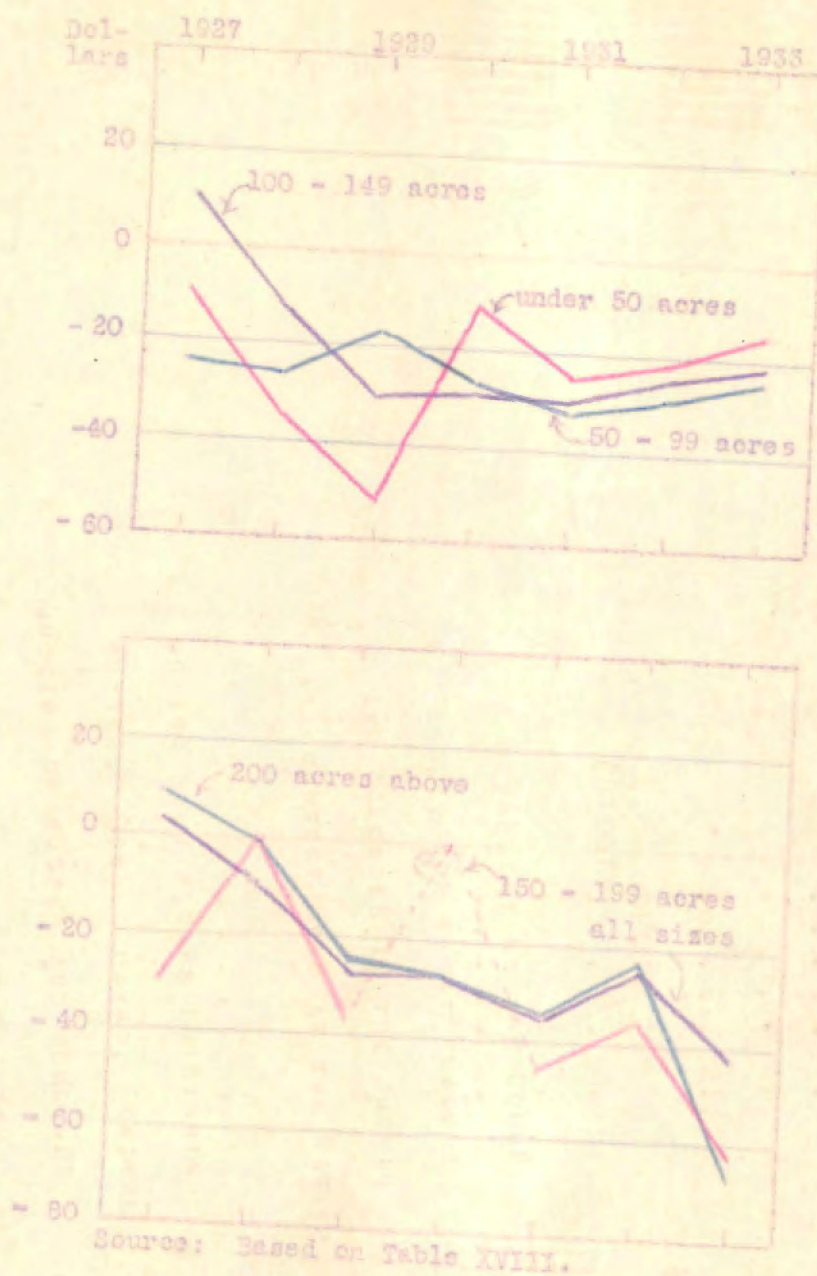


Fig. 51. Amount sale price exceeded or was less than debt on foreclosed farms by size, Obion County, 1927-1933

(a) There were no foreclosures in this group in 1930

a fair index of the size of the farm business.⁽¹¹⁾ Inasmuch as small size of farm business has been closely related to poor soil, it may be concluded that poor areas suffer greater losses in normal times and less losses in adverse years than do more fertile areas (see Figure 51).

Data showing the number of foreclosures in Tennessee are not complete for any period of time except for a limited number of counties. Hence, in a discussion of the influence of soils on the number of farm foreclosures it is not possible to adhere to the original grouping of counties. Instead the counties for which these data are complete for the period 1928 through 1933 are listed separately, and a comparison is made of the counties with the influence of soils on the number of foreclosures emphasized.

Assuming that the per cent of owner operated farms mortgaged is the same as the per cent of all farms mortgaged, the percentages that the number of foreclosures are of all farms mortgaged was calculated and shown in Table XXII and Figure 52 for 18 counties for which such data were available. Such figures are subject to error principally because of the tenant situation in West Tennessee. However, studies of the percentages of farms mortgaged by tenure show that there is comparatively little variation for different types of tenure for both the United States as a whole and for Tennessee.⁽¹²⁾

To some extent there has been a general tendency for foreclosures to be more numerous in the poorest counties than in the best counties in proportion to the number of farms mortgaged. While only 6.8 per cent of

(11) Warren, G. F., Farm Management, p. 290.

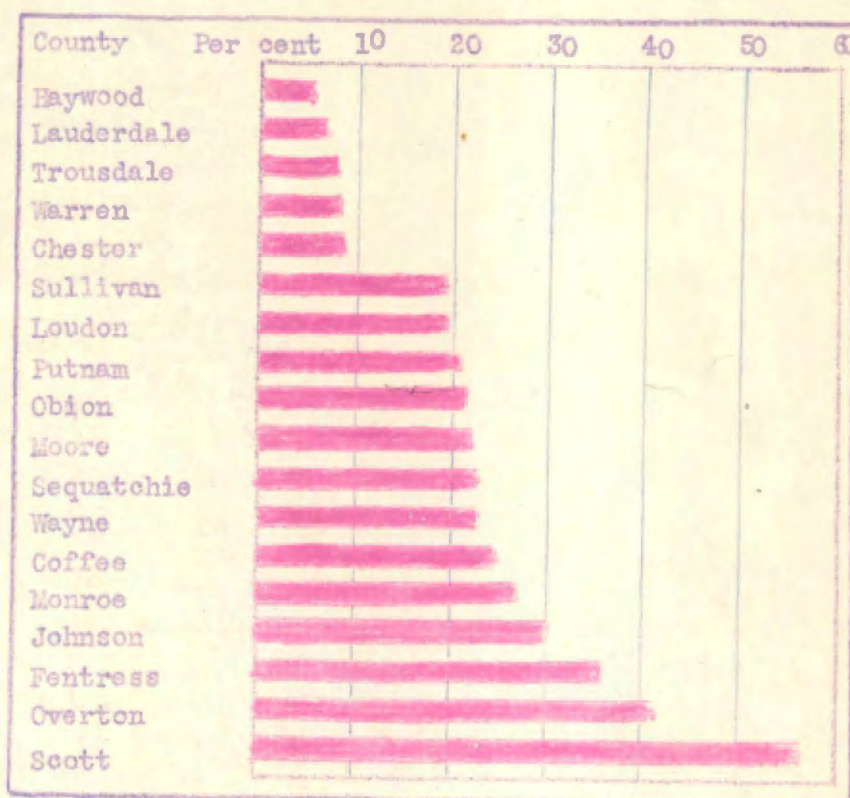
the farms in Scott County were mortgaged in 1929, the number of foreclosures for the years 1928 through 1933 equalled 56.6 per cent of the number of farms mortgaged. Scott County is on the Cumberland Plateau. The second highest ranking county in the proportion of mortgaged farms foreclosed was Overton, with 40.9 per cent. Overton County lies partially on the Plateau, but principally on the Highland Rim and its soils rank comparatively low in fertility. The third highest county in proportion of mortgaged farms foreclosed is Pentress, a Plateau County, with 36 per cent.

TABLE XXII. FARM FORECLOSURES: NUMBER AND PER CENT OF ALL FARMS MORTGAGED

County	Number Farms Mortgaged, 1930 (a)	Farms Fore- closed, 1928-33	County	Number Farms Mortgaged, 1930 (a)	Farms Fore- closed, 1928-33
Lauderdale	1,998	6.7	Overton	242	40.9
Obion	1,568	21.2	Pentress	100	36.0
Haywood	2,245	5.4	Sequatchie	85	22.4
Chester	717	8.8	Scott	76	56.6
Wayne	373	23.0	Loudon	375	19.5
Trousdale	345	8.1	Monroe	672	26.9
Moore	215	21.9	Johnson	249	30.1
Coffee	610	24.6	Sullivan	612	19.1
Warren	526	8.2			
Putnam	583	20.4			

Source: Univ. of Tennessee, Dept. of Agric. Economics, Real Estate Transfer Files. Number of Farms Mortgaged based on 15th U.S. Census of Agriculture, 1930.
(a) Assumed that per cent of all farms mortgaged was same as for owner operated farms.)

The counties having a relatively low proportion of the mortgaged farms foreclosed are: Lauderdale, 6.7 per cent; Haywood, 5.4 per cent; Trousdale, 8.1 per cent; and Chester, 8.8 per cent. For the most part, the soils of these counties are fairly fertile.



Source: Based on Table X

Fig. 52. Per cent that farms foreclosed are of all farms mortgaged, by certain Tennessee counties, 1929-1933

Between these extremes lie some counties having very productive soils and other counties with relatively poor soils. Obion, for instance, had 21.2 per cent of its mortgaged farms foreclosed. Wayne, one of the poor land counties, had 23.0 of its mortgaged farms foreclosed; and in Johnson County, which lies partially on the Unaka Range and which has large areas of poor farming land, the farms foreclosed equalled 30.1 per cent of the farms carrying mortgages.

Farm foreclosures are most likely to be greatest in fertile areas during depression periods, because farms in such areas are usually more heavily mortgaged. However, in normal time the opposite is true.

Summary

Credit activities are rather restricted in the poorest areas of the State. The percentage of farms mortgaged and the percentage that the amount of credit obtainable is of the value of the farm land and buildings tends to be lower in the poor areas than in the good land areas.

The fact that fewer farms are mortgaged and that less credit is granted in proportion to the value of the farm property cannot be explained by saying that farmers in the poor areas do not need credit facilities. The fact is that they are often in greater need of credit facilities than farmers in better regions. Nor can this low credit rating be attributed to a lack of honesty on the part of farmers in the poor areas. Observation indicates that farmers in the poor areas of Tennessee are equally as conscientious in dealing with their fellows as are people in the good land areas.

The primary reason for the low credit rating of poor areas is the fact that the income in such areas is not high enough on most farms to

provide a living for the operator and his family and to make payments of interest and principal on debts. Farm mortgage loan experience in Tennessee and other states indicates that lending operations are not as safe on poor land as on good land in normal times.

Of course, factors other than soil must be considered in determining the relative safety of credit transactions in any area. Yet soil fertility and productivity is a major factor affecting the ability to pay debts. Land must yield enough to provide a living for its occupants plus enough to pay interest and a part of the principal if debts are to be paid from the farm returns. Experience has shown that it is much safer to lend and to invest money on good land than on poor land.

CHAPTER VII

INFLUENCE OF SOIL TYPE ON FARM TAXATION

It is estimated that in 1913 taxes absorbed not over 10 per cent of the farmers' net income in the United States. During the nine-year period, 1921 to 1929, the usual computations show that taxes were taking 30 per cent, or one third, of the net farm income, and since 1930 a fair comparison of taxes to income breaks down because of the virtual disappearance of any income properly to be labelled net. (1)

While it is true that all parts of the United States and Tennessee have been heavily burdened by taxes, it is generally believed that the poorest areas are the most heavily burdened. In poor counties, while the total and per capita wealth and income is low, the per capita costs of maintaining governmental functions is relatively high. This is partly due to the sparseness of the population in poor areas, and to the fact that numerous governmental functions must be performed regardless of the sparseness of the population and the low total wealth with which to finance these functions.

Though the general belief prevails that poor areas are taxed more heavily than good land areas, it is somewhat difficult to establish a relationship between soil fertility and taxation in Tennessee, because of the limitation of data on the subject. Tax rates per \$100 assessed value do not show the amount of taxes paid in proportion to the true

(1) Hibbard, B. H., "Taxes, A Cause of Agricultural Distress", Journal of Farm Economics, Vol. XV, Jan. 1935, p. 3.

value of the farm real estate, because assessments are really made on the basis of full value of the property, and assessment practices vary greatly in the various counties of the State. In some counties the assessed value of land bears little, if any, relation to the sale value of the land, the assessment most frequently being low in relation to value. In some counties, tax rates are often set low and property assessed high in relation to its true value for the purpose of attracting industries by means of the low rates.

Tax Rates

County Tax Rates. There is a general tendency for the county tax rates per \$100 assessed valuation to be higher in poor areas than in the more fertile areas. Table XXIII and Figure 53 show that practically all of the counties lying partially or wholly on the Cumberland Plateau had a high tax rate for the year 1934. In contrast, the counties comprising the Central Basin had comparatively low rates.

County tax rates, alone, however, are not a good measure of the tax burden due to assessment-ratio differences.

Tax Rates As Reported by the Bureau of the Census. The ratio of taxes to the estimated true value of land and buildings, as reported by the Census of Agriculture, is a better index of the tax burden than are the rates per \$100 assessed value. Yet, as shown by Figure 55, there is a fairly high degree of correlation between the county rates and the ratio of taxes to value of land and buildings as reported by the Census. Therefore, one would expect a higher ratio of taxes to value of land and buildings in the poor areas than in the fertile areas. To some extent, this is true (Figure 54).

TABLE XXIII. RATIO OF FARM TAXES TO VALUE OF FARM LAND AND BUILDINGS(1) AND THE COUNTY TAX RATES(2), 1929
(Based on \$100 Property Values)

County	Ratio to Land and Bldgs.	County Tax Rate	County	Ratio to Land and Bldgs.	County Tax Rate	County	Ratio to Land and Bldgs.	County Tax Rate
Ander.	1.25	2.20	Hamilt.	0.71	1.32	Morgan	2.08	3.00
Bedf.	0.96	1.60	Hanc.	1.09	1.70	Obion	1.27	1.66
Bent.	1.51	1.90	Harde.	1.67	2.30	Overt.	1.54	2.30
Bleds.	1.33	1.80	Hardin	2.30	2.60	Perry	1.67	2.45
Blount	1.43	1.78	Hawkins	1.14	2.10	Pick.	1.38	1.88
Bradl.	1.03	1.75	Hayw.	1.23	1.65	Polk	1.01	1.50
Campb.	1.67	3.15	Hender.	2.14	2.80	Putn.	1.29	1.98
Cannon	1.18	1.60	Henry	1.55	1.85	Rhea	1.11	2.20
Carroll	1.83	1.85	Hickm.	1.97	2.34	Roane	1.65	2.40
Carter	0.87	2.85	Houst.	1.38	1.49	Robert.	1.19	1.42
Cheat.	1.08	1.51	Humph.	1.55	2.45	Ruther.	1.39	1.54
Chest.	1.66	1.91	Jacks.	1.42	2.30	Scott	1.52	2.50
Claib.	1.18	2.30	Jeffer.	1.24	2.00	Sequat.	0.93	1.70
Clay	1.82	2.15	John.	0.74	2.80	Sevier	1.28	2.55
Cocke	1.21	2.15	Knox	0.66	1.16	Shelby	0.89	0.98
Coffee	1.38	1.90	Lake	1.30	1.57	Smith	1.59	1.80
Crock.	1.35	1.55	Lauder.	1.49	1.85	Stew.	0.83	1.75
Cumber.	0.99	2.20	Lawr.	1.46	1.90	Sulli.	0.64	1.85
David.	0.76	.95	Lewis	1.30	2.08	Sumner	0.82	1.40
Decat.	1.81	2.25	Line.	1.29	1.80	Tipton	1.29	2.35
DeKalb	1.40	1.15	Loudon	1.12	1.80	Trousd.	1.45	1.55
Dicks.	1.13	1.80	McMinn	0.96	2.20	Unicoi	1.01	3.20
Dyer	1.86	2.55	McNairy	2.11	2.58	Union	1.51	1.90
Fayet.	1.54	1.80	Macon	1.14	1.56	V.Bur.	1.07	1.80
Fentr.	1.61	2.45	Madis.	1.06	1.65	Warren	1.10	1.80
Frank.	1.14	1.55	Marion	1.19	1.96	Wash.	0.98	1.84
Gibson	1.61	1.60	Marsh.	1.44	1.85	Wayne	1.15	2.40
Giles	1.24	1.56	Mauzy	1.10	1.35	Weak.	1.42	1.53
Grain.	1.59	1.95	Meigs	1.20	2.80	White	1.13	1.70
Greene	1.45	2.20	Monroe	1.75	2.63	Willi.	0.93	1.10
Grundy	1.54	2.60	Montg.	1.13	1.35	Wilson	1.31	1.15
Hambl.	1.01	1.55	Moore	1.01	2.00			
						Average	1.21	No data

Sources: (1) 15th Census of Agriculture, Tennessee, 1930, Series 2, p. 33.
(2) Tax Aggregate, Year 1929, Tennessee Department of Finance and Taxation.

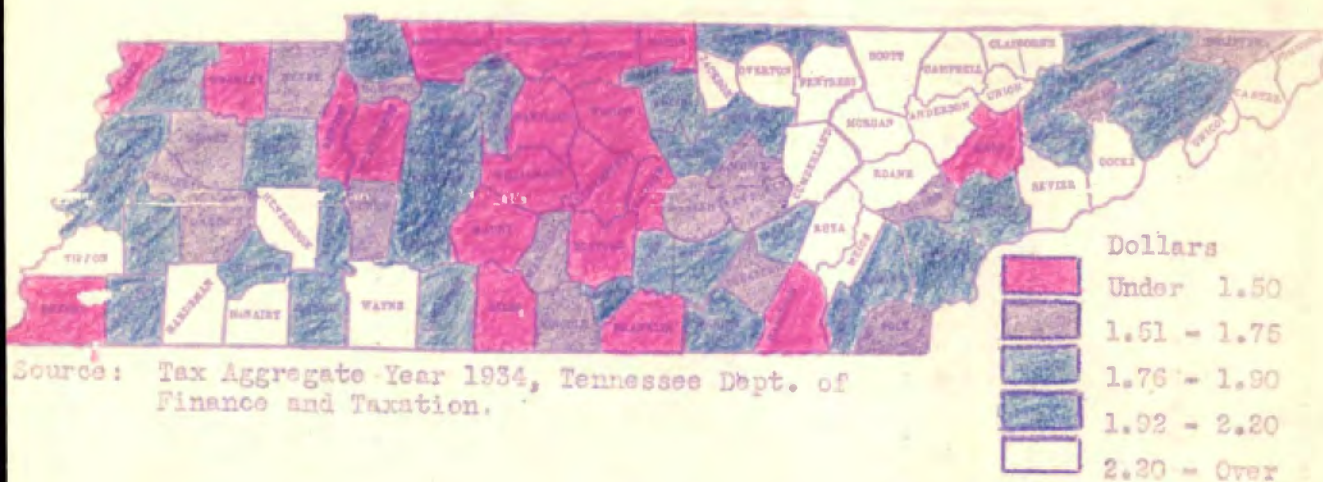
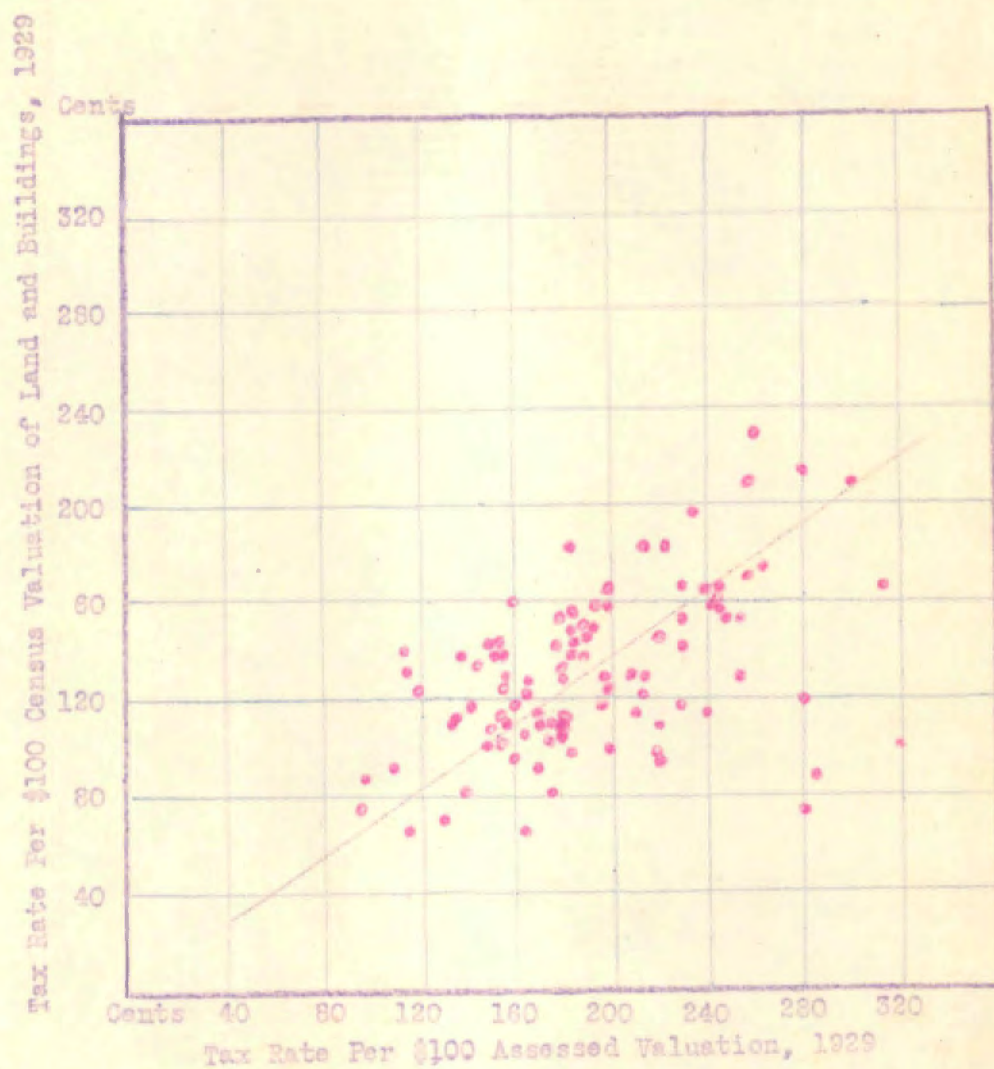


Figure 53. County tax rate per \$100 assessed valuation, 1934



Figure 54. Taxes per \$100 Census Value of land and buildings, Tennessee Counties, 1929



Source: Based on Table. XXIII

Figure 55. Relationship between Taxes per \$100 Census Valuation of land and buildings and taxes per \$100 assessed valuation
(One dot = one county)

Most of the counties comprising the Cumberland Plateau have a comparatively high ratio. Cumberland and Van Buren counties are the principal exceptions. Also the counties of West Tennessee had high rates, and the highest rates within that section were not confined to the poorer counties. Yet seven of the nine West Tennessee counties having a ratio of taxes to value of land and buildings of 1.61 per cent, or more, lie wholly or partly within the Water-Shed area, which is the poorest part of West Tennessee.

Using the selected county groups, the ratio of taxes to the value of land and buildings in West Tennessee is highest in the McMairy Sand area and continues to decrease as the groups extend westward across the State, except for the Mississippi Bottom. The soils increase in fertility from east to west. The tax rates are higher in the Mississippi Bottom (represented by Lake County) than they otherwise might be because of the small size of the county. Nevertheless, the ratio for this area is only 1.30 per cent compared to 1.27 per cent for the Leess area.

Therefore, basing tax rates upon the true value of farm property there is a general tendency for poor areas to have higher rates than the more productive areas.

Relation Between Taxes and Income

Most students of taxation have come to the conclusion that the principle of justice to be followed in taxation is that people pay taxes in proportion to their ability to pay. That is, taxes should be paid on the basis of one's income rather than on the basis of property

TABLE XXIV. RATIO OF TAXES TO FARM INCOME AND TO CASH
RENT OF LAND,
LOWER EAST TENNESSEE VALLEY

Soil Areas	Ratio to Net Income Per Cent	Ratio to Cash Rent Per Cent
Unaka Range	10.3	27.8
Upper East Tennessee Valley: Group I	7.6	23.6
Group II	8.2	33.8
Middle East Tennessee Valley	10.3	20.4
Cumberland Plateau	6.5	57.7
Central Basin	10.3	23.2
Eastern Rim	7.5	23.2
Northern Rim	4.5	22.7
Western Rim: Group I	4.2	22.1
Group II	3.7	11.8
McNairy Sand	4.3	25.5
LaGrange	4.8	20.8
LaGrange and Loess	4.7	19.2
Loess	6.4	15.9
Mississippi Bottom	2.9	10.2

Source: Computations based on 15th U. S. Census of Agriculture,
1930, Tennessee.

owned. Furthermore, rates should increase progressively as income rises. (2)

The basis of the greater part of farm taxes paid is the amount of property owned. In the preceding chapter it was shown that the ratio of farm income to the value of land and buildings bears little relationship to soils, the ratio tending to be higher, if anything, in the poor areas. Figure 56 shows that the ratio of taxes to net income bears little, if any, relationship to soil fertility. This is not unusual

(2) Yoder, Fred R., Introduction to Agricultural Economics, p. 398.



Source: Based on Table XXV.

Fig. 56. Percentage of net farm income taken by taxes in Tennessee counties, 1929



Source: Based on Table XXV.

Fig. 57. Property tax paid per farm Tennessee counties, 1929



Source: Based on Table XXV.

Fig. 58. Per capita county tax levy, Tennessee counties, 1933
(Does not include state or city tax)

in view of the fact that taxes are paid on the basis of the value of property owned and that the ratio of income to value of farm property has little relationship to soil fertility.

Relation Between Taxes and Cash Rent

The relationship between soil fertility and the ratio of taxes to cash rent may be seen by a study of Figure 59, using the selected grouping of counties. Cash rent is probably the nearest approach to land income that is available. Net farm income represents the returns from labor, good management, etc., in addition to the returns from the use of land and buildings alone. There is some tendency for the ratio of taxes to cash rent to be highest in the poorest areas and lower in the better farming regions. Especially is this noticeable for the extreme areas in ratio of taxes to rent. For example, the ratio of taxes to cash rent for the Cumberland Plateau is 57.7 per cent compared to 10.2 per cent for the Mississippi Bottom. Excluding these two groups, the tax - cash rent ratios for the other areas do not show a significant relationship to soil fertility.

Taxes Paid Per Farm and Per Capita

Taxes paid per farm tend to be highest in the good land counties. Table XXV and Figure 57 show that most of the counties comprising the Cumberland Plateau have comparatively low taxes per farm. The taxes for most of the Central Basin counties range from \$65 to \$99 per farm compared to a state average of \$47.28 per farm. The three counties, Lake, Obion, and Dyer, which make up the upper part of the Mississippi

TABLE XXV. RATIO OF NET FARM INCOME TO FARM TAXES, PROPERTY TAXES PER FARM, AND COUNTY PROPERTY TAX LEVY PER CAPITA

County	Ratio of Income to Taxes, 1929	Ratio of Taxes per Capita to Income, 1929	County	Ratio of Income to Taxes, 1929	Ratio of Taxes per Capita to Income, 1929	County	Ratio of Income to Taxes, 1929	Ratio of Taxes per Capita to Income, 1929
Andover	8.40	37.65	Franklin	8.61	49.72	Franklin	8.61	49.72
Bedford	8.61	49.72	Franklin	8.61	49.72	Franklin	8.61	49.72
Bentley	5.56	31.87	Franklin	4.34	31.87	Franklin	4.34	31.87
Bridgewater	6.46	47.90	Franklin	6.73	47.90	Franklin	6.73	47.90
Brighton	12.76	72.51	Franklin	6.04	72.51	Franklin	6.04	72.51
Bradford	8.62	50.28	Franklin	9.15	50.28	Franklin	9.15	50.28
Campden	7.44	34.61	Franklin	7.17	34.61	Franklin	7.17	34.61
Cannock	6.03	41.45	Franklin	2.80	41.45	Franklin	2.80	41.45
Carlisle	4.61	46.66	Franklin	3.94	46.66	Franklin	3.94	46.66
Chertsey	11.86	30.21	Franklin	8.04	30.21	Franklin	8.04	30.21
Chesterton	4.33	49.14	Franklin	6.74	49.14	Franklin	6.74	49.14
Chesham	2.51	61.87	Franklin	5.27	61.87	Franklin	5.27	61.87
Claydon	8.21	36.01	Franklin	6.22	36.01	Franklin	6.22	36.01
Cleworth	5.20	47.82	Franklin	4.40	47.82	Franklin	4.40	47.82
Coke	8.08	45.31	Franklin	9.03	45.31	Franklin	9.03	45.31
Cottingham	9.49	41.48	Franklin	5.01	41.48	Franklin	5.01	41.48
Croft	4.12	80.65	Franklin	4.74	80.65	Franklin	4.74	80.65
Cumber	4.55	19.44	Franklin	6.97	19.44	Franklin	6.97	19.44
Davton	15.15	81.82	Franklin	9.81	81.82	Franklin	9.81	81.82
Deer	4.39	45.45	Franklin	4.42	45.45	Franklin	4.42	45.45
Deer	7.61	43.85	Franklin	4.43	43.85	Franklin	4.43	43.85
Dickens	3.61	50.90	Franklin	6.24	50.90	Franklin	6.24	50.90
Dyer	5.82	119.74	Franklin	7.81	119.74	Franklin	7.81	119.74
Easton	3.62	56.80	Franklin	6.04	56.80	Franklin	6.04	56.80
Easton	5.26	21.87	Franklin	5.27	21.87	Franklin	5.27	21.87
Frank	7.89	49.37	Franklin	5.43	49.37	Franklin	5.43	49.37
Hampton	4.89	76.16	Franklin	6.03	76.16	Franklin	6.03	76.16
Harlow	6.20	53.55	Franklin	6.16	53.55	Franklin	6.16	53.55
Grain	9.17	48.59	Franklin	6.56	48.59	Franklin	6.56	48.59
Green	8.84	37.60	Franklin	9.58	37.60	Franklin	9.58	37.60
Grundy	7.61	24.04	Franklin	5.25	24.04	Franklin	5.25	24.04
Hamp	8.02	58.00	Franklin	8.67	58.00	Franklin	8.67	58.00

Data on Farm Taxes calculated from 15th Census of Agriculture, Tennessee, 1930, Series 2, p. 33.
Per Capita Tax Levies calculated from Financial Statistics of Tennessee Counties, Thos. H. Temple
Company, Nashville, 1934.

Bottom and Loess areas all paid taxes amounting to more than \$100 per farm in 1929.

That taxes per farm would be higher in the good land areas is not unusual. The value of property per farm is much higher in good land areas, and even though tax rates tend to be highest in the poor land counties, the difference in tax rates between poor and good land counties is not great enough to cause taxes per farm to be as high in poor as in rich counties.

The per capita county property tax levy does not follow the same pattern as the taxes per farm (Figure 58). Instead there seems to be comparatively little relationship in either direction between per capita taxes and soil fertility. The per capita tax levy tends to be high on the Cumberland Plateau. In the McNairy Sand area and the western Highland Rim, the opposite is true. The poorer counties of the Eastern Rim also have low per capita tax levies, there being a tendency for the more fertile counties lying in the southern half of the eastern Rim to have higher rates.

From the consideration of these various aspects of taxation, it is practically impossible to make any conclusions as to the relationship between soil fertility and the tax burden. While rates (both assessed rates and rates as reported by the Bureau of the Census), are highest in the poorest areas, taxes do not seem to take up a greater proportion of the farm income in the poorest areas. There is a tendency for taxes to consume a greater proportion of the cash rent in the poor counties than in the good farming areas.

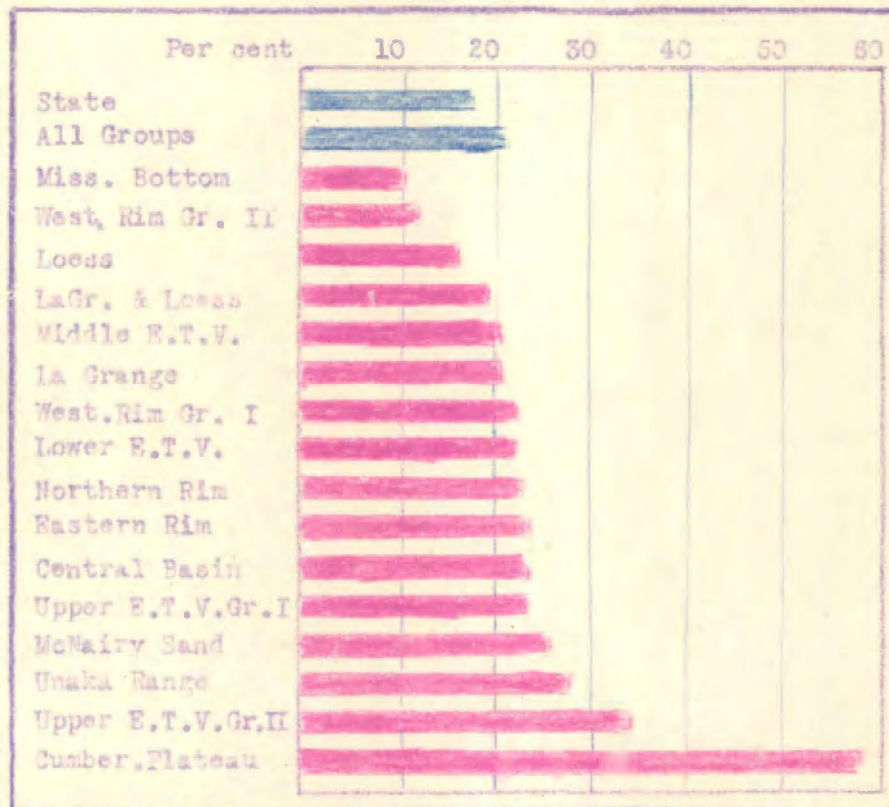
Regardless of the significance of these tendencies, it is an established fact that incomes per farm in the poor areas are extremely low. Using net income per farm operator as the basis of taxation and applying the principle of progression, there can be but little doubt that farmers in the poor areas are suffering greater injustice in taxation than farmers in the more prosperous regions. Too, as shown in another chapter, there is some tendency for the quality and variety of services supported by tax money to be less in the poor areas.

State and Federal Aid to Counties

While it may be somewhat difficult to show that the tax burden is greater in poor areas than in fertile areas, it is a fact that the most productive areas help support a relatively large proportion of the governmental services in the poorer counties. This is shown by a study of the percentages that state and federal aid to counties was of the county's revenue receipts in 1932 (see Table XXVI and Figure 60).

The counties comprising the Cumberland Plateau draw more heavily on state and federal funds in relation to their tax levies than counties in any other area of the State. Ranking next to the Plateau are the relatively poor Western Rim and McNairy Sand areas. In contrast to these poorer counties, the counties comprising the Central Basin draw a comparatively small proportion of their total revenue receipts from state and federal funds. The same is true of urban counties, which have a large amount of wealth.

The relatively great state and federal subsidies help to explain why the local tax burden is not very much greater in poor than in rich



Source: Based on Table XXIV

Figure 59. - Per cent that taxes are of cash-rent of land, county soil areas, 1929



Source: Based on Table XXVI

Figure 60. - Per cent state and federal aid to counties was of county's total revenue receipts, Tennessee, 1932.

State average 24.13

TABLE XXVI. PER CENT STATE AND FEDERAL AID TO COUNTIES WAS
OF COUNTY'S REVENUE RECEIPTS, TENNESSEE, 1932

County	Per Cent	County	Per Cent	County	Per Cent
Anderson	24.70	Hamilton	6.45	Morgan	30.19
Bedford	28.16	Hancock	55.66	Obion	18.07
Benton	41.32	Hardeman	51.62	Overton	42.75
Bledsoe	33.65	Hardin	43.27	Perry	59.46
Blount	14.49	Hawkins	26.10	Pickett	58.93
Bradley	20.70	Haywood	39.93	Polk	20.00
Campbell	31.63	Hender.	47.91	Putnam	46.06
Cannon	59.71	Henry	29.88	Rhea	23.93
Carroll	39.34	Hickman	37.96	Roane	28.46
Carter	29.36	Houston	56.10	Robertson	25.86
Cheatham	50.00	Rumphreys	38.86	Rutherford	25.57
Chester	43.36	Jackson	50.59	Scott	38.11
Claiborne	48.48	Jefferson	31.43	Sequatchie	51.47
Clay	50.00	Johnson	43.62	Sevier	40.72
Cocke	26.07	Knox	5.27	Shelby	7.55
Coffee	44.89	Lake	35.88	Smith	27.01
Crockett	42.77	Lauderdale	22.78	Stewart	41.51
Cumberland	44.80	Lawrence	36.64	Sullivan	13.63
Davidson	3.77	Lewis	56.73	Sumner	31.51
Decatur	64.44	Lincoln	20.23	Tipton	30.88
DeKalb	48.23	Loudon	31.31	Trousdale	39.60
Dickson	47.06	McMinn	37.75	Unicoi	34.85
Dyer	18.76	McMairy	44.65	Union	48.89
Fayette	33.67	Macon	47.55	V. Buren	58.06
Fentress	53.40	Madison	15.94	Warren	32.72
Franklin	33.48	Marion	24.64	Washington	19.70
Gibson	38.41	Marshall	23.13	Wayne	49.11
Giles	22.71	Maury	23.06	Weakley	27.93
Grainger	50.00	Meigs	64.76	White	43.19
Greene	32.62	Monroe	27.78	Williamson	17.11
Grundy	56.10	Montgomery	17.33	Wilson	23.59
Hamblen	19.82	Moore	57.41	Average	24.13

Source: Calculated from Financial Statistics of State and Local Government, 1932, Bureau of Census.

land areas. In many counties the tax burden is relatively low because of the relatively low quality of governmental service (see Chapter I).

Influence of Soils on Tax Delinquency

A study of tax delinquency in Tennessee shows that farm tax delinquency has been increasing continuously since 1922 and irregularly since 1927. Since 1927 a larger proportion of taxes have constantly been delinquent than for any year from 1890 to 1927. Furthermore, the tax delinquency problem has been more acute in rural than in urban areas since 1927; whereas, prior to that time the opposite was true. ⁽³⁾

Studies of tax delinquency in other states show that there has been a corresponding increase in tax delinquency. Large acreages of land have reverted to state ownership in the northern and middle western states.

While the tax delinquency problem has been serious on all classes of land, studies in other states show that it has been most acute on the poorer grades of land. For instance, in Missouri, delinquency in the rugged and stony Ozark region averaged higher than in the most productive farming regions. ⁽⁴⁾ Throughout the poorer areas of the Lake States, a rapidly mounting rate of tax delinquency has become a serious problem. ⁽⁵⁾ This tendency for high rates of delinquency on poor land is not confined to any section of the United States. Studies in New York show that tax delinquency was a much more serious problem on poorer grades of land than

(3) Allred, C. E., Boyer, P. B., and Horne, R. E., Tax Delinquency on Rural and Other Property In Tennessee, Tennessee Agricultural Experiment Station, Circular No. 53, p. 2.

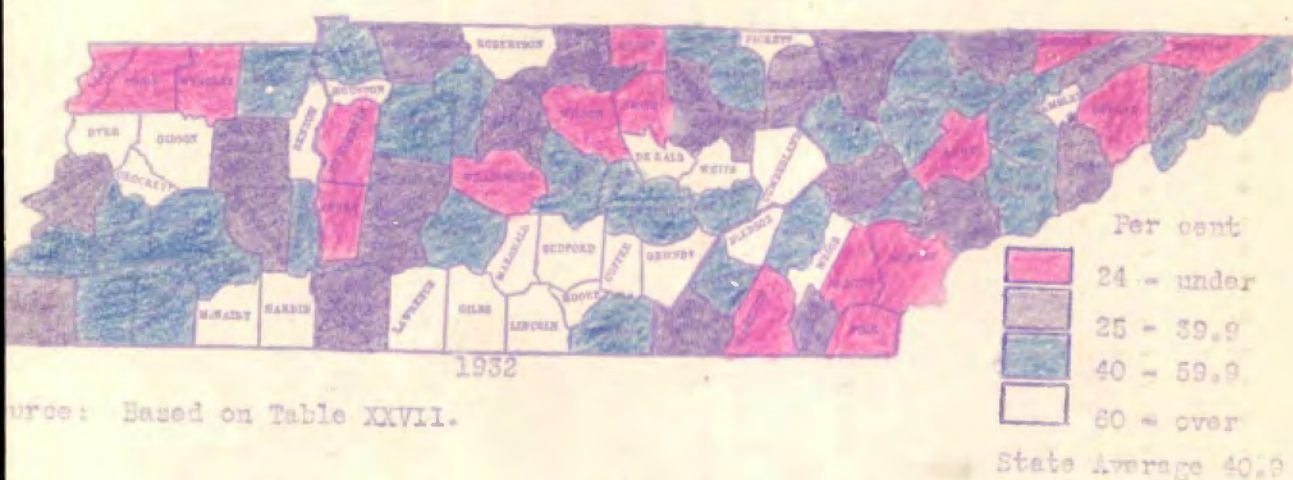
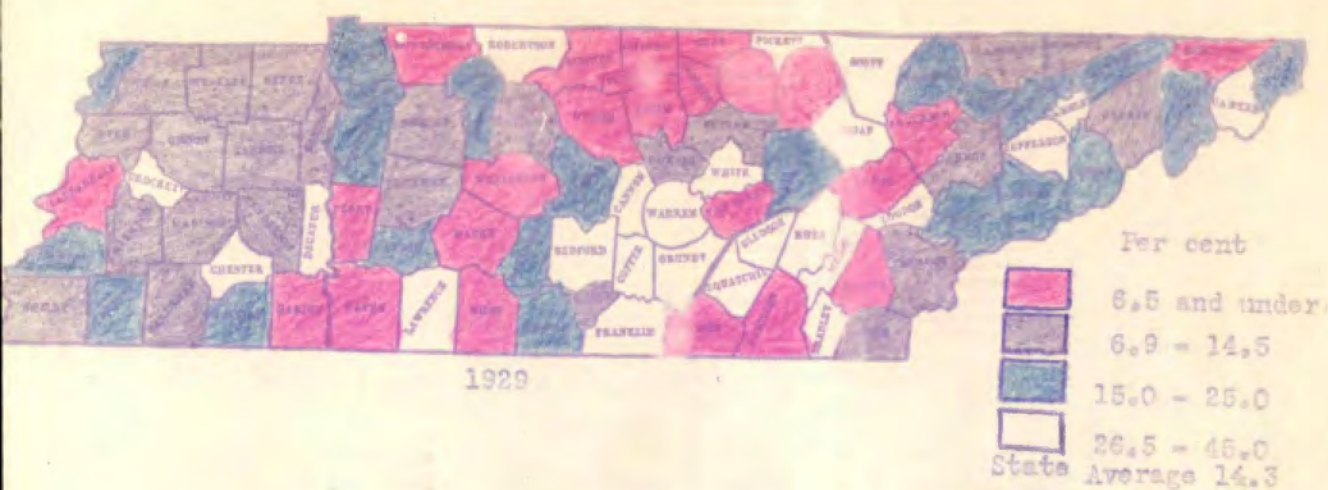
(4) Hammar, C. H., Land Tax Delinquency In Missouri, University of Missouri, Agricultural Experiment Station Research Bulletin No. 224, 1935, p. 15.

(5) Sitterley, J. H., Moore, H. R., and Falconer, J. I., Land Utilization In a Southeastern Ohio County, Ohio Agricultural Experiment Station Bulletin 485, p. 3.

TABLE XXVII. PER CENT OF TAXES ON RURAL PROPERTY WHICH BECAME DELINQUENT IN TENNESSEE COUNTIES, 1929 AND 1932, AND PER CENT INCREASE OR DECREASE, 1929 TO 1932.

County	Per Cent Delinquent		Per Cent Dec. or Inc. 1929-1932	County	Per Cent Delinquent		Per Cent Dec. or Inc. 1929-1932	County	Per Cent Delinquent		Per Cent Dec. or Inc. 1929-1932
	1929	1932			1929	1932			1929	1932	
Ander.	3.5	47.4	1333	Hamilt.	5.1	16.8	229	Morgan	29.2	58.9	101
Bedf.	27.6	61.6	123	Hanc.	8.4	14.1	67	Obion	7.1	21.9	208
Bent.	9.7	77.0	693	Harde.	7.8	48.0	515	Overt.	6.5	45.9	606
Bleds.	27.4	67.2	145	Hardin	5.5	69.3	1160	Perry	4.1	22.6	451
Blount	24.3	38.5	58	Hawk.	19.8	37.6	89	Pick.	33.9	64.0	88
Bradl.	39.7	36.1	- 9	Hayw.	14.5	47.3	226	Polk	8.4	11.6	38
Campb.	18.1	44.1	143	Hend.	12.1	28.4	134	Putn.	6.9	26.9	289
Cannon	36.2	58.3	61	Henry	10.2	43.7	328	Rhea	28.8	56.5	96
Carr.	9.7	31.9	228	Hick.	13.0	26.4	103	Roane	3.9	30.7	637
Carter	39.5	45.9	1620	Houst.	21.0	64.1	205	Robert.	34.8	66.6	91
Cheat.	19.0	53.6	182	Humph.	20.8	24.0	15	Ruther.	16.0	46.8	192
Chest.	29.8	59.6	100	Jacks.	0.3	26.0	856	Scott	35.6	33.9	- 5
Claib.	8.1	39.1	382	Jeff.	26.9	58.8	118	Sequa.	46.5	59.6	30
Clay	3.3	46.5	1278	John.	15.0	49.7	231	Sevier	20.0	58.4	192
Cocke	17.9	39.2	118	Knox	14.5	21.1	45	Shelby	12.8	26.5	99
Coffee	34.5	63.8	84	Lake	15.7	19.7	25	Smith	1.9	11.6	510
Crock.	28.4	65.6	130	Laud.	2.8	25.2	800	Stew.	20.0	45.0	125
Cumber.	22.5	62.4	177	Lawr.	26.8	60.8	126	Sulli.	2.5	13.5	440
David.	12.5	28.2	125	Lewis	16.2	25.5	57	Sumner	5.3	27.8	424
Decat.	36.4	59.5	63	Linc.	15.8	65.0	311	Tipton	16.3	58.2	257
DeKalb	8.5	67.8	697	Loud.	28.9	51.9	79	Trous.	0.9	30.0	323
Dicks.	10.9	46.3	324	McM.	1.2	23.1	1825	Unicoi	24.1	55.9	131
Dyer	9.2	65.7	614	McN.	20.4	64.9	218	Union	15.0	41.9	179
Fayet.	18.7	55.0	194	Macon	2.0	18.6	830	V.Bur.	5.3	55.7	950
Fentr.	4.7	27.4	482	Madis.	12.9	49.4	282	Warren	27.7	48.0	73
Frank.	26.5	57.3	116	Marion	4.9	31.2	536	Wash.	19.6	31.1	59
Gibs.	7.7	65.3	748	Marsh.	17.7	74.0	318	Wayne	4.4	29.1	561
Giles	0.6	71.0	1173	Mauzy	3.2	47.3	1393	Weak.	7.2	23.3	224
Grain.	19.3	55.3	186	Meigs	36.6	62.9	70	White	36.6	70.1	91
Greene	8.6	23.5	173	Monroe	11.6	23.1	99	Willi.	1.9	9.0	374
Grundy	37.0	64.3	73	Montg.	3.7	29.9	708	Wilson	6.5	18.6	186
Hambl.	27.5	60.7	120	Moore	7.3	66.1	805				
								Ave.	14.3	40.9	186

Source: Allred, C. E., Boyer, P. B., and Horne, R. E., Tax Delinquency on Rural and Other Property In Tennessee, Univ. of Tennessee Agricultural Experiment Station Circular No. 53, p. 3.



Source: Based on Table XXVII.

Figure 61. Per cent of taxes on rural property delinquent in Tennessee counties, 1929 and 1932



Figure 62. Per cent increase or decrease in rural property delinquent taxes, Tennessee counties, 1929-1932

than on the better grades of land.⁽⁶⁾

In Tennessee the amount of tax delinquency has not followed any definite pattern in relation to soil fertility, using the available data as the basis of conclusion. Table XXVII and Figure 61 shows the per cent of taxes on rural property delinquent in Tennessee counties in 1929 and 1932. In 1929 most of the counties comprising the Cumberland Plateau had high rates of delinquency. However, counties having high delinquency rate were not confined to these poorer counties. Robertson County, on the Northern Rim; Jefferson and Hamblen counties, in the Upper East Tennessee Valley; and Crockett County, in the Loess and LaGrange areas, also had high rates of delinquency. Low rates of delinquency were not necessarily confined to the better farming counties. Van Buren, Fentress and Marion counties on the Cumberland Plateau, Perry and Wayne on the Western Rim, and Hardin County lying in the poor area along the eastern border of West Tennessee had comparatively low rates of delinquency. For the most part, however, there was a tendency for delinquency to be highest in the poorest counties in 1929.

By 1932 the pattern of tax delinquency was somewhat changed. The counties having high rates of delinquency were about evenly divided between the good land counties and the poor land counties.

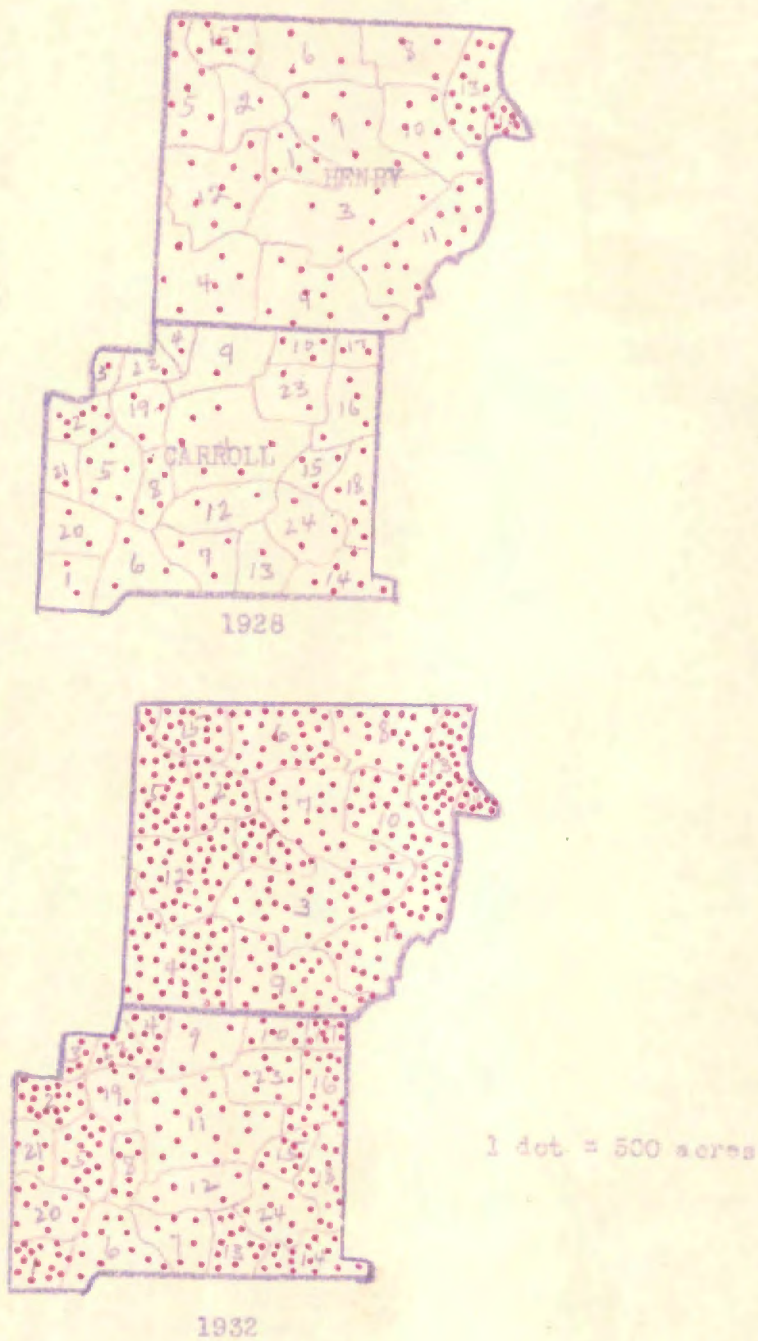
In view of this shift in the tax delinquency pattern, from 1929 to 1932 it is apparent that the rate of increase in tax delinquency must have been greatest in the more productive regions. Table XXVII and Figure 62 show that there was a slight tendency for the percentage

(6) Lewis, A. B., An Economic Study of Land Utilization In Tompkins County, New York, p. 32.

increase in tax delinquency to be greatest in such regions. Most of the counties of the Central Basin had percentages of increase greater than the State average of 186 per cent. The same was true of most of the better counties in West Tennessee, Lake County being the principal exception. High percentages of increase in tax delinquency were not confined to the better regions; however, the greater number of such counties were in the better farming areas.

Taxes are similar to farm mortgages in Tennessee in that taxes constitute a liability to the farmer. Therefore, about the same factors contributing to delinquency in the payment of interest and principal on farm mortgages contribute to tax delinquency. In normal times farmers in the better regions are generally more able to pay their taxes than farmers in the poorer regions. In periods of depression the opposite is generally true, because taxes per farm are lower in the poor areas, other obligations are not as great, and the greater self-sufficiency of the poor areas make such areas less susceptible to the influences of depression than the better regions.

Whether or not the same is true of individual farms within a given community cannot be determined for lack of data. The nearest approach to such limited areas is the comparison of civil districts within counties having two well defined and differing types of soil. The tax delinquency for two such counties, Carroll and Henry, is shown in Table XXVIII and Figure 63. These two counties lie in the eastern part of West Tennessee. The eastern half of both is underlain principally by the McNairy Sand geologic formations, which gives rise to soil of low



Source: Based on Table XXVIII.

Figure 65. - Acres of tax delinquent land in Carroll and Henry counties, 1928 and 1932.

natural fertility, whereas, the western half is underlain by the Holly Springs formation, which gives rise to soils of much greater fertility.

TABLE XXVIII. TAX DELINQUENT ACRES IN HENRY AND CARROLL COUNTIES, 1928 AND 1932

Civil Districts	Acres 1928	Acres 1932	Civil Districts	Acres 1928	Acres 1932
Henry			Carroll (cont.)		
1	2,605	7,809	4	402	2,338
2	586	7,291	5	2,268	6,938
3	2,524	12,567	6	1,495	5,297
4	3,711	19,034	7	1,419	2,811
5	3,689	14,128	8	1,786	3,023
6	1,275	13,039	9	650	2,619
7	3,469	9,436	10	1,292	2,552
8	1,646	8,254	11	2,322	8,611
9	4,305	12,443	12	896	1,930
10	3,134	9,860	13	575	5,723
11	6,882	13,358	14	3,021	7,359
12	4,128	14,992	15	1,510	4,502
13	6,545	15,064	16	1,828	7,539
14	3,123	4,511	17	829	3,250
15	3,008	7,273	18	2,313	6,228
			19	1,322	2,606
Carroll			20	738	4,558
1	1,197	6,882	21	485	1,959
2	3,385	8,232	22	573	4,346
3	584	2,015	23	870	3,416
(cont.)			24	1,490	4,108

Source: University of Tennessee, Department of Agricultural Economics, Tax Delinquency Files.

Figure 63 shows that the tax delinquency pattern for the civil districts of these counties does not bear a close relationship to soil fertility, either in 1928 or in 1932. Unlike large regions, there is not great variations in the type of farming among these civil districts. Therefore, both the poorer and the better civil districts would be about equally subjected to the influences of the depression.

CHAPTER VIII

INFLUENCE OF SOIL TYPE ON FARM POPULATION

The soil not only influences the economic activities of a given region, but its influence is reflected in the lives of the people which it supports. The number of people which any region, particularly an agricultural region, can support is dependent upon the fertility of the soil. Largely because of economic conditions resulting from natural factors, various areas of the State have their own particular personality groups. The differences between these groups are often very marked and distinct.

Density of Population

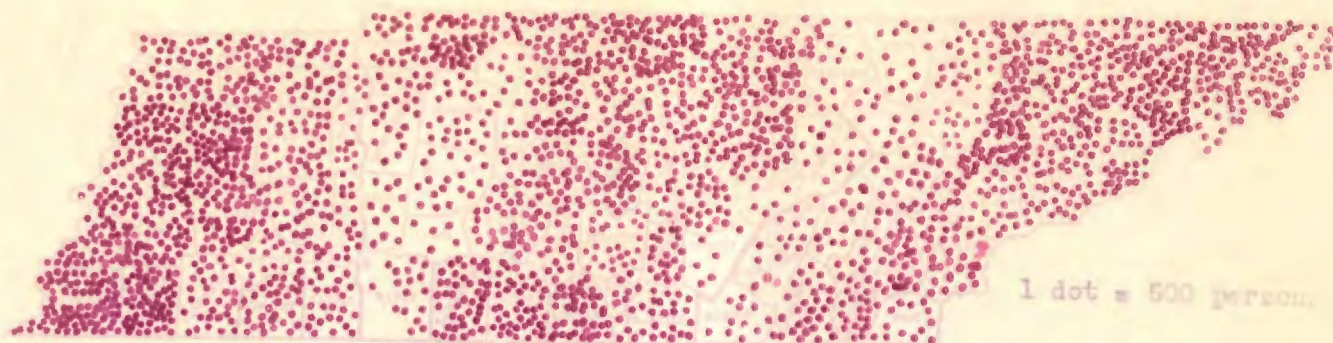
Unless non-farming activities offer opportunity for employment, the population of any given area is limited to that which the land can support. If the land is fertile and suitable for an intensive type of farming, there is a tendency for the area to be more thickly settled (1) than on poor land which is adapted to a less intensive type of farming. This is shown by the distribution of the rural farm population in Tennessee (see Table XXIX and Figure 64). There are three areas of dense farm population in the State. These are: (1) the western half of West Tennessee; (2) the central part of the State, comprising the Central

(1) Climate may also limit the density of farm population as in the semi-arid regions of the West.

TABLE XXIX. RURAL FARM POPULATION AND PER CENT NEGROES, TENNESSEE COUNTIES, 1930

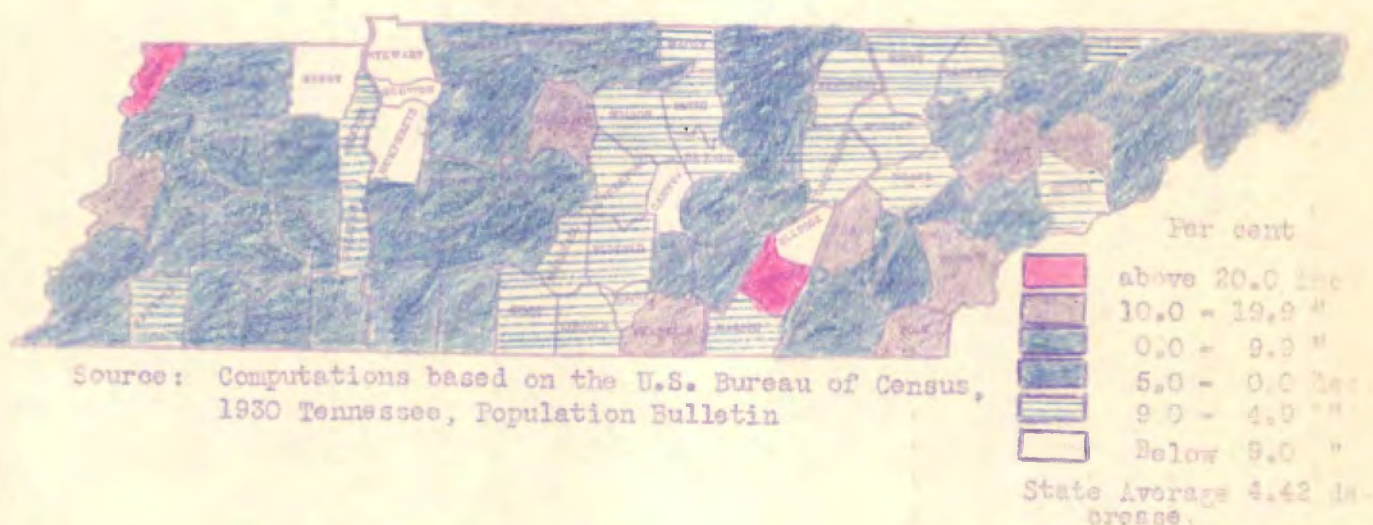
County	Rural Farm Popula- tion Number	Rural Farm Negroes: Per Cent of Farm Pop.	County	Rural Farm Popula- tion Number	Rural Farm Negroes: Per Cent of Farm Pop.	County	Rural Farm Popula- tion Number	Rural Farm Negroes: Per Cent of Farm Pop.
Ander.	8,224	1.4	Hamil.	13,950	5.7	Morg.	5,980	-
Bedf.	12,373	13.5	Hano.	8,728	1.8	Obion	16,301	7.3
Bent.	8,431	1.3	Harde.	16,103	32.9	Overt.	14,479	0.4
Bleds.	5,124	2.4	Hardin	12,689	5.7	Perry	5,546	1.9
Blount	14,113	1.8	Hawk.	18,672	3.1	Pick.	4,749	0.1
Bradl.	10,498	3.8	Hayw.	21,851	70.7	Polk	6,649	1.4
Campb.	10,031	0.1	Hender.	14,900	7.9	Putn.	15,071	2.1
Cannon	7,589	1.4	Henry	15,439	15.9	Rhea	7,223	2.3
Carroll	18,656	17.2	Hickm.	8,630	4.3	Roane	7,839	2.3
Carter	13,636	0.7	Houst.	3,827	7.2	Robert.	18,861	20.1
Cheat.	6,860	8.0	Humph.	7,910	1.5	Ruther.	20,876	23.1
Chest.	8,474	17.6	Jacks.	12,165	1.0	Scott	6,234	-
Claib.	17,152	1.6	Jeff.	13,494	4.3	Sequa.	2,817	0.3
Clay	7,657	1.0	John.	9,218	1.2	Sevier	15,931	0.5
Cocke	15,162	1.9	Knox	23,309	2.7	Shelby	38,559	64.6
Coffee	10,025	3.0	Lake	7,622	39.8	Smith	11,733	4.7
Crock.	14,212	19.8	Lauder.	17,890	40.9	Stew.	10,256	3.2
Cumber.	6,278	-	Lawr.	20,274	1.5	Sull.	17,352	0.4
David.	18,105	12.5	Lewis	2,693	1.1	Sumn.	19,979	10.1
Decat.	8,079	7.4	Linc.	18,807	13.4	Tipt.	22,062	43.6
DeKalb	11,585	1.7	London	7,591	3.9	Trous.	8,347	8.3
Dicks.	11,688	8.3	McMinn	13,619	4.5	Unicoi	4,759	-
Dyer	18,365	9.0	McNairy	15,888	6.1	Union	10,490	-
Fayet.	26,214	77.3	Macon	11,777	2.1	V.Bur.	2,414	2.4
Fentr.	5,867	-	Madis.	21,641	45.7	Warren	13,141	3.9
Frank.	13,137	7.4	Marion	5,686	3.1	Wash.	15,188	0.9
Gibson	30,501	17.7	Marsh.	9,611	12.1	Wayne	8,708	1.0
Giles	21,290	25.1	Mauzy	17,317	20.8	Weak.	20,863	4.7
Grain.	10,806	2.0	Meigs	5,556	8.7	White	10,384	2.6
Greene	26,102	1.6	Monroe	16,256	4.2	Wmson.	16,052	18.9
Grundy	2,868	1.3	Montg.	18,975	29.8	Wilson	15,618	15.0
Hambl.	8,001	4.8	Moore	3,459	6.4			
						Total	1,221,065	174715
						Ave.		6.9

Source: 15th Census of United States: 1930, Tennessee, Population,
2nd Series, p. 29.



Source: Based on Table XXIX.

Fig. 64. Rural farm population, Tennessee, 1930



Source: Computations based on the U.S. Bureau of Census, 1930 Tennessee, Population Bulletin

Fig. 65. Per cent change in farm population, Tennessee Counties, 1920 - 1930



Source: Based on Table XXIX.

Fig. 66. Per cent of farm population, Negroes, Tennessee Counties, 1930

Basin, the Northern Rim, and parts of the Eastern Rim; and (3) the East Tennessee Valley. These comprise the better farming areas of Tennessee. In contrast, the Western Rim, which has poor cherty soils, for the most part, is an area of sparse population. To the east of the Eastern Highland Rim lies the Cumberland Plateau, a very sparsely populated area which has relatively poor soil. Beyond this region on the east lies the East Tennessee Valley, an area of densely settled population. Within this region, however, the greatest concentration of farm population is in the Middle East Tennessee Valley counties and in the most productive Upper East Tennessee Valley counties. As the East Tennessee Valley gives way to the rough and relatively poor land of the Unaka Range, the farm population becomes less concentrated. This is especially true in Polk, Monroe, Blount, Cocke, Unicoi, Carter, and Johnson counties, all of which lie partly or wholly on the Unaka Range.

In addition to soil fertility, the closely related factor of topography is also influential in the determining, or limiting, the density of farm population. Topography is an important factor in determining the percentage of land available for agricultural production.

Trend in Farm Population, 1920-1930

There was a decrease of 4.42 per cent in the total farm population of Tennessee from 1920 to 1930. Generally, it is believed that those areas which offered poor opportunities for farming suffered the greatest losses. This, however, was not generally true of Tennessee.

Figure 65 shows that there were losses in the farm population in all of the Central Basin counties except Davidson, and that losses in

this area were as large, if not larger, than in any other area of the State. Excluding the Central Basin, it is true that losses in the farm population were greatest in the poorer areas -- the Cumberland Plateau, the Western Rim, and the Water-Shed area of eastern West Tennessee. However, in the main, there seems to be very little relationship between soils and the change or movement in farm population from 1920 to 1930.

Characteristics of the Population

Race. There are only two races of importance in Tennessee -- white and negro. The rural farm population of 1,213,065 persons was made up of 1,037,242 native whites, 1,215 foreign born whites, 174,515 negroes, and 89 persons of other races in 1930.⁽²⁾

In general, there is a tendency for a concentration of negro population in the better farming areas and in the cotton production sections. Figure 86 shows that the southwest corner of West Tennessee is an area in which the farm population is largely negro. Cotton production, no doubt, is a more important factor than soil fertility in accounting for the large number of negroes in this section. The Central Basin and the Northern Rim are the next leading areas in the proportion of the farm population that was negro in 1930. In the Northern Rim the production of dark tobacco lends itself readily to a cropper-tenant system of farming. This partially explains the concentration of negroes. The Central Basin formerly was the leading cotton producing region of the State. After cotton production shifted to other regions a large proportion of the negroes used as slaves, hired hands, or tenants, remained in the

(2) Bureau of the Census, Population, Tennessee, Composition and Characteristics, 1930, p. 5.

Central Basin.

Most of the counties in the East Tennessee Valley have a few negroes on farms. In the poor counties of the Cumberland Plateau, however, there are scarcely any negroes. The subsistence type of farming practised in this area did not lend itself to the slave plantation system of pre-Civil War days nor to the landlord-tenant plantation system which followed the Civil War. The association of the negro with the plantation or tenant system, which was a highly commercialized system of farming, accounts for the present concentration of the negro farm population in the major cotton producing areas and to a much less extent in the other commercial farming areas.

Size of Families. The average rural farm family in Tennessee is largest in the poorest areas and smallest in the best farming areas. On the Cumberland Plateau, for example, the average size of the farm family for the representative counties in 1930 was: Cumberland, 5.09 persons; Morgan, 5.13 persons; and Scott, 5.19 persons. Families in Scott County averaged 0.97 more persons than the average farm family of the State (see Table XXX and Figure 67). Ranking along with the Cumberland Plateau is the Unaka Range, which had an average size farm family of 5.09 persons.

In contrast to the large families of these two poor areas, the average size of the farm families for the representative Central Basin counties in 1930 was as follows: Marshall, 3.55; Wilson, 3.57; Trousdale, 3.79; Maury, 3.85; and Rutherford, 4.10 persons.

While farm families tend to be smaller in West Tennessee than in either East or Middle Tennessee, yet the largest families are found in

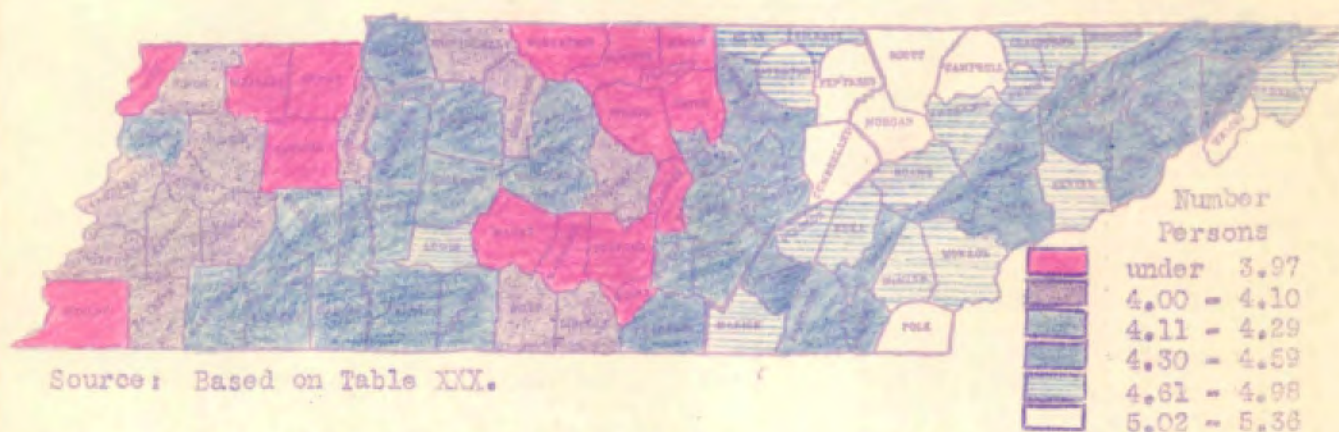
TABLE XXX. MEDIAN SIZE OF RURAL FARM FAMILIES, TENNESSEE COUNTIES, 1930

County	All Families	Negro Families	County	All Families	Negro Families	County	All Families	Negro Families
	Persons	Persons		Persons	Persons		Persons	Persons
Ander.	4.62	-	Hamilt.	4.51	3.53	Morg.	5.13	-
Bedf.	3.82	3.88	Hanc.	4.86	-	Obion	4.02	4.63
Bent.	4.03	-	Hard.	4.17	4.08	Overt.	4.79	-
Bleds.	4.71	-	Hardin	4.33	3.97	Perry	4.17	-
Blount	4.44	-	Hawk.	4.30	4.00	Pick.	4.62	-
Bradl.	4.36	-	Hayw.	4.10	4.17	Polk	5.23	-
Campb.	5.02	-	Hender.	4.13	4.20	Putn.	4.47	-
Cannon	3.92	-	Henry	3.94	4.61	Rhea	4.90	-
Carroll	3.92	4.45	Hickm.	4.29	-	Roane	4.75	-
Carter	4.98	-	Houst.	4.29	-	Robert.	3.95	3.92
Cheat.	4.08	4.15	Humph.	4.30	-	Ruth.	4.10	4.25
Chest.	4.17	4.41	Jacks.	4.29	-	Scott	5.19	-
Claib.	4.66	-	Jeffer.	4.43	4.16	Sequa.	4.49	-
Clay	4.61	-	John.	4.70	-	Sevier	4.84	-
Cocke	4.48	-	Knox	4.32	3.65	Shelby	3.96	3.94
Coffee	4.18	-	Lake	3.50	2.57	Smith	3.87	4.07
Crock.	4.01	4.01	Laud.	4.00	3.79	Stew.	4.49	-
Cumber.	5.09	-	Lawr.	4.59	-	Sulli.	4.42	-
David.	4.13	3.47	Lewis	4.61	-	Sumner	3.87	3.62
Decat.	4.18	4.39	Line.	4.10	4.41	Tipton	4.08	3.82
DeKalb	4.18	-	Loudon	4.54	-	Trousd.	3.79	3.78
Dicks.	4.31	3.91	McMinn	4.66	4.02	Unicoi	5.09	-
Dyer	4.20	4.50	McNairy	4.27	4.29	Union	4.61	-
Fayet.	4.05	4.06	Macon	3.97	-	V.Bur.	4.25	-
Fentr.	5.36	-	Madis.	4.01	4.15	Warren	4.11	3.61
Frank.	4.31	3.93	Marion	4.76	-	Wash.	4.26	-
Gibson	4.01	4.17	Marsh.	3.55	4.01	Wayne	4.44	-
Giles	4.09	4.52	Maury	3.85	3.74	Weak.	3.74	3.74
Grain.	4.11	-	Meigs	4.53	-	White	4.34	-
Greene	4.32	-	Monroe	4.67	4.68	Winson.	4.12	4.49
Grundy	4.18	-	Montg.	4.10	4.08	Wilson	3.57	3.66
Hambl.	4.26	-	Moore	3.83	-	Ave.	4.22	4.02

Source: 15th Census of U. S., 1930, Tennessee, Families, p. 27.

the poorest counties within this region.⁽³⁾ The average sizes of families for the representative counties of the McNairy Sand area in 1930

(3) The smaller families in West Tennessee is due to the large number of negro families which are smaller on the average than white families.



Source: Based on Table XXX.

Fig. 67. Median size of farm families, Tennessee 1930



Source: Based on Table XXXI.

Fig. 68. Percentage illiteracy among native white population,
Tennessee, 1930

was McNairy, 4.27 persons; Chester, 4.17 persons; and Henderson, 4.13 persons. The next highest county of West Tennessee among the representative counties of the other areas was Haywood, with 4.10 persons per family.

It seems that farmers in the better regions place a higher premium upon material comforts and a high standard of living than persons
(4)
in poor land areas. As explained by Sumner and Keller,

It is clear (to the family which desires a high standard of living including higher education for the children) that there is no reasonable prospect of realizing their aims if the family is large -- as large, say, as their grandparents' families. Then one thing or the other -- quality or numbers -- must be renounced; and if they cling to the standard of their ambition, the number of births is controlled and the size of families limited. (5)

Illiteracy. There is a tendency for the highest percentages of illiterate population to be found in the poorest areas (see Table XXXI and Figure 63). The percentage of illiterate white persons for most of the counties comprising the Cumberland Plateau was above 8 per cent for 1930, and only one of the Plateau counties, Sequatchie, had less than 4 per cent illiteracy.
(6)
The State average was 5.4 per cent. The percentage illiteracy for the East Tennessee counties was higher than for either Middle or West Tennessee. However, the lowest rates of illiteracy in East Tennessee were in the most productive agricultural counties. Most of the Central Basin counties had percentages of illiteracy below the State average. The rates of illiteracy were higher

(4) Hammar, C. H., and Muntzel, J. H., "Intensity of Land Use and the Resettlement Problem in Missouri", Journal of Farm Economics, August, 1935.

(5) Sumner, W. G., and Keller, A. G., The Science of Society, p. 73.

(6) A large proportion of the farm population in Sequatchie County live in the Sequatchie Valley, which has limestone soil comparable in fertility to the East Tennessee Valley limestone soil.

TABLE XXXI. PERCENTAGE ILLITERACY OF POPULATION

County	Native White	Foreign- Born White	Negro	County	Native White	Foreign- Born White	Negro	County	Native White	Foreign- Born White	Negro
Anderson	8.1	-	10.5	Hamilton	2.6	3.6	11.7	Morgan	7.8	-	17.8
Bedford	3.2	-	14.5	Hancock	13.0	-	31.8	Obion	3.8	-	19.4
Benton	7.5	-	26.0	Hardeman	4.1	-	23.8	Overt.	10.7	-	27.2
Bledsoe	8.1	-	7.5	Hardin	8.6	-	15.9	Perry	10.9	-	13.4
Blount	6.0	-	15.3	Hawkins	9.0	-	19.5	Pickett	9.9	-	-
Bradley	5.0	-	9.4	Haywood	2.2	-	23.2	Polk	9.1	-	30.0
Campbell	9.4	23.8	17.9	Hender.	7.1	-	19.1	Putnam	7.6	-	17.4
Cannon	7.4	-	24.0	Henry	4.2	-	21.4	Knea	5.9	-	14.3
Carroll	5.4	-	21.5	Hickman	7.9	-	36.5	Roane	7.5	-	12.9
Carter	9.0	0.7	19.7	Houston	6.5	-	31.9	Robertson	7.3	-	24.0
Cheatham	6.1	-	18.6	Humph.	7.3	-	22.0	Ruther.	4.9	-	17.9
Chester	2.8	-	18.9	Jeffer.	8.4	-	15.2	Scott	9.4	-	-
Claiborne	12.1	-	23.3	Jackson	11.4	-	18.3	Sequa.	2.6	-	-
Clay	13.9	-	18.6	John.	8.4	-	8.7	Sevier	9.2	-	16.2
Cocke	12.0	-	14.2	Knox	3.9	4.4	9.8	Shelby	5	7.6	10.5
Coffee	6.1	-	26.0	Lake	9.8	-	26.4	Smith	6.8	-	20.0
Crock.	3.8	-	20.8	Lauder.	5.8	-	21.7	Stew.	7.3	-	23.2
Cumber.	9.1	-	-	Lavr.	5.4	-	18.1	Sulli.	6.8	2.0	13.2
David.	1.8	4.2	11.1	Lewis	8.4	-	19.1	Sumner	7.1	-	21.9
Deat.	4.7	-	15.7	Lincoln	4.8	-	19.3	Tipton	2.7	-	17.0
DeKalb	9.0	-	16.1	Loudon	7.7	-	13.9	Trousd.	10.5	-	27.7
Dickson	5.9	-	22.3	McMinn	4.8	-	11.0	Union	7.7	-	-
Dyer	5.2	-	16.3	McNairy	7.0	-	19.9	Union	9.8	-	-
Fayette	3.1	-	20.5	Macon	15.5	-	31.6	V. Buren	7.1	-	-
Fentress	13.5	-	-	Madison	2.2	.9	16.4	Warren	4.8	-	15.3
Franklin	6.8	-	17.3	Marion	8.0	-	13.8	Washington	5.1	2.1	15.2
Gibson	3.2	-	15.9	Marshall	4.0	-	17.7	Wayne	7.8	-	16.0
Giles	5.4	-	18.5	Maury	5.1	-	22.3	Weakley	3.2	-	17.4
Grain.	11.6	-	16.9	Meigs	8.0	-	10.3	White	8.7	-	18.3
Greene	6.0	-	18.5	Monroe	9.6	-	14.9	Wmson.	7.5	-	23.6
Grundy	7.6	-	21.3	Montg.	5.2	-	18.3	Wilson	3.1	-	14.0
Hamblen	6.3	-	13.8	Moore	9.0	-	20.0	Average	5.4	5.8	14.9

Source: 15th U. S. Census of Population, 1930, Tennessee.

in the extreme Western Rim counties and in the counties within the Water-Shed area. In West Tennessee the percentages of illiterate white persons were much lower. Lake County, lying in the Mississippi Bottom, is the principal exception to the general tendency for the better counties to have lower rates of illiteracy than the poorer counties -- the illiteracy rate being 9.8 per cent. There, however, the exceptionally high proportion cropper-tenants accounts for such high rates of illiteracy.

CHAPTER IX

INFLUENCE OF SOIL TYPES ON THE FARM FAMILY'S STANDARD OF LIVING

Kirkpatrick defines standard of living as the variety, quantity, and quality of goods used to meet the physical and psychic, both personal and social, needs of different members composing the family or groups of families on the average.⁽¹⁾

In measuring the standard of living there are at least three elements of consideration. The first of these is cost; that is, the amount of money a family or group of families spends for living. The second element is the amount of goods and services used by any particular family or group of families. Size of dwelling, amount and kinds of food used, amount of leisure time, etc., are included in this category. The third factor is the efficiency of living; that is, the degree of success a family or group of families attain in the use of available money, goods, and time, to promote what they call their well-being.⁽²⁾

Amount of Money Spent as Indicated by Index of Purchasing Power

An advertisement appearing ⁱⁿ the the Saturday Evening Post made the following comment on farm standards of living:

(1) Kirkpatrick, E. L., The Farmers' Standard of Living, D. Appleton-Century Company, 1929, p. 15.

(2) Hoffer, C. R., Introduction to Rural Sociology, Farrar and Rinehart, Inc., 1934, pp. 365-366.

TABLE XXXII. INDEX OF FARM PURCHASING POWER IN TENNESSEE

Rank	County	Per Cent of U.S. Average as 100	Rank	County	Per Cent of U.S. Average as 100	Rank	County	Per Cent of U.S. Average as 100
1	Lake	84	32	Smith	52	64	Henderson	37
2	Davidson	71	33	Humph.	51	65	Jackson	37
3	Maury	70	34	Bradley	50	66	McNairy	37
4	Winson.	69	35	Meigs	50	67	Sevier	37
5	Robertson	67	36	Wash.	50	68	Wayne	37
6	Bedford	66	37	Cheatham	49	69	Cocke	36
7	Shelby	65	38	Gibson	48	70	DeKalb	36
8	Montgomery	64	39	Hamilton	48	71	Lawrence	36
9	Trousdale	64	40	Sullivan	47	72	Grainger	35
10	Dyer	63	41	Greene	46	73	Polk	35
11	Obion	63	42	Hickman	46	74	Anderson	34
12	Franklin	61	43	Crockett	45	75	Benton	34
13	Tipton	61	44	McKinn	45	76	White	34
14	Marshall	59	45	Stewart	45	77	Grundy	33
15	Fayette	57	46	Hardeman	44	78	Lewis	33
16	Hamblen	56	47	Hardin	44	79	Union	33
17	Jefferson	56	48	Marion	44	80	Claiborne	32
18	Lauderdale	56	49	Perry	44	81	Clay	32
19	Lincoln	56	50	Coffee	43	82	Hancock	32
20	Giles	55	51	Johnson	43	83	Macon	32
21	Knox	55	52	Roane	43	84	Putnam	32
22	Moore	55	53	Carroll	42	85	Carter	31
23	Sumner	55	54	Monroe	42	86	Campbell	29
24	Wilson	55	55	Hawkins	41	87	Unicoi	29
25	Bledsoe	54	56	Chester	40	88	Cumberland	28
26	Haywood	54	57	Houston	40	89	V.Buren	27
27	Loudon	54	58	Warren	40	90	Overton	25
28	Ruther.	54	59	Blount	39	91	Fentress	24
29	Weakley	54	60	Dickson	38	92	Morgan	24
30	Madison	53	61	Rhea	38	93	Pickett	23
31	Henry	52	62	Cannon	37	94	Sequatchie	23
			63	Decatur	37	95	Scott	22

Source: The "Other Half" of America's Markets - Compiled for
Standard Farm Paper Unit, 1927.

The tastes of farmers have been sharpened by magazines and newspapers until they know and want most modern conveniences. Their standards of living are high. They are receptive to labor-saving devices. They are demanding the pleasures and comforts of their metropolitan neighbors. These things can be sold to the farm market, but only to that section of it where there is sufficient money to buy them. (3)

(3) The "Other Half" of America's Market compiled for Standard Farm Paper Unit, 1927.



Source: Based on Table XXXII.

Figure 69. Farm purchasing power of Tennessee counties
(U. S. Average as 100 per cent)

An index of farm purchasing power by counties in Tennessee reveals that purchasing power is lowest in the counties having the poorest soils (Figure 69). Excluding the urban counties, farm purchasing power is highest in the most productive farming areas. For example, the Plateau counties rank low in purchasing power, while the counties comprising the Central Basin and the Mississippi Bottom and Loess areas of northern West Tennessee rank relatively high. Thus if farm purchasing power is an indication of the relative standard of living for various areas, the standard of living is greatly influenced by soil fertility.

Amount of Goods and Services Used

Farm Dwelling: It was shown in Chapter V that the value of the farm dwelling was closely associated with the fertility of the soil, the higher value dwellings being located on the more fertile soil. A study of 814 farm appraisals in East Tennessee shows that size of the farm dwelling is also influenced by soils (Table XXXIII). On both the clay loam and limestone clay soils, the farm dwelling averaged 6.0 rooms in size. On the other hand, on the slate and shale soils and on the clay knob soils the farm dwellings averaged only 4.6 and 4.3 rooms, respectively. Furthermore, a comparison of the soil groups lying between these extremes shows a close relationship between size of dwelling and soil. Only in the case of the gravel soils is there a deviation from the tendency for the larger houses to be found on the poorer soils.

There is also a tendency for the farm dwellings located on the higher grades of land to be in better condition than dwellings located

TABLE XXXIII. SIZE AND CONDITION OF FARM DWELLINGS BY
SOIL TYPES IN EAST TENNESSEE, 1935

Soil Type	Rooms Per House Number	Condition of Dwelling			Value of Land Per Acre Dollars
		Good Pct.	Fair Pct.	Poor Pct.	
Clay loam	6.0	46.4	48.1	5.4	36.26
Limestone clay	6.0	48.7	39.1	12.2	35.40
Silts and loams	5.6	52.6	44.8	2.6	25.10
Clay	5.5	43.7	45.8	10.4	38.35
River bottom	5.4	25.0	51.9	23.1	33.33
Gravel	5.4	16.7	75.0	8.3	15.79
Gravel clay	5.3	47.6	44.0	8.4	25.37
Sandy loam	5.2	27.3	57.1	15.6	24.16
Limestone (rocky)	4.8	38.9	44.4	16.7	21.28
Ridge gravel	4.6	16.4	70.9	12.7	20.12
Slates and shales	4.6	20.0	63.6	16.4	19.65
Clay knob	4.3	33.3	66.7	-	14.03
Average	5.5	39.5	49.8	10.7	No data

Source: Farm Appraisals made by representatives of the Tennessee Valley Authority, 1935.

(4) on poorer grades of land. On the higher value soil types there is a relatively large proportion of the dwellings classified as good. The river bottom land is the principal exception, in which case only 25.0 per cent of the dwellings are classified as good compared to the average of 39.5 per cent for all groups. There seems to be a general tendency for farms located on river bottom land throughout the State to have poorer dwellings than upland of even slightly less fertility. (This is more opinion based on personal observation of the writer.)

Homes Lighted By Electricity: Probably no one thing adds more to the comfort and convenience of farm people than the general use of elec-

(4) The condition of the dwellings referred to above was reported by the appraisers as excellent, good, fair, or poor. Since only 0.2 per cent of the total number were classified as excellent, they were listed under the classification, "good".

tricity for various farm and home purposes. Yet in 1930 only 4.1 per cent of the farms of the State reported dwellings lighted electrically (Table XXXIV). To some extent a large proportion of these farms were

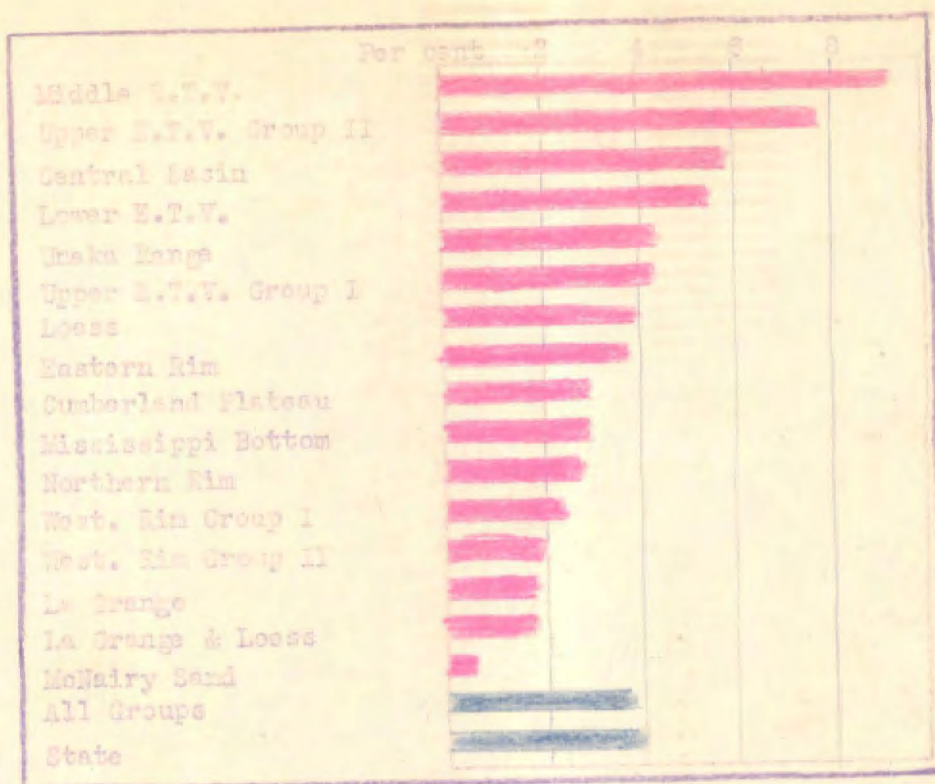
TABLE XXXIV. PER CENT OF FARMS AND HOMES HAVING SPECIFIED MODERN CONVENIENCES

Soil Region	Lighted By Elec- tricity	Running Water In Dwell- ing	Water Piped Into Bath- room	Tele- phone	Rabies	Automo- biles
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Unaka Range	4.4	7.2	1.7	4.4	2.5	17.3
Upper E. Tenn.						
Valley: Group I	4.3	1.6	2.2	7.5	3.0	30.8
Group II	7.8	5.0	2.8	17.0	4.7	45.4
Middle East Tenn.						
Valley	9.3	7.1	5.0	18.7	8.9	48.2
Lower E. Tenn.						
Valley	5.5	3.6	2.8	14.1	3.2	41.8
Cumb. Plateau	3.0	1.0	.7	6.2	2.3	18.2
Central Basin	5.9	5.6	3.8	30.8	10.2	47.3
Eastern Rim	3.8	2.4	2.1	19.7	2.9	23.9
Northern Rim	2.8	1.5	1.6	12.8	7.1	36.9
Western Rim:						
Group I	2.3	.8	.4	8.0	4.0	29.4
Group II	2.0	.8	.3	15.5	3.3	26.4
McNairy Sand	.6	.5	.3	32.2	2.4	28.1
LaGrange	1.8	2.2	1.5	29.1	3.8	36.1
LaGrange & Loess	1.8	2.3	1.6	24.2	4.0	35.6
Loess	4.0	5.1	3.2	32.3	8.1	43.7
Miss. Bottom	3.0	1.8	1.5	8.3	1.9	31.9
All Groups	3.9	2.9	2.3	19.9	4.9	35.3
State	4.1	3.3	2.0	18.4	4.8	34.2

Source: Census of Agriculture, 1930, Tennessee, Series 2, Census of Population.

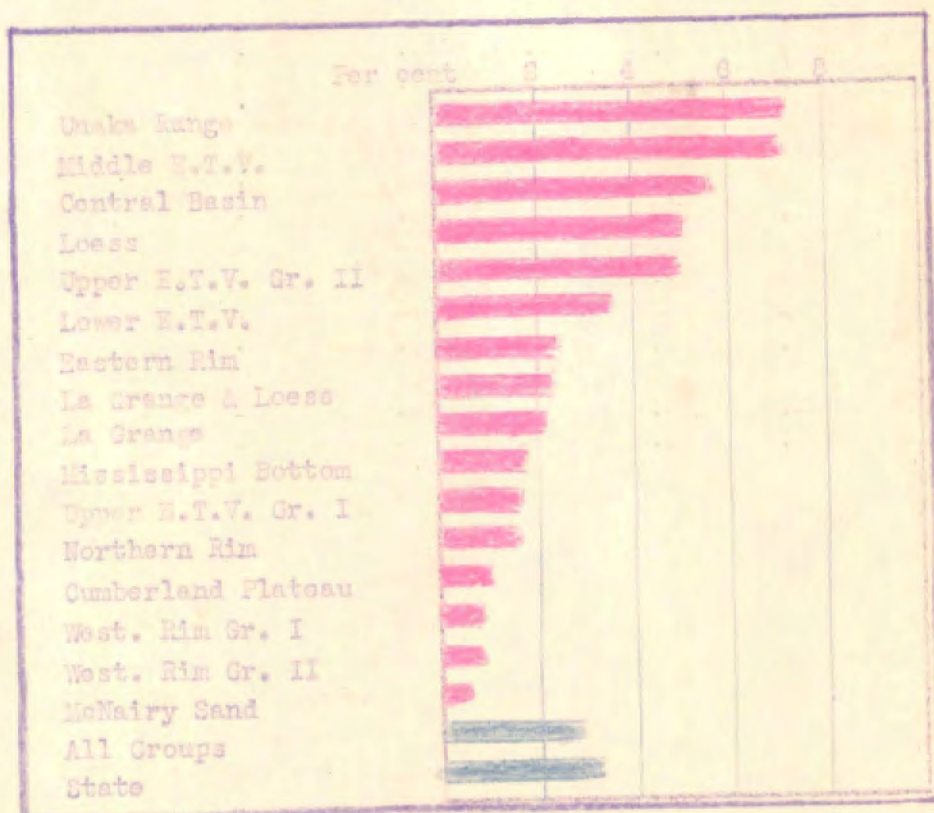
in the counties having the best land. In the Central Basin counties, 5.9 per cent of the farms reported dwellings lighted by electricity.

The Upper ^East Tennessee Valley group composed of Greene, Sullivan, and



Source: Based on Table XXIV.

Fig. 70. Per cent of farm dwellings lighted by electricity, county soil areas, 1930



Source: Based on Table XXIV.

Fig. 71. Per cent of farm dwellings having running water, county soil areas, 1930

Washington counties had 7.8 per cent, and the Middle East Tennessee Valley group, 9.3 per cent. Urban influences, no doubt, account for a large proportion of the farms using electricity in the latter area, as well as fertile soils.

In West Tennessee, comparatively few of the farm homes were lighted by electricity, probably due to the high proportion of tenancy. Yet, within that division of the State, Obion, Lake, and Gibson counties lead in the use of electricity, while the counties making up the poorer water-shed region in eastern West Tennessee report the smallest proportion of farms using electricity.

Running Water: In 1930 only 3.3 per cent of the farms of the State reported running water piped into the dwelling. These farms were also largely concentrated in the better farming areas of the State. In the Central Basin counties 5.6 per cent of the farms reported running water in the home compared to 1.0 per cent for the Cumberland Plateau. In the Unaka Range (represented by Unicoi County), 7.2 per cent of the farms reported running water piped into the dwellings, even though the soils rank among the poorest in the State. This might be due in part to the relatively low cost of installation through the use of gravity systems.

In West Tennessee, comparatively few of the farms reported running water in the dwelling. Yet the better farming areas have a larger percentage of the farms reporting than do the poorer areas. In the Northern Rim, tenancy is high, which tends to reduce the percentage of farms using both electricity and running water.

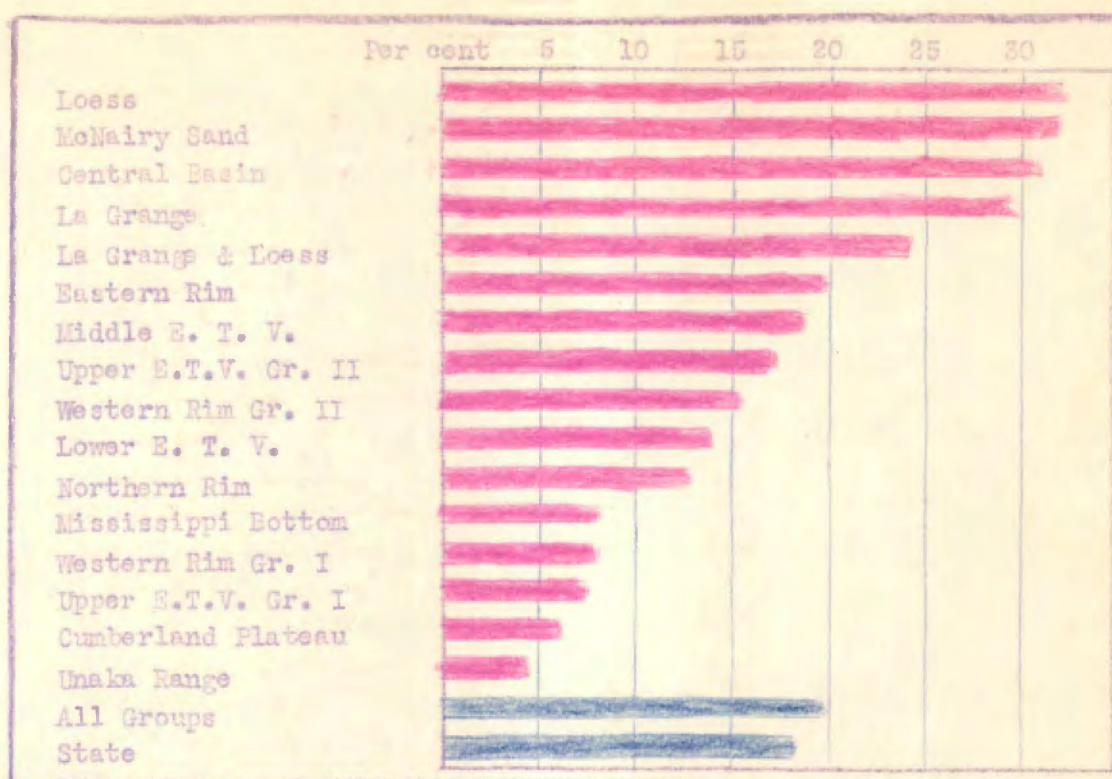
Telephones: The telephone has become more or less a necessity on

the modern farm. It makes possible communication with distant markets and ready contact between neighbors for the transaction of business and the exchange of news and local gossip. Like other farm conveniences, its use is most general on the better farms and in the better farming regions. Excluding West Tennessee, the Central Basin counties lead the other regions of the State in the use of the telephone. On the other hand, comparatively few of the farms on the Unaka Range, Cumberland Plateau, and the Western Rim Group I (Dickson, Lewis, and Wayne counties) have telephones (Figure 72).

In West Tennessee, there seems to be no correlation between soil fertility and number of farms having telephones. This is probably due to the fact that tenancy, especially share cropping tenancy, is higher in the rich land counties as a rule than in the poorer counties. This, in turn, would cause fewer farms in the better counties to have telephones.

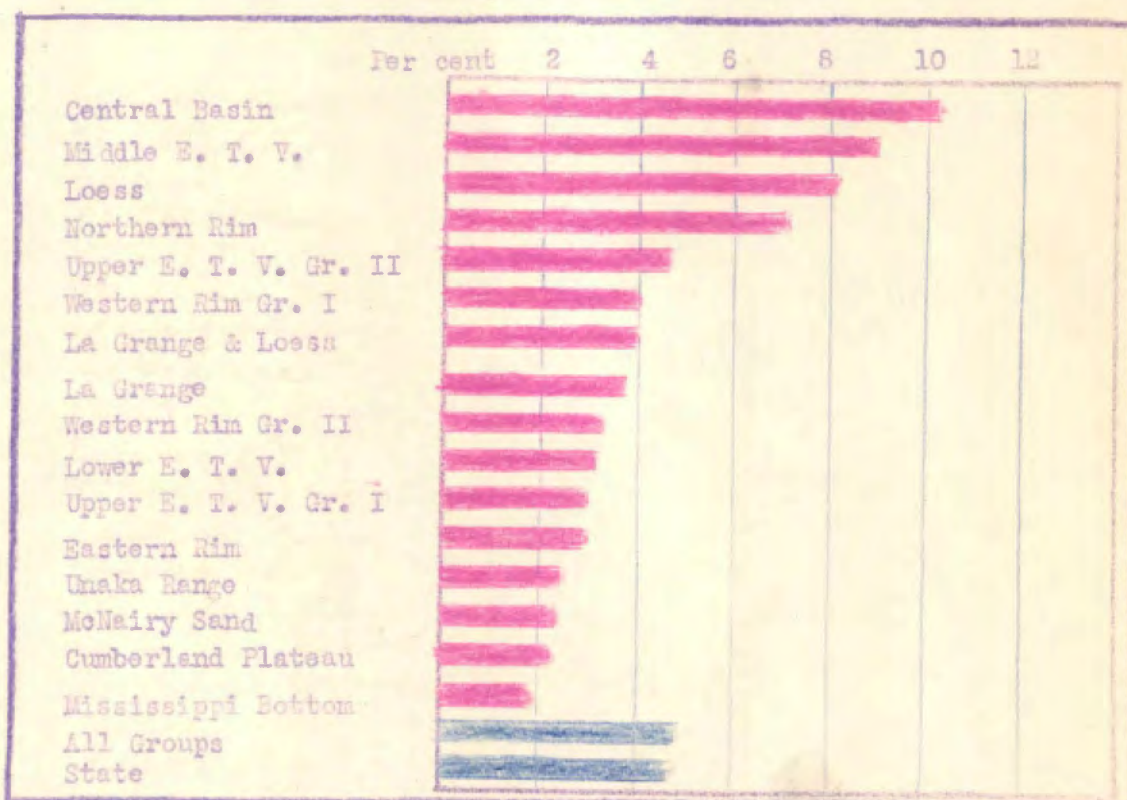
West Tennessee leads the other divisions of the State in proportion of farms having telephones, probably because of the greater concentration of farms in that section. Concentration of farms makes possible lower telephone costs. Less wire is needed and the upkeep of the lines is less in such areas. Also, the greater number of telephones makes possible central service at less cost per farm. No doubt, these factors, as well as a relatively high farm income in most of the West Tennessee counties, accounts for the large number of telephones in that region.

Radios: While only 4.8 per cent of the farm families of the State had radios in 1930, they were reported by 10.2 per cent of the farm families in the Central Basin. On the other hand, only 2.3 per cent and



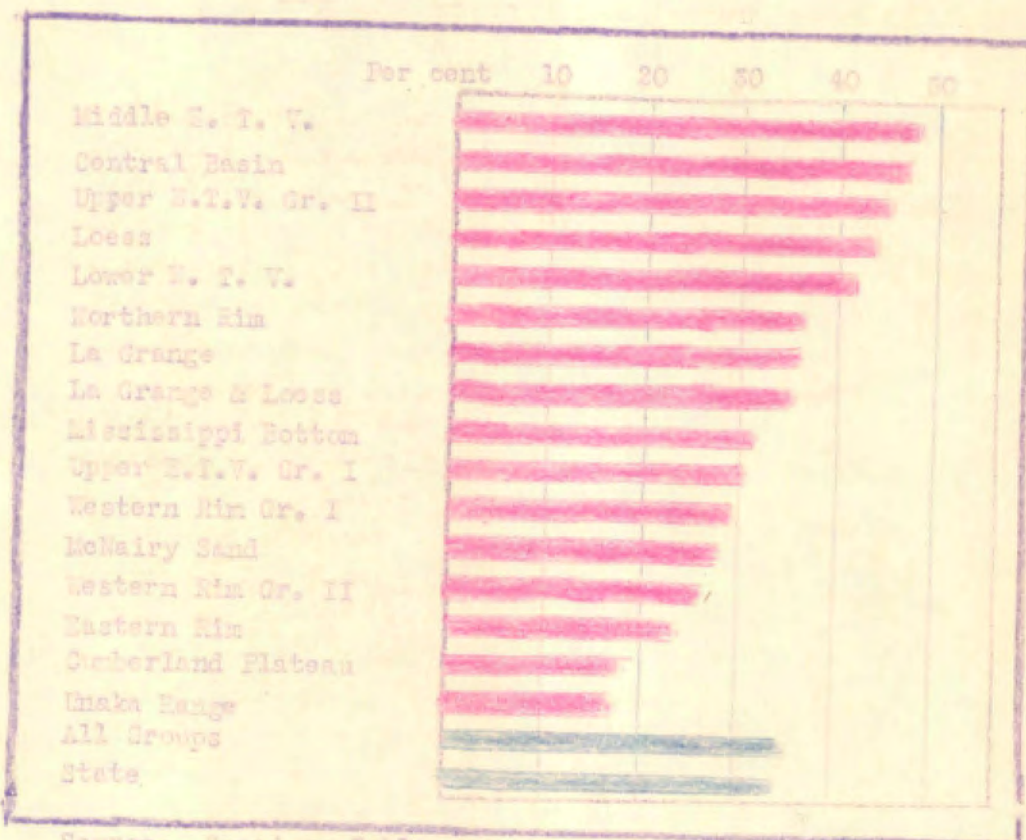
Source: Based on Table XXXIV.

Fig. 72. Per cent of farms having telephones,
county soil areas, 1930



Source: Based on Table XXXIV.

Fig. 73. Per cent of farm families having radios,
county soil areas, 1930



Source: Based on Table XXIV.

Fig. 74. Per cent of farms having automobiles,
county soil areas, 1930

2.5 per cent of the farm families in the Cumberland Plateau and the Unaka Range, respectively, had radios (Figure 73). In West Tennessee, a larger proportion of the farms in the Loess and LaGrange regions have radios than in the poorer McNairy Sand region.

Automobiles: The automobile is another farm convenience and necessity on many farms. Yet its use, like the use of other modern conveniences, is limited largely to those areas where the farm income is sufficiently large to support the other needs of the family and farm plus enough to provide for the payment and upkeep of the automobile. Thus, a larger proportion of the farms in rich land areas have automobiles than in the poor land areas. In the Central Basin, 47.3 per cent of the farms reported automobiles in 1930 compared to 18.2 per cent and 17.3 per cent in the poor land areas -- the Cumberland Plateau and the Unaka Range, respectively (Figure 74). In West Tennessee, fewest automobiles are found in the McNairy Sand area and in the poorer counties of the LaGrange and Loess area.

CHAPTER X

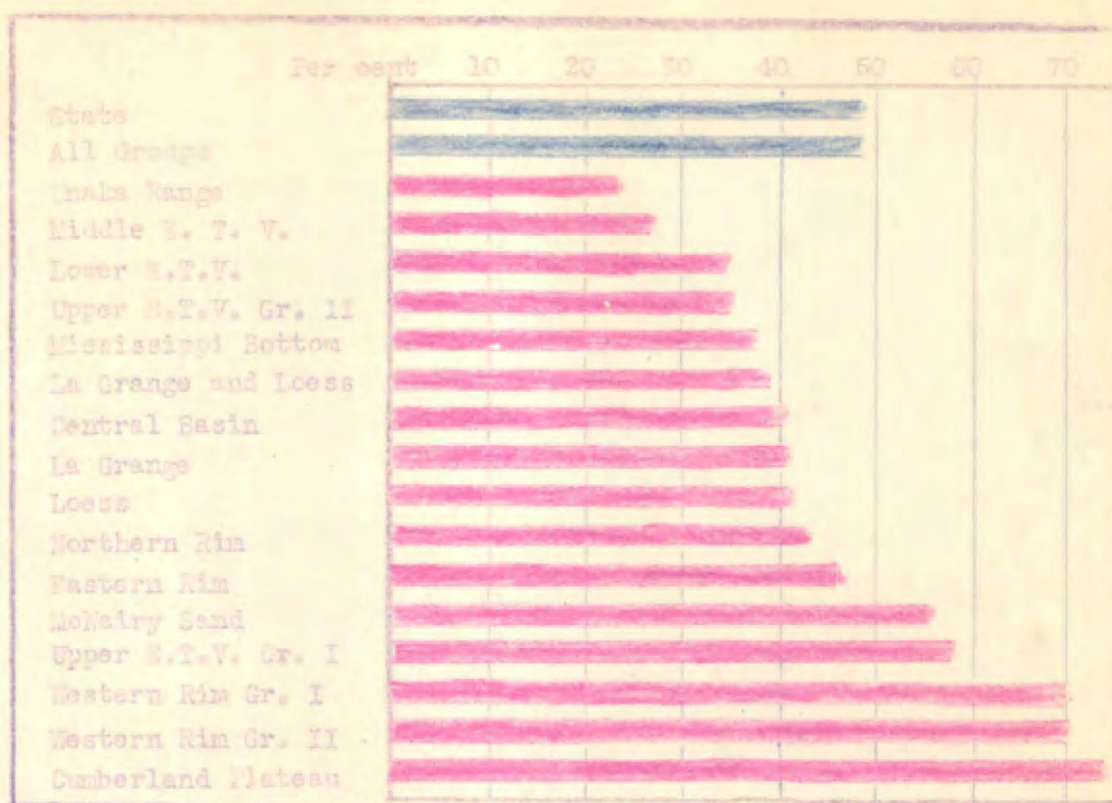
THE INFLUENCE OF SOIL TYPES ON CERTAIN COMMUNITY INSTITUTIONS AND SERVICES

Schools

The influence of soil upon farm income and density of population is reflected in the schools of a given region. While state aid makes possible good schools in poor counties, there still remains evidence that poor areas are handicapped in educational opportunities.

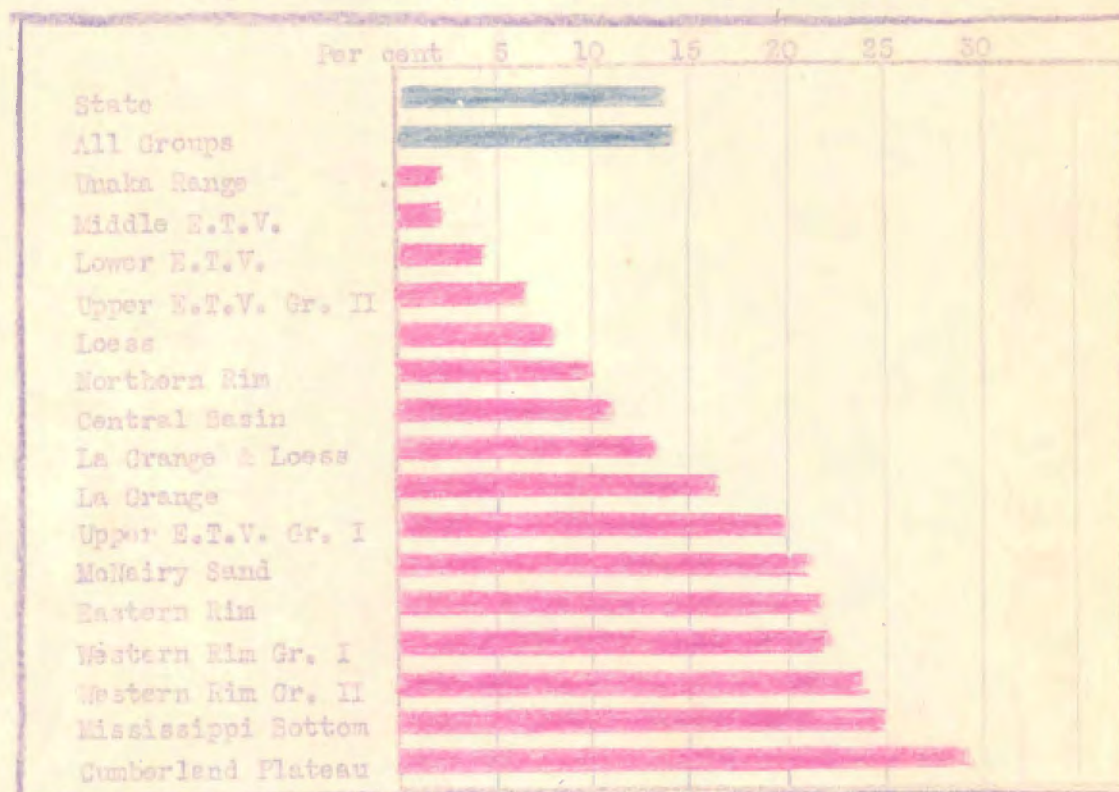
Teachers Employed Per School. The percentage of county elementary schools having only one-teacher schools is highest in the Cumberland Plateau, where 75.9 per cent of the schools are one-teacher schools, compared with 49 per cent for the State as a whole (Table XXXIV). On the Western Rim, Groups I and II, 70.2 per cent and 69.8 per cent respectively of all the county elementary schools are one-teacher. These high percentages of one-teacher schools are explained in part by the fact that these areas are sparsely settled. Since schools are provided in each community, the small number of pupils does not make practical the hiring of more than one teacher per school. Sparseness of population, which accompanies poor and rough areas, and poor roads makes consolidation of county schools difficult in these poor areas.

In West Tennessee, the greater density of population accounts for the fact that a much smaller percentage of the schools are one-teacher



Source: Based on Table XXXV.

Fig. 75. Per cent of county elementary schools (white) having only one teacher per school, county soil areas, 1932



Source: Based on Table XXXVI.

Fig. 76. Per cent of county elementary teachers (white) having only high school training, county soil areas, 1932

than in other parts of the State. In the Unaka Range (represented by Unicoi County) the schools are supported largely by non-agricultural population, there being only 33 per cent of the gainful workers in the representative county, Unicoi, engaged in agriculture. Therefore the schools are perhaps better than one might ordinarily expect for an area of poor soils.

TABLE XXXV. PERCENTAGE OF SCHOOLS BY NUMBER OF TEACHERS EMPLOYED, BY COUNTY SOIL AREAS, 1932-33

Soil Area	One-Teacher	Two-Teacher	Three- or More-Teacher
	Pct.	Pct.	Pct.
Unaka Range	23.3	40.0	36.7
Upper E. Tenn. Valley: Group I	57.5	30.9	11.8
Group II	34.8	37.8	27.4
Middle E. Tennessee Valley	26.8	50.3	42.9
Lower E. Tennessee Valley	34.5	38.9	26.6
Cumberland Plateau	73.9	9.9	16.2
Central Basin	40.3	33.9	25.8
Eastern Rim	45.7	31.8	22.5
Northern Rim	42.9	38.4	18.7
Western Rim: Group I	69.6	23.8	6.6
Group II	69.8	17.3	12.9
McNairy Sand	55.2	29.3	15.5
LaGrange	40.4	32.2	27.5
LaGrange and Loess	38.3	35.4	26.3
Loess	40.8	38.8	20.4
Mississippi Bottom	37.5	50.0	12.5
All Groups	48.4	30.4	21.2
State	48.4	29.3	22.3

Source: Tennessee Department of Education, Nashville, Annual Report, 1933, p. 204.

Training of Teachers: The rich land counties employ better trained teachers than do poor land counties. Counties employing teachers having only elementary training are found principally in the poorer soil re-

gions (Table XXXVI). For example, on the Cumberland Plateau, 5.4 per cent of the elementary teachers employed in the county white schools have only elementary training. Also, 3.4 per cent of the teachers in the McNairy Sand area have only elementary training. Other areas employing some teachers who have had no training other than elementary are: the Western Rim groups, the Eastern Rim, and the Upper East Tennessee Valley groups. Excluding Group II of the Upper East Tennessee Valley, all of these areas rank relatively low in soil fertility, particularly the counties within these areas employing such teachers. Only Greene County in Group II of the Upper East Tennessee

TABLE XXXVI. TRAINING AND EXPERIENCE OF COUNTY ELEMENTARY SCHOOL TEACHERS (WHITE), BY COUNTY SOIL AREAS, 1932-1933

Soil Region	Training of Teachers					Teachers Without Previous Experience
	Col-lege Grad.	2-yrs. Col-lege	One Year Col.	High School Grad.	Elemen-tary School	
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Unaka Range	19.8	36.8	36.8	1.9	-	18.9
Upper E.Tenn. Valley						
Group I	4.4	10.4	28.4	19.7	1.0	15.0
Group II	17.3	27.5	44.0	6.4	.5	11.2
Middle E.Tenn. Valley	18.3	18.5	48.9	2.2	-	5.9
Lower E. Tenn. Valley	5.5	39.8	36.3	4.3	-	7.0
Cumberland Plateau	4.7	12.6	40.8	29.2	5.4	20.2
Central Basin	10.5	26.3	42.9	10.7	-	8.0
Eastern Rim	7.9	21.6	37.8	21.6	2.1	14.9
Northern Rim	5.4	33.5	42.9	9.8	-	12.9
Western Rim: Group I	4.1	19.3	47.0	21.9	1.5	13.3
Group II	2.0	14.8	43.4	23.8	1.6	11.7
McNairy Sand	5.3	17.1	39.9	20.9	3.4	9.7
LaGrange	8.5	28.7	38.2	16.1	-	11.9
LaGrange & Loess	6.7	30.1	41.4	13.2	-	11.3
Loess	3.0	37.0	39.0	8.0	-	6.0
Mississippi Bottom	5.6	13.9	50.0	25.0	-	5.5
All Groups	8.6	23.0	40.4	14.2	.7	11.9
State	9.3	22.4	42.6	13.6	1.8	12.5

Source: Tennessee Department of Education, Nashville, Annual Report, 1933, pp. 108 and 224.

Valley is an exception. A relatively large percentage of the teachers employed in these areas have only high school training. On the Cumberland Plateau, for instance, 29.2 per cent of the teachers had only high school training, compared with 10.7 per cent for the Central Basin and the State average of 13.8 per cent (Figure 76).

Annual Turnover In Teaching Personnel: Not only are teachers who lack training employed in the comparatively poor counties, but a relatively large proportion have not had previous teaching experience, as a rule. On the Cumberland Plateau, for example, 20.2 per cent of the teachers employed in the county white elementary schools had not had previous experience in 1932-1933. The other soil groups which employed a relatively high proportion of inexperienced teachers were the Unaka Range, the Western Rim groups, the Eastern Rim, and Group I of Upper East Tennessee Valley.

These large percentages of inexperienced teachers indicates a rapid annual turnover in the teaching personnel. A study of counties of the State shows the salaries paid have little or no relationship to soil type (Figure 77). It is probable, therefore, that the large turnover in teaching personnel in the poorer counties is due to the fact that such areas do not offer as great attractions to persons engaged in teaching as do other areas. Some factors that tend to make certain areas more desirable as places in which to teach are, good roads, consolidated schools, and modern home conveniences. The poorer areas rank low in these items.

Expenditures Per Child Enrolled: While the poorest regions

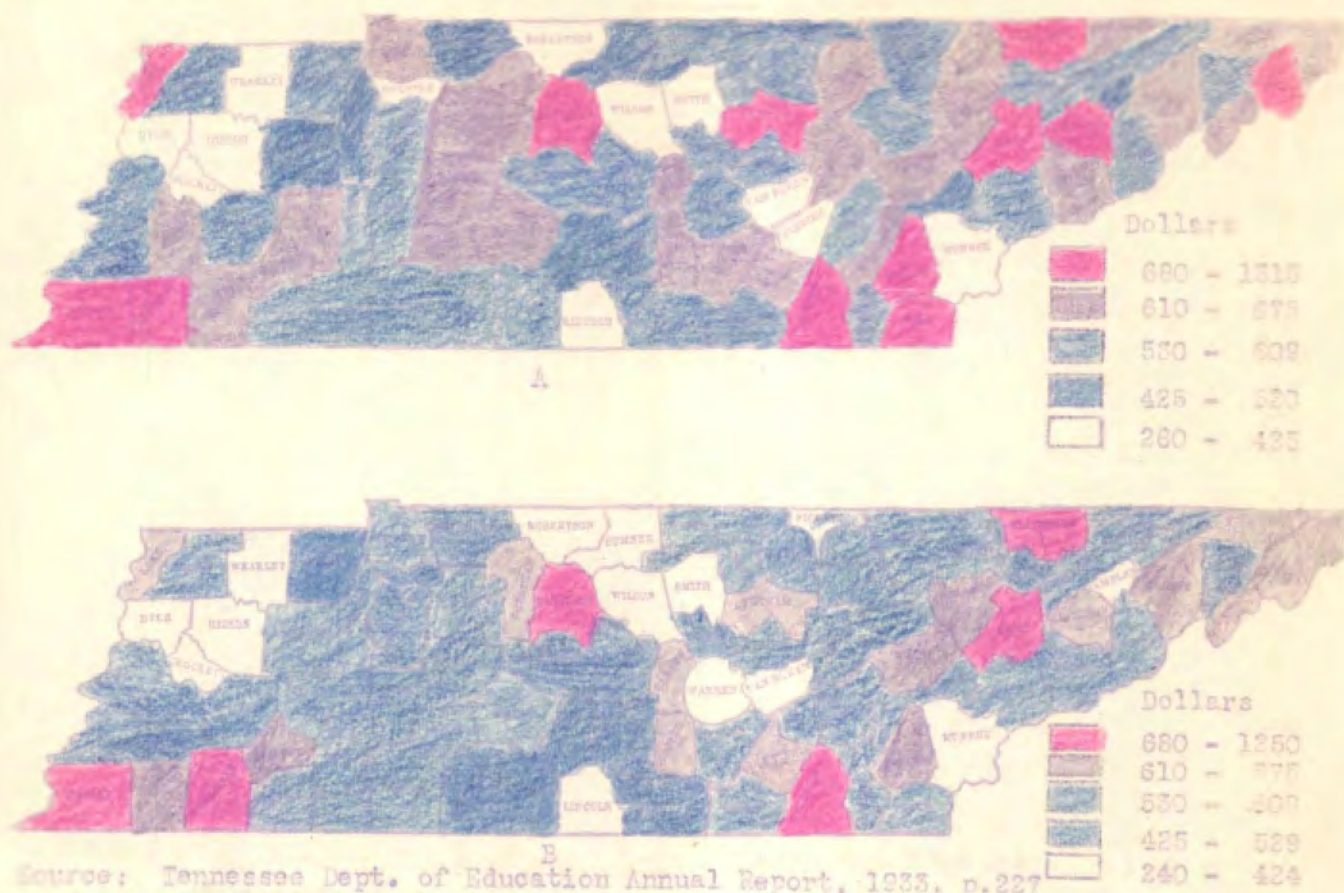


Fig. 77. Median annual salary paid county elementary school teachers,
Tennessee Counties

A.- Salaries paid men.

B.- Salaries paid women



Source: Allred, C. E., Atkins, S. W., and Elliot, J. A., Inventory of Certain
Social Agencies and Problems of Tennessee, Part II., p. 50.

Fig. 78. Location of public libraries in Tennessee, 1932

generally have the poorest schools (that is, basing quality on percentage of one-teacher schools), the expenditures per pupil enrolled in these areas are equal to expenditures per pupil in the better farming counties. Thus there does not appear to be much correlation between soil type and expenditures per school child. Rather it seems

TABLE XXXVII. SOURCE OF SCHOOL RECEIPTS AND SCHOOL EXPENDITURES PER PUPIL BY COUNTY SOIL REGIONS, 1932 - 1933

Soil Region	School Funds Received From State Per \$100 Paid By Counties For School Purposes		Expenditures Per Pupil Enrolled, County Schools	
	Elementary Schools	High Schools	Elementary Schools	High Schools
	Dollars	Dollars	Dollars	Dollars
Unaka Range	53	8	25.33	67.11
Upper E. Tenn. Valley:				
Group I	52	14	14.96	30.92
Group II	27	3	21.14	34.37
Middle E. Tenn. Valley	6	4	24.50	65.76
Lower E. Tenn. Valley	22	6	22.25	54.32
Cumberland Plateau	31	8	18.80	53.79
Central Basin	2	6	18.71	42.75
Eastern Rim	19	12	19.03	43.18
Northern Rim	2	4	13.15	17.27
Western Rim: Group I	67	11	20.69	42.75
Group II	58	13	19.12	48.94
McNairy Sand	76	10	18.59	39.59
LaGrange	12	9	12.60	30.23
LaGrange and Loess	8	8	12.08	27.26
Loess	1	5	16.85	13.40
Mississippi Bottom	2	9	10.22	41.29
All Groups	18	7	18.11	40.99
State	12	6	19.27	50.03

Source: Tennessee Department of Education, Annual Report, 1933. Nashville, p. 294 and 295.

that the quality of the school and the amount and quality of instructional service are sacrificed in the poorer areas. Otherwise, the cost per child would be considerably higher in the poor areas than in the more densely populated rich land areas (Table XXXVII).

State Aid to Schools. If it were not for the state equalizing fund, for schools, the poor farm areas would be very severely handicapped. Table XXXVII shows that of the money appropriated in the counties for schools from the county and from the State, a larger proportion is received from the State in the poor counties and areas than in the rich land counties. In the case of elementary education, only \$2.00 is received from the State per \$100 received from the county in the Central Basin. On the other hand, the Western Rim groups, McNairy Sand area in West Tennessee, the Cumberland Plateau, and the Unaka Range, receive amounts from the state ranging from \$31 for the Cumberland Plateau to \$76 for the McNairy Sand area per \$100 received from county sources. Thus these poor areas draw heavily upon state funds in order to maintain the county elementary schools of the region. Furthermore, counties within the various groups tend to vary according to soil fertility, the poorer counties drawing most heavily on state funds. In the case of the LaGrange soils, \$50 is received from the State in Fayette compared to \$1 and \$2 in Gibson and Weakley, respectively. According to a crop yield index, the soil in Fayette ranks among the poorest in the State.

For high schools, poor areas also receive more State funds than the fertile regions in relation to the amount paid by the counties, although the difference is not as great as in the case of elementary schools. Yet

it is noticeable that excluding West Tennessee, the best farming counties and regions do not exceed the state average in proportion of high school funds received from the State. These are the Upper East Tennessee Valley group, composed of Greene, Sullivan, and Washington counties; the Middle East Tennessee Valley; Central Basin; Northern Rim. The poorer areas having a relatively high ratio of state aid are the Cumberland Plateau, Western Rim, Eastern Rim, McNairy Sand, and Group I of the Upper East Tennessee Valley.

Per Cent of Scholastic Population In School. In general, there appears to be as great proportion of the scholastic population in schools

TABLE XXXVIII. PER CENT ENROLMENT IN COUNTY SCHOOLS
IS OF COUNTY SCHOLASTIC POPULATION (6-18 YEARS)
BY COUNTY SOIL AREAS, 1932-33

Soil Area	All Schools	Elementary Schools	High Schools
	Pct.	Pct.	Pct.
Unaka Range	91.0	78.5	12.5
Upper E. Tenn. Valley: Group I	89.3	81.2	8.1
Group II	102.4	84.7	17.7
Middle East Tennessee Valley	92.6	79.1	13.5
Lower E. Tenn. Valley	107.1	89.0	18.1
Cumberland Plateau	92.0	82.0	10.0
Central Basin	108.7	89.2	19.5
Eastern Rim	95.4	82.2	13.2
Northern Rim	92.7	78.3	14.4
Western Rim: Group I	109.5	96.5	13.0
Group II	92.5	82.9	9.6
McNairy Sand	97.3	86.7	11.1
LaGrange	110.6	95.8	14.8
LaGrange and Loess	98.7	84.5	14.2
Loess	81.5	61.6	19.9
Mississippi Bottom	100.0	92.3	7.7
All Groups	97.9	84.2	13.7
State	95.6	83.0	12.6

Source: Annual Report, Tennessee Department of Education,
Nashville, page ____.

in the poor counties as in the richer counties. The annual report of the Tennessee Department of Education shows the total enrollment in schools, and the percentage that this is of the scholastic population, that is, persons from 6 to 18 years of age, is shown in Table XXXVIII. Because schools draw pupils from adjoining counties and because the ages of persons enrolled is not limited to the 6 to 18 years of age group, the school enrollment in some counties is higher than 100 per cent of the scholastic population (Table XXXVIII).

Public Libraries in Tennessee

In 1932 there were 48 public libraries in Tennessee, the distribution of which are shown in Figure 80. These were most numerous in the East Tennessee Valley, followed by the western two-thirds of West Tennessee, the Northern Rim, and the Central Basin. The counties of the Cumberland Plateau and those of the eastern one-third of West Tennessee and the Western Highland Rim had few and, in most instances, no public libraries. Taken as a whole, the sections of the State having the best soils are the most adequately supplied with public library service. The wealth of these areas is dependent to a considerable extent upon the agricultural resources, although they are the most highly urbanized regions in the State.

The Rural Church

The rural church, like rural schools, is indirectly influenced by soils through their effects on farm income and other economic and social conditions. A study made of the rural church in Virginia shows that among other factors affecting church activities are soils and type of

farming.

Type of farming is a very important factor affecting the size of rural churches. It is in a measure responsible for population density and social stratification. Soil fertility is likewise a factor in density, and thus indirectly affects the size of rural churches. (1)

A study of Figure 79 shows that in Tennessee there is a general tendency for a larger percentage of the total population to be church members in the most productive farming regions than in the poorer areas. There are exceptions, of course, but, for the most part, the counties comprising the Cumberland Plateau, the Western Rim, and the southeastern part of West Tennessee had a relatively small percentage of the population church members in 1926. In contrast, there was a relatively high percentage of church membership in the Central Basin and the better counties of West Tennessee.

A study made of the rural church in Tennessee, attributed the low church membership in the poor areas to several factors, such as (1) low per capita wealth, (2) poor transportation facilities, (3) sparseness of population, and (4) low rank in percentage of homes equipped with various types of modern conveniences. The people in the poorer areas, largely because of these characteristics, have not developed the community spirit that is so essential to organizing and carrying out a religious program. (2)

These factors tend to keep the size of the rural church lower in the poor areas than in the rich land areas, as is shown by Figure 80.

These phases of the rural church - per cent that church membership

(2) Hamilton, C. H., and Garnett, W. E., The Role of the Rural Church in Rural Life in Virginia, p. 25, Virginia Agr. Exp. Sta., Bulletin 267, June, 1929.

(2) Tosch, C.A., Some Aspects of The Rural Church Situation In Tennessee, p. 3, Graduate Thesis, University of Tennessee, Aug. 1935.



Source: Tosch, C. A., Some Aspects of the Rural Church Situation in Tennessee, a thesis, Univ. of Tenn. Aug. 1936, p. 2.

Fig. 79. Per cent that total church membership is of total population, Tennessee counties, 1926



Source: Tosch, C. A., Some Aspects of the Rural Church Situation in Tennessee, Thesis, Univ. of Tenn. Aug. 1935, p. 60

Fig. 80. Church membership: average members per church, (white only) of 4097 Tennessee churches, 1934

is of the total population and average number of members per church - are only two of several phases of church activity indirectly influenced by soil productivity. Other phases include Sunday school membership, value of church property, training of religious leaders, salary paid pastors, amount of benevolence, etc. As a rule, the poorer areas rank lowest in each of these phases.

Roads

Prior to 1925, expenditures for rural roads in Tennessee were largely made by the counties. The type of roads within the county was largely influenced by the amount of taxable resources. Therefore poor counties were unable to finance the construction and maintenance of improved roads.

By 1930, all county seats were connected with hard surfaced roads which were a part of the State highway system, financed by State funds. These served the poorest as well as the wealthiest counties. These roads maintained by the State compose a relatively large percentage of the improved roads in the poorer counties (Table XXXIX). In general, the state highway mileage composes as large a proportion of the total road mileage in the poorest areas as in other parts of the State. The Cumberland Plateau, Unaka Range, Western Rim, and McNairy Sand areas have as large a proportion of the total road mileage in the state highway system as the more fertile areas, such as the Central Basin, Northern Rim, Group II of the Upper East Tennessee Valley, the Middle East Tennessee Valley, and the Loess and LaGrange areas of West Tennessee. Yet when the total public road mileage is considered, the

TABLE XXXIX. ROAD MILEAGE ON WHICH FARMS ARE LOCATED, BY TYPES OF ROADS

Soil Region	Mileage Public Roads Per Sq. Mi. Area, 1935	Per Cent State Mile- age Is Of Total Mile- age, 1935	Farms on Hard-Surfaced Roads		Farms on Gravel Roads		Farms on Improved Dirt Roads		Farms on Unimproved Dirt Roads	
			1930	1925	1930	1925	1930	1925	1930	1925
			Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Unaka Range	.48	29.1	10.9	4.6	18.3	11.2	9.0	18.9	54.5	64.0
Upper E. Tenn. Valley: Group I	1.79	10.7	8.3	8.9	13.9	.9	22.3	24.5	55.4	63.7
Upper E. Tenn. Valley: Group II	2.55	8.2	16.0	21.3	19.8	3.2	17.5	27.1	42.2	48.2
Middle E. Tenn. Valley	2.71	7.7	31.0	34.6	22.4	5.8	7.7	19.4	27.6	37.4
Lower E. Tenn. Valley	1.72	12.5	5.8	2.7	25.1	12.5	16.5	42.0	40.7	42.2
Cumberland Plateau	1.12	10.7	5.9	6.6	20.9	2.1	15.8	16.9	55.4	68.2
Central Basin	1.58	11.0	14.5	17.9	39.5	36.1	12.8	13.6	26.5	27.8
Eastern Rim	1.68	11.7	8.8	5.7	15.7	9.7	19.1	24.0	50.3	57.6
Northern Rim	2.30	9.0	9.0	7.1	37.3	30.6	8.5	22.8	31.9	33.2
Western Rim: Group I	1.18	12.2	4.3	0.9	20.2	19.5	13.7	21.6	56.0	57.5
Western Rim: Group II	1.17	12.2	3.2	-	23.2	5.4	15.5	26.0	41.9	67.6
McNairy Sand	1.61	6.9	2.7	-	11.5	2.2	28.6	62.5	50.9	34.5
LaGrange	1.92	7.5	3.9	0.9	10.6	0.1	29.3	55.9	50.7	42.6
LaGrange and Loess	1.83	8.4	3.9	1.1	10.3	0.2	32.6	57.9	48.1	40.1
Loess	1.99	6.6	3.8	2.0	25.3	0.4	26.5	60.4	39.2	36.5
Mississippi Bottom	1.29	23.6	0.9	-	42.5	0.9	9.9	94.1	35.4	4.8
All Groups	1.70	10.1	9.3	8.9	20.7	10.4	20.1	33.6	43.6	44.8
State	1.63	10.7	9.5	7.8	23.1	15.4	18.3	29.4	42.6	45.1

Source: Report of State Highway Commissioner of Tennessee, Nashville, 1935. 15th U. S. Census of Agriculture, 1930, Series 2, p. 38.

the poorest areas have the poorest roads. For example, on the Cumberland Plateau, only 5.9 per cent of the farms were located on hard surface roads in 1930; 20.9 per cent on gravel roads; 15.8 per cent on improved dirt roads; and 55.4 per cent on unimproved dirt roads. In comparison with the State average, these percentages are higher for the low type roads and lower for the high type roads (Table XXXIX). In both of the Western Rim groups a relatively small proportion of the farms are on hard surface roads and a very large percentage are on unimproved dirt roads. The Unaka Range is above the state average in proportion of farms on hard surfaced roads. Yet, 29.1 per cent of the roads there are on the state highway system compared to 10.7 per cent for the State as a whole. Thus it is evident that even though a relatively large proportion of the money spent for roads in the poorer counties is derived from State funds, the poorer areas still have poorer roads than the more prosperous regions.

The kind of roads in the counties of the state in 1925 probably was a better index to the wealth and income of the counties than were the type of roads in 1930, since a greater proportion of the roads then were built and maintained by the counties. In 1925 only 6.6 per cent of farms on the Cumberland Plateau were on hard surfaced roads compared with 7.8 per cent for the State and 17.9 per cent for the Central Basin. In the Middle East Tennessee Valley and Group II of the Upper East Tennessee Valley, 34.6 per cent and 21.3 per cent respectively of the farms were on hard surfaced roads. The Unaka Range had only 4.6 per cent of the farms on hard surfaced roads, but 64.0 per cent on unimproved dirt roads.

In West Tennessee a very small proportion of the farms were located on hard surface roads in both 1925 and 1930. Even the proportion of

farms on gravel roads was below the state average, except for Lake and Obion counties. This condition is probably due to a lack of road building materials. In other parts of the state an abundance of rock and gravel make road building easier and less expensive. Yet in 1930 the Mississippi Bottom and the Loess region had 42.5 per cent and 25.3 per cent respectively of the farms on gravel roads. These counties have the best soils found in West Tennessee. The McMairy Sand area ranks next in percentage of farms on gravel roads. There, gravel deposits within the region make gravel readily accessible for road construction.

Rural Relief

On May 1, 1935, there were 24,713 farm operators and farm laborers on relief in Tennessee.⁽³⁾ To some extent there is a tendency for the better farming counties to have a smaller percentage of people on relief than do the poor counties. Especially is this true in the case of farm owners (see Figure 81). The counties comprising the Cumberland Plateau, the Western Rim, and the lower counties of the Water-Shed area in West Tennessee, have a high percentage of the farm owners on relief. The Central Basin, which is one of the most productive agricultural regions of the State, has a relatively low percentage of the farm owners on relief. In West Tennessee, the percentage of farm owners on relief is much lower than in either Middle or East Tennessee. This is

(3) Tabulations based on Meigs, L. J., Report of Works Progress Administration of Tennessee, Volumes II, III, IV, V, and VI, Tennessee Emergency Relief Administration, Nashville, May 1935.

TABLE XL. PER CENT OF FARM OWNERS AND TENANTS ON RELIEF,
TENNESSEE COUNTIES, 1935

County	Farm Owners	Farm Ten- ants	County	Farm Owners	Farm Ten- ants	County	Farm Owners	Farm Ten- ants
	Pct.	Pct.		Pct.	Pct.		Pct.	Pct.
Anderson	3.12	6.0	Hamilton	1.43	27.4	Morgan	3.00	13.5
Bedford	.23	6.0	Hancock	2.34	20.8	Obion	.12	3.3
Benton	.26	6.4	Hardeman	.19	1.3	Overt.	5.40	19.1
Bledsoe	9.00	57.0	Hardin	4.63	9.9	Perry	.16	1.9
Blount	1.02	11.6	Hawkins	2.90	5.5	Pickett	7.47	41.0
Bradley	18.06	6.4	Haywood	-	2.2	Polk	6.55	0.5
Campbell	3.13	15.4	Henderson	.95	7.5	Putnam	4.50	13.1
Cannon	1.09	13.5	Henry	.05	5.5	Rhea	4.47	9.0
Carroll	.26	6.7	Hickman	1.55	8.1	Roane	2.23	1.0
Carter	.35	9.4	Houston	5.55	32.0	Robert.	.31	5.4
Cheatham	1.31	12.4	Humphreys	11.90	7.6	Ruther.	.17	5.8
Chester	1.00	5.0	Jackson	.50	15.6	Scott	2.09	2.2
Claiborne	.39	15.0	Jefferson	.30	6.6	Sequat.	.22	0.8
Clay	1.57	43.6	Johnson	1.27	31.9	Sevier	.10	-
Cocks	.99	1.2	Knox	.88	0.7	Shelby	1.42	5.2
Coffee	.41	2.1	Lake	.70	1.0	Smith	.23	2.9
Crockett	.27	5.4	Lauderdale	.40	6.1	Stewart	5.99	15.4
Cumberland	2.89	22.1	Lawrence	1.54	7.3	Sullivan	1.09	10.7
Davidson	.76	16.6	Lewis	2.98	20.2	Sumner	1.28	15.4
Decatur	9.76	10.3	Lincoln	.31	1.6	Tipton	-	4.5
DeKalb	3.66	23.3	Loudon	1.05	3.2	Trousd.	-	4.9
Dickson	.61	4.2	McMinn	2.57	4.5	Unicoi	6.50	14.9
Dyer	3.29	7.5	McNairy	.14	8.0	Union	.06	0.2
Fayette	.70	1.1	Macon	.41	13.8	V.Buren	22.16	43.6
Fentress	13.57	5.1	Madison	.71	4.1	Warren	.59	9.9
Franklin	.28	1.1	Marion	2.39	18.6	Wash.	.15	9.0
Gibson	.07	4.6	Marshall	.29	5.2	Wayne	1.96	12.8
Giles	-	1.6	Mauzy	.27	2.2	Weakley	.04	3.3
Grainger	2.60	28.9	Meigs	6.20	21.8	White	2.37	37.7
Greene	4.14	1.5	Monroe	4.90	20.3	Williams.	.38	1.9
Grundy	11.22	17.6	Montgomery	1.18	1.4	Wilson	.30	2.8
Hamblen	4.70	5.2	Moore	7.22	2.1			
						Average	2.61	7.8

Source: Relief figures based on tabulation from report of Tennessee
Emergency Relief Administration, May 1935.

Total number of farm operators based on U. S. Census of
Agriculture, 1935, Tennessee, Statistics by Counties.

probably due to the fact that land owners, as a class, in West Tennessee
are in better condition financially than land owners in other parts of the
State.



Source: Based on Table XL.

Fig. 81. Per cent of farm owners on relief,
Tennessee Counties, May 1, 1935



Source: Based on Table XL.

Fig. 82. Per cent of farm tenants on relief,
Tennessee Counties, May 1, 1935

There are some exceptions to the general tendency for poor land counties to have a higher percentage of farm owners on relief than the more productive counties. For example, Perry County on the Western Rim has a low percentage of owners on relief. Hamblen County, in the Upper East Tennessee Valley, has a relatively high percentage. Perry County ranks among the poorest counties of the State in soil fertility, whereas Hamblen County is one of the high ranking counties in this respect.

TABLE XII. DISTRIBUTION OF POPULATION AND RURAL RELIEF CASES BY SOIL TYPE, OVERTON COUNTY, 1935

Soil Type	Dwellings of Open Country 1908 (a)		Area in Each Soil Type - Per Cent	Per Cent Rural Relief Cases (1935)
	Number	Pct.	Per Cent	
Hagerstown Stony Loam (very good)	7	.8	.5	0
Clarksville Stony Loam (fair)	163	18.3	18.3	12
Clarksville Silt Loam (best)	363	40.9	28.2	29
Decatur Stony Loam (good)	55	6.2	6.5	7
Decatur Loam (good)	78	8.8	4.2	4
DeKalb Stony Loam (poor)	95	10.7	24.5	25
DeKalb Sandy Loam (poor)	13	1.5	5.0	12
DeKalb Silt Loam (poor)	67	7.5	6.5	9
Guthrie Silt Loam (not cultivatable)	0	0	.1	0
Meadow (good)	16	1.8	1.7	1
Rough Stony Land (not cultivatable)	31	3.5	4.7	1

Source: Tennessee Emergency Relief Administration Count, 1935.

(a) Note: The number of dwellings was taken from the soil survey map made in 1908. Just how the number of dwellings in the county now, compared with the number in 1908 by soil types, cannot be shown. However, it is likely that the distribution of dwellings in the county follows about the same pattern as in 1908.

These comparisons by counties fail to indicate whether or not relief clients are actually found on poor farms or on good farms. Every

county has some good farm land and every county has some poor farm land. It is doubtful, however, that farm owners living on good land and operating farms of any size would be dependent on relief funds.

A study of rural cases on relief in Overton County by soil types shows that in general persons on relief are more numerous on the poorest types of soil (Table XLI). The number of dwellings located on the Clarksville Silt Loam (one of the best in the county) was 40.9 per cent of all the open country dwellings in the county, whereas the number of relief clients in 1936 was only 29 per cent of all rural persons on relief. On the DeKalb Stony Loam (one of the poorer soils of the county), the number of dwellings was 10.7 per cent of all the open country dwellings in the county, compared with 25 per cent of all the relief cases in the county. The DeKalb Sandy Loam (another of the poorer soils of the county) had only 5 per cent of the dwellings in the open country but 12 per cent of all the rural relief cases in the county.⁽⁴⁾

(4) Fertility of Soils in Overton County based on Ayrs, O.L., and Hill, D.H., Soil Survey of Overton County, Tennessee, U.S.D.A. Bureau of Soils, Washington, 1909, pp. 13-23.

BIBLIOGRAPHY

- Allred, C. E., Atkins, S. W., and Cotton, W. P., Economic Aspects of Agriculture, Land Utilization and Forestry in Tennessee, University of Tennessee, August, 1933.
- Allred, C. E., Atkins, S. W., and Elliot, J. A., Inventory of Certain Social Agencies and Problems in Tennessee, Part II, University of Tennessee, 1933.
- Allred, C. E., Boyer, P. B., and Horne, R. E., Tax Delinquency On Rural and Other Property In Tennessee, University of Tennessee Agricultural Experiment Station Circular 53, 1934.
- Allred, C. E., and Atkins, S. W., Tennessee: Economic, Social and Civic, University of Tennessee, 1935 (unpublished).
- Baker, O. E., "Agricultural Regions of North America", Economic Geography, January, 1927.
- Beattie, W. R., and Beattie, J. H., Peanut Growing, U. S. D. A. Farmers' Bulletin No. 1656, Government Printing Office, Washington, D. C., 1931.
- Bennett, H. H., The Soils and Agriculture of the Southern States, The Macmillan Company, New York, 1921.
- Ely, R. T., and Morehouse, E. W., Elements of Land Economics, The Macmillan Company, New York, 1924.
- Farm Paper Unit, Chicago, The Other Half of America's Markets, 1927.
- Garner, W. E., Moss, E. G., Yoke, H. S., Wilkinson, F. B., and Stine, O. C., "History and Status of Tobacco Culture", U.S.D.A. Yearbook of Agriculture, 1922, Government Printing Office, Washington, 1922.
- Hammar, C. H., and Muntzel, J. H. "Intensity of Land Use and the Resettlement Problem in Missouri", Journal of Farm Economics, August, 1935.
- Hammar, C. H., Land Tax Delinquency in Missouri, University of Missouri, Agricultural Experiment Station, Research Bulletin No. 224, 1935.
- Hill, F. F., An Analysis of the Lending Operations of The Federal Land Bank of Springfield, Cornell University, Agricultural Experiment Station, Bulletin 549, 1932.

- Hulbert, A. B., Soil, Its Influence On American History, Yale University Press, New Haven, 1930.
- Huntington, E., "Handicaps of Poor Soil", Economic Geography, July, 1926.
- Lewis, A. B., An Economic Study of Land Utilization In Tompkins County, New York, Cornell University, Agricultural Experiment Station Bulletin No. 590, 1933.
- Lyon, F. L., and Buckman, The Nature and Properties of Soils, Macmillan Company, New York, 1929.
- Mereness, H. H., Farm Mortgage Loan Experience In Southeast Alabama, Alabama Polytechnic Institute, Bulletin No. 242, 1935.
- Miller, F. B., Beattie, J. H., and Zimmerley, H. H., Sweet Potato Growing, U.S.D.A. Farmers' Bulletin No. 999, Government Printing Office, Washington, 1932.
- Moers, C. A., The Soils of Tennessee, Circular of Information No. 5, University of Tennessee Agricultural Experiment Station, 1932.
- National Resources Board Report, Government Printing Office, December, 1934.
- Pond, W. F., Geologic Map of Tennessee, Tennessee Division of Geology, Nashville, 1933.
- Richey, F. D., Corn Culture, U. S. D. A. Farmers' Bulletin 1714, Government Printing Office, Washington, 1933.
- Sitterley, J. H., Moore, H. R., and Falconer, J. I., Land Utilization In A Southeastern Ohio County, Ohio Agricultural Experiment Station Bulletin 455.
- Strickler, Paul A., History of Agriculture In Tennessee to 1870, A Thesis, University of Tennessee, August, 1935.
- Sumner, W. G., and Keller, E. G., The Science of Society, Yale University Press, New Haven, 1927.
- Taylor, Henry C., Outline of Agricultural Economics, The Macmillan Company, 1928.
- Tennessee Department of Education, Annual Reports, 1933 and 1929, Nashville.
- Tennessee Department of Finance and Taxation, Tax Aggregates 1929, 1933 and 1934, Nashville.

Tennessee Highway Commission, Annual Report, 1935, Nashville.

Thompson, H. C., Vegetable Crops, McGraw-Hill Book Company, Inc., New York, 1931

United States Bureau of the Census, Tenth Census of the United States: 1880, Productions of Agriculture, Government Printing Office, Washington, 1885.

United States Bureau of the Census, Eleventh Census of the United States: 1890, Statistics of Agriculture, Government Printing Office, Washington, 1895.

United States Bureau of the Census, Twelfth Census of the United States: 1900, Agriculture, Part I, Government Printing Office, Washington, 1902.

United States Bureau of the Census, Thirteenth Census of the United States: 1910, Abstract of The Census with Supplement For Tennessee, Government Printing Office, Washington, 1913.

United States Bureau of the Census, Fourteenth Census of the United States: 1920, Agricultural Statistics, Southern States, Government Printing Office, Washington, 1925.

United States Bureau of the Census, Census of Agriculture: 1925, Part II, The Southern States, Government Printing Office, Washington, 1927.

United States Bureau of the Census, Fifteenth Census of the United States: 1930, Compendium of Tennessee, Government Printing Office, Washington, 1932.

United States Bureau of the Census, Fifteenth Census of the United States: 1930, Population Bulletins, First and Second Series, Tennessee, Government Printing Office, Washington, 1931.

United States Bureau of the Census, United States Census of Agriculture; 1935, Tennessee Statistics by Counties, Government Printing Office, Washington, 1935.

Warren, G. F., Farm Management, The Macmillan Company, New York, 1921.

Wickens, David L., Farm Mortgage Credit, U. S. D. A. Technical Bulletin No. 288, Government Printing Office, Washington, 1932.

Yoder, Fred R., Introduction to Agricultural Economics, Thomas Y. Crowell Company, New York, 1929.