

A  
THESIS

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by  
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LAND UTILIZATION STUDY

ON

100 FARMS

IN

FLOYD COUNTY, VIRGINIA

IN

1937



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## PURPOSE AND SCOPE

The purpose of an economic study of land utilization and land classification in the Alum Ridge District of Floyd County, Virginia was to determine the intensity of the use of the land and to discover important factors on which might be based an adequate classification of land in other similar areas where detailed maps of soil and of geological and topographic features are not available.

Land classification is a tool necessary for determining the utilization of land areas. Scientific classification is the foundation upon which an economic utilization program must be built.

Had the Federal Government adopted an adequate classification policy in connection with its operation of the Homestead Act of 1862, the disposal of free public lands would probably have been conducted on a more unified and sound economic basis. Such a program would have done much to prevent such cynical observations as "----it takes three generations of settlers to subdue the land, two of them sacrificed so that the third might live". <sup>1/</sup>

After the disposal of all the free lands in the United States, the use of economic land classification in further public programs of assisting prospective owners and tenant farmers in becoming located would sometimes prevent their location on lands unsuited to agriculture.

Land classification offers many aids to both government and private enterprise. It (1) serves as a guide for future road building and

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<sup>1/</sup> Land Economics, R. T. Ely and G. S. Wehrwein, Edwards Brothers, Inc., Ann Arbor, Michigan.



maintenance programs, (2) serves as a guide for land assessment and tax equalization programs, (3) affords information for the location and maintenance of rural schools, (4) affords a basis for appraising land for both governmental and private lending agencies, and (5) should be of benefit in both research and extension programs for agriculture and rural industry.



## LOCATION AND DESCRIPTION OF AREA

Floyd County was at one time a part of the territory of Augusta, and later a part of Fincastle County. In October, 1776, when Fincastle County was subdivided, the area now known as Floyd became a part of the newly formed Montgomery County. It remained a part of this county until 1831, at which time Floyd County was formed. Later, however, a narrow strip of land about five miles long was taken from Franklin County and added to Floyd.

Floyd County is considered as one of the Blue Ridge Plateau counties, although it lies between the Blue Ridge mountains on the east and the Alleghanies on the west. It is bounded on the north by Pulaski, Montgomery and Roanoke counties; on the east and south by Franklin and Patrick counties; and on the west by Carroll County. The shape of the county somewhat resembles that of a flat-iron (Figure 1).

Floyd County has only one incorporated town, which was originally called Jacksonville but later the name was changed to Floyd. This town of about 400 people serves as the county seat.

Several small industrial concerns are located within the county, most of which are concentrated about the county seat.

### Population

The population of the county, with the exception of the town of Floyd, is rural. The population of the county decreased 3,240 persons from 1900 to 1930. The decrease was not restricted to any one locality (Table 1).

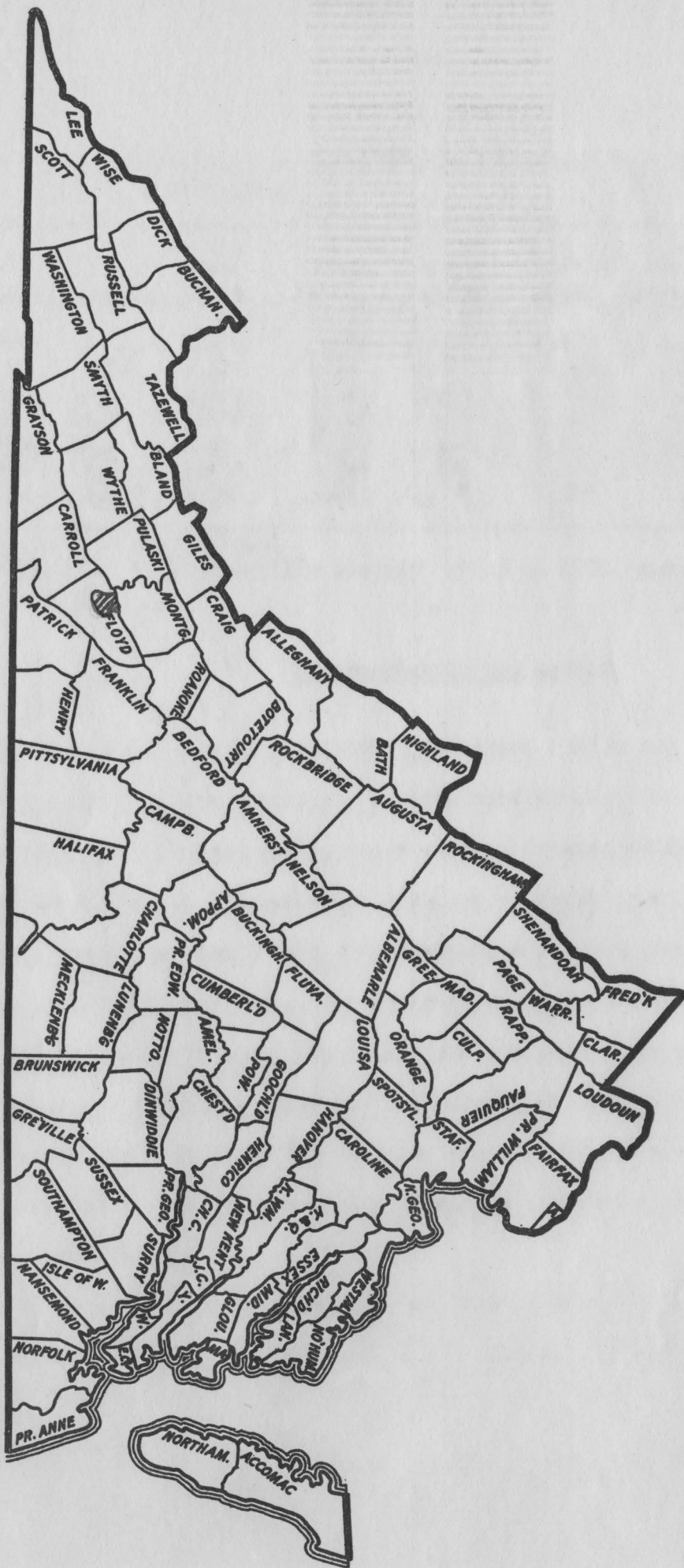


FIGURE 1 - LOCATION OF AREA STUDIED


Area studied 

Table 1. Population Trend of Floyd County, Virginia, by Civil Divisions.

Year	County	By Civil Divisions					
		Alum Ridge	Burkes Fork	Indian Valley	Little River	Locust Grove	Court House District
1870	9,824	1,035	671	1,475	1,879	1,991	3,094 <u>1/</u>
1880	13,255	1,428	1,547	2,171	2,592	2,769	2,748 <u>1/</u>
1890	14,405	1,721	2,365	2,012	2,622	2,950	2,735 <u>1/</u>
1900	15,388	1,780	2,449	2,479	2,643	3,079	2,958
1910	14,461	1,424	2,179	2,431	2,407	2,882	3,138
1920	13,505	1,262	2,089	2,330	2,234	2,568	3,022
1930	12,148	1,011	2,052	2,078	1,885	2,199	2,923

Source: Census Reports.

1/ Reported as Jacksonville District prior to 1900 Census.

#### Transportation and Markets

The county has no railroad; the nearest rail point for the north central part of the county is Cambria, approximately 12 miles from the county line. Transportation was a serious problem until the advent of the motor truck. The marketing cost for products grown in Floyd County, since there has been little or no development within the boundaries, has been relatively high. The tobacco product is marketed at Abingdon, Virginia, which is about 135 miles from the central part of the county. The nearest vegetable market of any importance is Roanoke, which is situated about 50 miles from the central part of the county. These factors place the growers of the county in a position of high transportation costs.

The county is somewhat isolated from markets due to two main factors: the lack of good roads and railroads, and the relatively few



nearby urban centers.

Markets for fluid milk from the area studied are available at Riner and Christiansburg, nearby points outside the county.

The nearest market of any size for fresh fruits, fresh vegetables, dressed poultry, dressed pork, and other perishables, is Roanoke, with a population in 1930 of 69,206. (Figure 2) Cabbage and tomatoes for manufacture are processed by small factories within the county, relatively little being sold fresh. Green beans are sold fresh when possible, but there is no steady market for them as most of the fresh vegetables are sold to truckers.

#### Topography and Elevation

Floyd County is a part of the Blue Ridge Plateau which extends from Roanoke southward to include the counties of Floyd, Grayson and Carroll. The uplands are somewhat more than 1,000 feet above the Piedmont to the southeast and somewhat less than 1,000 feet above the limestone valleys to the northwest. On the northwest and southeast borders, numerous peaks and ridges rise to an elevation of 3,000 to 3,200 feet. The relief varies to about 1,200 feet but is generally less. The valleys are usually broad and most of the uplands are rounded; however, the flood plains are generally narrow. The topography is generally hilly to steep. In spite of this fact erosion is not prevalent to a marked degree.

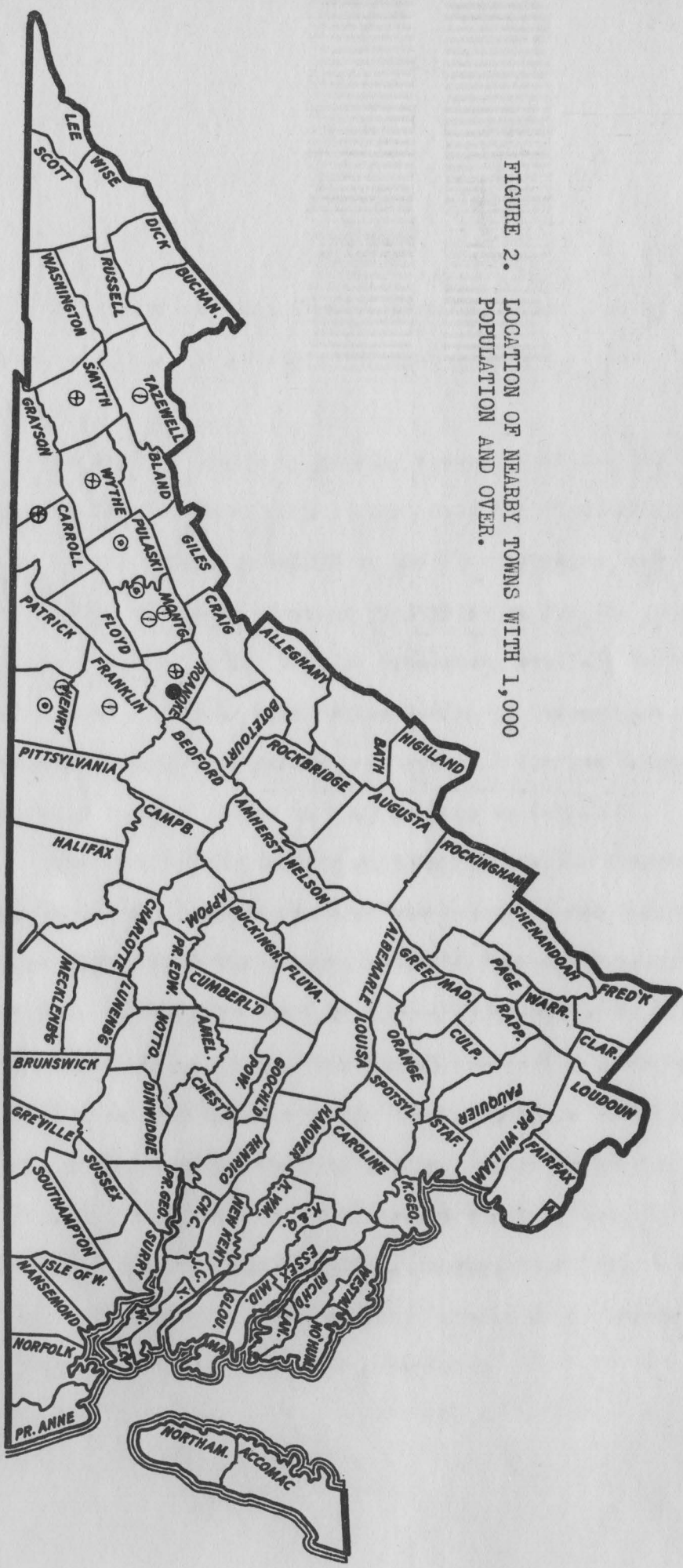
In topography such as this, land utilization studies seem very important, especially from the standpoint of governmental expenditure for roads, schools, and other public services.



LEGEND  
Approximate Population of Towns and Cities

- ⊕ 1,000 to 2,000
- ⊕ 2,500 to 5,000
- ⊕ 5,000 to 10,000
- Over 25,000

FIGURE 2. LOCATION OF NEARBY TOWNS WITH 1,000 POPULATION AND OVER.



### Climate

Climatological data from Blacksburg, Stuart, Rocky Mount, and Floyd indicate likely variations of climate within the county (Figure 3 and Table 2).

The average length of growing season, that is, the period between the last killing frost in the spring and the first killing frost in the fall for the period 1934-1938 at the Floyd station, was 174 days, ranging from 139 to 195 days. Average precipitation for the period 1933-1938 for the five months May through September, was 3.71 inches, ranging from 3.16 inches in May to 4.20 inches in July. Temperature from May through September during this period averaged 68.7 degrees Fahrenheit, ranging from 62.6 degrees in May to 73.3 degrees in July.

Data from the Blacksburg station, presumably comparable to climatic data in the northwestern part of the county, shows that over a 47 year period (1891-1938) the average rainfall from May through September was 4.16 inches, ranging from 3.21 inches in September to 5.20 inches in July. Temperature during this period averaged 66.6 degrees Fahrenheit, ranging from 59.8 degrees in May to 71.0 degrees in July.

The Stuart climatological station, which is located southeast of the county, recorded a 16-year average precipitation (1922-1938) of 4.20 inches for the five months period, ranging from 3.34 in June to 5.67 in August. Temperature for this period averaged 71.7 degrees Fahrenheit, ranging from 65.0 in May to 76.0 in July.

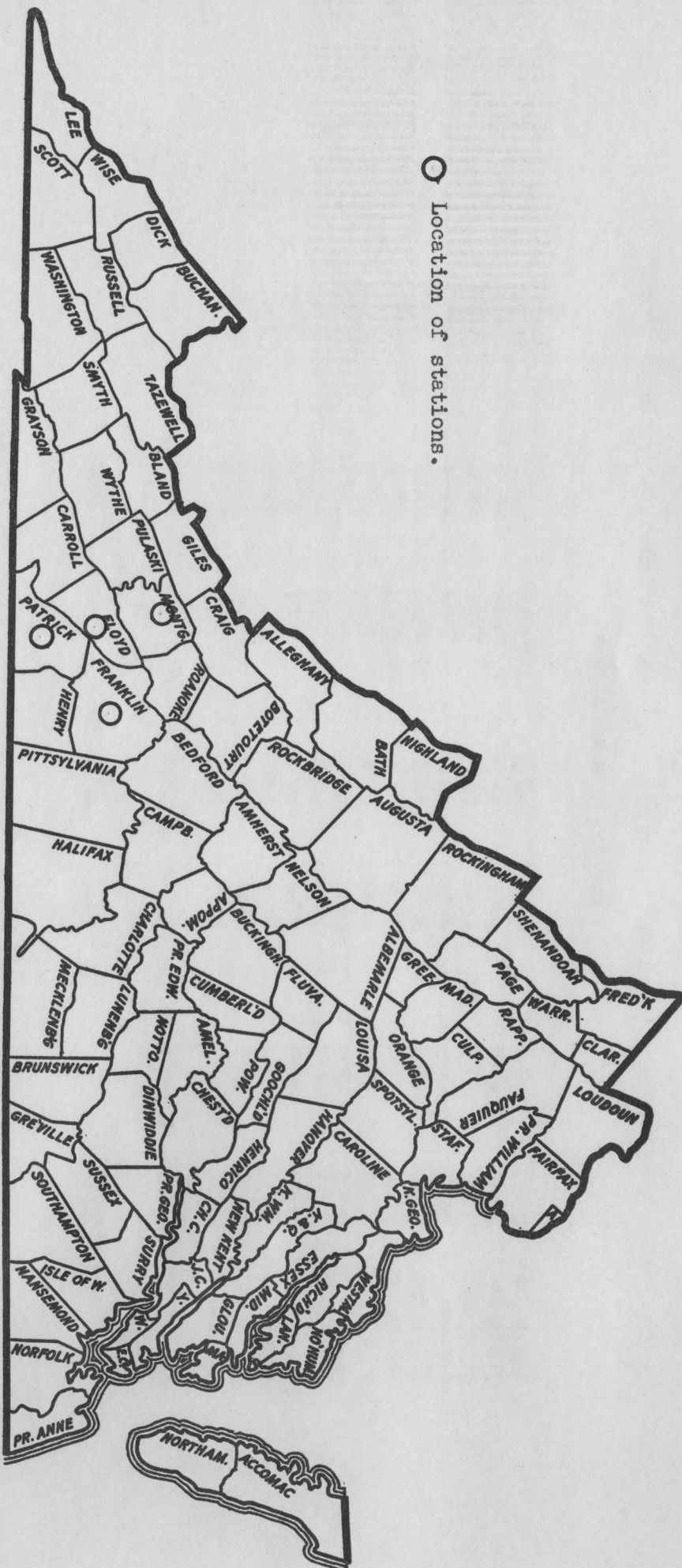


FIGURE 3. MAP SHOWING LOCATION OF STATIONS FROM WHICH WEATHER DATA WAS TAKEN.



Table 2.-- Climatological Data from Stations Within and Surrounding Floyd County, Virginia. <sup>1/</sup>

Month	Floyd Station (1933-1938)		Blacksburg Station (1891-1938)		Stuart Station (1922-1938)		Rocky Mount Station (1893-1938)	
	Rainfall Inches	Temperature Degrees F.	Rainfall Inches	Temperature Degrees F.	Rainfall Inches	Temperature Degrees F.	Rainfall Inches	Temperature Degrees F.
January	5.16	36.0	3.29	33.3	3.05	40.4	3.36	37.7
February	2.83	34.3	3.08	34.2	3.10	41.9	3.21	38.8
March	3.95	45.1	3.68	42.7	4.19	46.4	3.94	46.9
April	3.05	52.2	3.19	50.8	3.52	56.1	3.33	55.7
May	3.16	62.6	3.68	59.8	3.52	65.0	3.67	64.7
June	3.33	70.2	4.58	67.6	3.34	72.3	4.84	71.9
July	4.20	73.3	5.20	71.0	4.58	76.0	4.79	75.0
August	3.85	71.9	4.10	69.9	5.67	74.1	4.65	73.6
September	3.99	65.5	3.21	64.6	3.89	70.2	3.62	68.7
October	3.76	53.8	3.20	53.4	4.18	58.0	3.86	56.9
November	3.30	43.9	2.31	42.6	2.98	48.0	2.43	47.4
December	2.98	34.8	3.44	34.6	3.94	42.1	3.71	38.7
Total-Year	45.57	53.6	42.96	52.0	45.96	57.5	45.41	56.3

Average Growing Season

Station	No. of years in average	No. of days	Range in days	Range in date of	
				last killing frost	first killing frost
Floyd	5	174	199-195	Mar. 30 - May 27	Sept. 30 - Oct. 15
Stuart	5	188	171-218	Apr. 11 - Apr. 26	Oct. 7 - Nov. 15
Blacksburg	6	179	169-191	Apr. 13 - Apr. 28	Oct. 5 - Nov. 1
Rocky Mount	5	195	171-218	Mar. 25 - Apr. 27	Oct. 14 - Nov. 21

<sup>1/</sup> An Economic Study of Farm Management and Land Utilization in North Central Floyd County, Virginia, 1937, by F. L. Underwood and W. H. Fippin, and unpublished data compiled by the authors in connection therewith.



The Rocky Mount station to the northeast recorded average rainfall for the five-month period amounting to 4.31 inches, ranging from 3.67 inches in May to 4.79 inches in July. The average temperature was 68.2 degrees Fahrenheit, ranging from 55.7 degrees in May to 75.0 degrees in August.

Some difference in climate due to elevation is to be expected. Winters are not generally severe. The winter temperature ranges from 34.8 degrees in December to 45.1 degrees in March at the Floyd station. Average yearly temperature is 53.6 degrees Fahrenheit. Average rainfall for the year is 45.57 inches.

Climatic conditions seem to indicate that only crops that do not require long growing seasons or hot dry summers can be grown in Floyd County. Crops that are to be grown in summer months cannot be planted early due to the fact that the last killing frost date varies so greatly. For a five year period the last killing frost date varied from March 30 to May 27, a total of 57 days. This fact tends to prevent farmers from producing for early markets.

Short and extremely variable length of growing season (139 to 195 days) will tend to reduce the amount of land double-cropped due to the uncertainty of success of the second crop. In the 100 cases studied, which covered 14190.8 acres, only 2 acres were double cropped.

### Soils

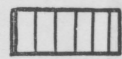

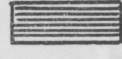
Floyd County soils lie within the Blue Ridge Division of the Appalachian mountains and Plateau Soil Region of Virginia (see Figure 4). The soils are largely of residual origin; that is, formed from

# SOIL REGIONS OF VIRGINIA


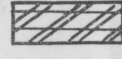
BY - Wm. B. Cobb - 1926  
SCALE - 1 INCH = 27 MILES

## LEGEND


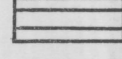
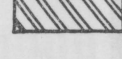
### PIEDMONT PLATEAU

-  CRYSTALLINE ROCK DIVISION
-  SLATE BELT
-  TRIASSIC SANDSTONE AREAS

### APPALACHIAN MTS. & PLATEAUS

-  PLATEAU REGION
-  BLUE RIDGE DIVISION

### COASTAL PLAIN

-  CHESAPEAKE BAY REGION
-  FLATWOODS
-  MIDDLE COASTAL PL.

### LIMESTONE

VALLEYS & UPLANDS

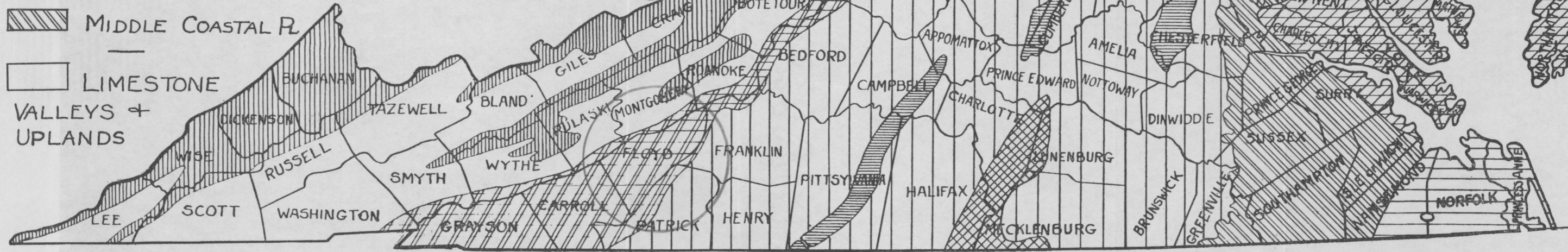


FIGURE 4.



the decay of underlying rock. Most of the rock in the county can be classified as either metamorphic or igneous which are either schists or gneisses. The hornblende schists yield dark colored rocks in contrast to the prevailing gray schists. In the northwestern section there are well-banded schists which are in contrast to the other sections where banding is not so pronounced. These well banded schists are, however, noticeably lacking in feldspars which furnish valuable potash for plant food, and this is generally true throughout the county.

The soils of the county are mostly gray, which is due in this particular formation, to the lack of ferromagnesian minerals. However, when these minerals appear, the soils vary in color from pink to red.

There are some alluvial bottom lands along the streams which probably contain the best soils of the county. This acreage, however, is limited due to topography and other factors.

## HISTORY OF AGRICULTURE AFTER 1880

In the period 1880 to 1935 crops decreased and livestock increased in importance in the agriculture of the county. Tobacco as a crop has practically disappeared from Floyd County agriculture.

Population, which is in the vast majority, rural, increased until 1920, after which it began to decline. This loss of population tends to indicate a less intensive type of agriculture. (Table 1).

### Land in Farms

Land in farms increased from 216,748 acres in 1880 to 238,433 acres in 1920, or 10 per cent in 40 years. After 1920 there was a decrease of 3.7 per cent. (Table 3). Abandonment of farm land became pronounced after 1920. The average size of the farms showed a rapid decrease from 141 acres in 1880 to 102.6 acres by 1900. After 1900 the rate of decline was much less. Most of this change was due to the increasing number of farms of 3 to 100 acres in size. (See Table 4). The peak in number of farms of less than 50 acres was reached in 1910. The decline after 1910 occurred mostly among those of 20 to 49 acres in size and to a much smaller extent among those of less than 20 acres. Apparently, the part-time and subsistence farms have shown little if any tendency to disappear, while the average acreage of the family-sized full time commercial farm has increased. The number of farms of 50 to 259 acres in size increased continuously from 1880 to



Table 3.- Number of Farms and Land Area in Farms, Reported by the United States Census, in Floyd County, Virginia, 1880-1935.

Year	Number of farms	Acres in Farms		Per Cent Improved
		Total	Per Farm	
1880	1,541	216,748	141.0	48
1890	2,008	224,380	112.0	54
1900	2,284	234,384	102.6	64
1910	2,416	237,128	98.1	67
1920	2,333	238,433	102.2	67
1930	2,244	228,481	101.8	61
1935	2,416	229,496	95.0	61

Table 4.- Farms by Size in Floyd County, Virginia.

Acres	1880	1890	1900	1910	1920	1930	1935
Under 3	0	1/	11	1	-	-	0
3 - 9	10		98	132	85	65	101
10 - 19	48		163	179	160	148	203
20 - 49	214		511	555	514	471	334
50 - 99	458		678	710	714	718	752
100 - 174			535	537	540	533	535
175 - 259	767		159	175	192	189	175
260 - 499			100	100	103	100	95
500 - 999	40		19	20	19	15	18
1000 and over	4		10	7	6	5	3
All farms	1541	2008	2284	2416	2333	2244	2416

1/ Unavailable.

Source: Census Reports.

1935. The number of farms of 260 to 499 acres in size changed very little in 55 years. The number of very large farms (500 or more acres in size) decreased continuously from 1880 to 1930.

### Crops

Acreage in cultivated crops (corn, tobacco, potatoes, and sweet potatoes) reached a peak in 1900. Since that time there has been a decrease. Most of this decrease was due to a decrease in the corn acreage. The acreage of small grains and hay reached a peak in 1920 and since that time has decreased rapidly. Of these crops only hay has shown a general upward trend; the others, rye, oats, and wheat have shown a downward trend in acreage. The barley acreage is of little significance.

Tobacco was an important crop in 1880, but since that time its importance has declined rapidly, especially since 1900. In 1900, 780 acres were reported, but only 66 acres in 1910. By 1920 the acreage had increased to 203 acres, but rapidly decreased to a new low of 59 acres in 1930. The principal reason for the rapid decline in the importance of tobacco was the shift in the demand by the tobacco trade for a lighter, thinner-bodied type of tobacco.

The apple growing enterprise, which consisted largely of home orchards, has likewise shown a downward trend.

Such crops as barley, white and sweet potatoes, have been introduced in the cropping system but from a commercial standpoint have

Table 5.- Acreages and Yields of Major Crops, Reported by the United States Census, in Floyd County, Virginia, 1880-1935.

Crop	Years						
	1880	1890	1900	1910	1920	1930	1935
Corn, for grain	13,449	14,852	16,424	16,747	14,244	11,097	11,941
Wheat	8,944	7,746	7,594	6,011	12,986	5,112	6,588
Oats	9,521	10,342	6,062	2,137	4,562	2,952	1,995
Rye	3,247	3,369	1,338	2,326	3,252	1,655	1,681
Hay	8,679	14,326	14,025	17,082	17,203	16,194	13,800
Tobacco	827	781	780	66	203	59	62
Potatoes	1/	334	501	459	461	570	680
Sweet Potatoes	22	30	133	21	28	46	52
Total Cultivated Crops	14,298	15,997	17,850	17,293	14,936	11,772	12,735
Total Small Grains & Hay	30,391	35,787	29,036	27,556	38,026	25,925	24,074
No. of bearing apple trees	1/	102,205	195,868	178,425	157,791	122,638	1/

Average Acreage Per Farm

Corn, for grain	8.73	7.40	7.19	6.93	6.11	4.95	4.94
Wheat	5.80	3.86	3.32	2.49	5.57	2.28	2.73
Oats	6.18	5.15	2.65	.88	1.96	1.32	.83
Rye	2.11	1.68	.59	.96	1.39	.74	.70
Hay	5.63	7.13	6.14	7.07	7.37	7.22	5.71
Tobacco	.54	.39	.34	.03	.09	.03	.03
Potatoes	1/	.17	.22	.19	.20	.25	.28
Sweet Potatoes	.01	.01	.06	.01	.01	.02	.02
Total Cultivated Crops	9.28	7.97	7.82	7.16	6.40	5.24	5.27
Total Small Grains & Hay	19.72	17.82	12.71	11.41	16.30	11.55	9.96
No. of bearing apple trees	1/	50.90	85.76	73.85	67.63	54.65	1/

Yield Per Acre

Corn, bu. shelled	16.8	16.3	18.4	21.6	22.7	24.0	21.6
Wheat, bu.	5.2	7.5	5.8	9.1	9.7	9.7	10.5
Oats, bu.	13.7	13.8	14.2	9.9	14.5	19.2	21.1
Rye, bu.	6.3	6.7	6.4	8.6	8.1	8.8	8.9
Hay, tons	.79	.78	.79	.88	.98	1.02	.82
Tobacco, lbs.	414	404	565	631	660	762	986
Potatoes, bu.	1/	58.0	62.4	67.9	62.3	85.4	86.9
Sweet Potatoes, bu.	67.7	73.7	48.2	147.7	80.8	71.7	63.5

1/ Data unavailable.



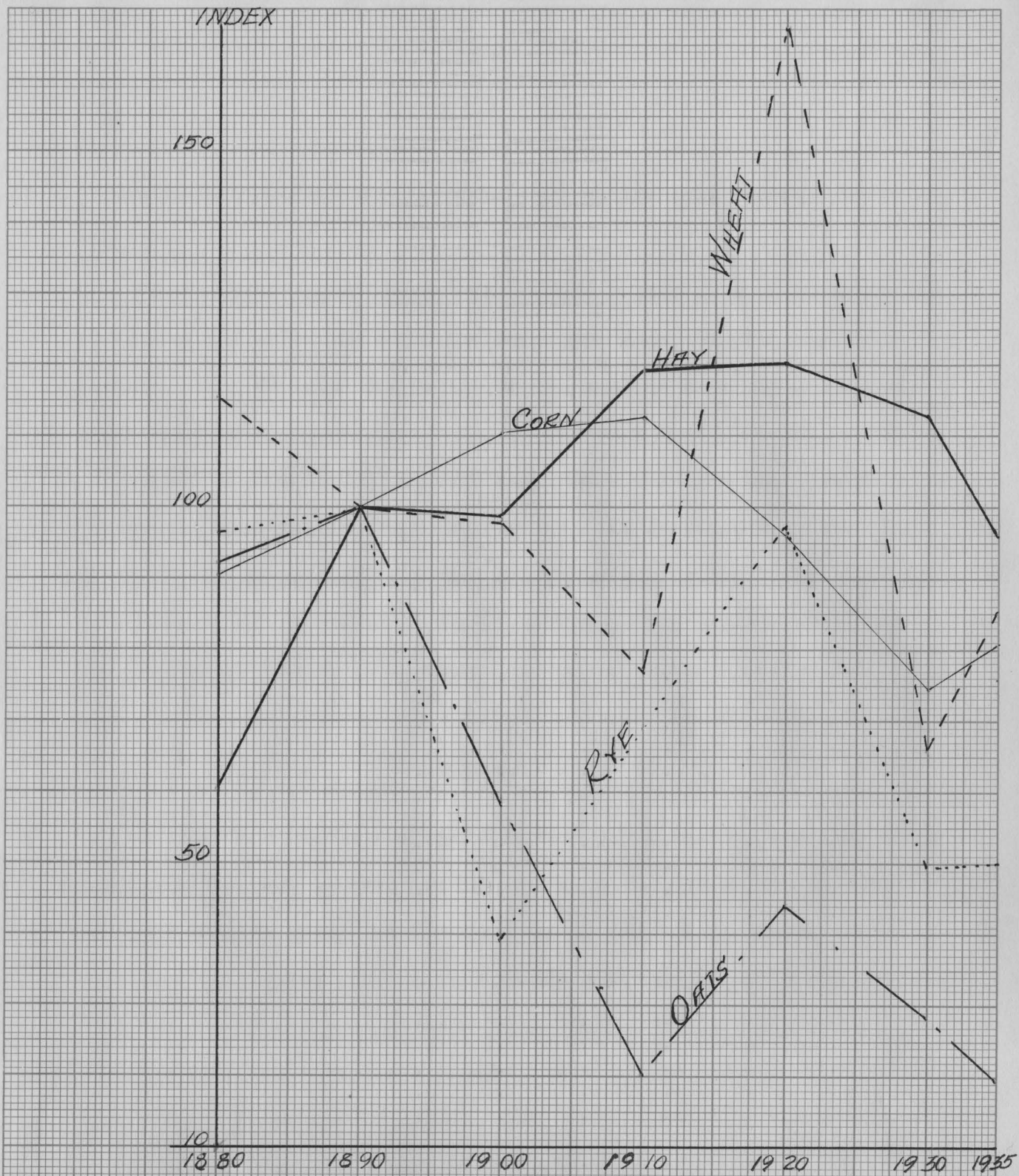


FIGURE 5. INDEX OF MAJOR CROP ACREAGES.  
(1890 = 100)

little or no significance. Potatoes probably are grown largely for family use.

The cropping system appears to indicate a general or subsistence type of farming. Most of the crops are bulky and non-perishable, mainly cereals. Most of these are fed to livestock, since this is not a commercial cereal growing area.

With the exception of minor crops, yields per acre have generally increased. This was probably the result of the abandonment of the less productive lands, better selection of enterprises, including an increase in livestock, and improved cultural practices. Such changes represent the actions of farmers in response to changing economic conditions.

#### Livestock

In 1880 beef cattle averaged 3.62 head per farm. This has since declined. The peak of beef cattle numbers in the county came in 1910 but the number of farms had increased, which reduced the average to 3.02 per farm. After 1910 the decline in total numbers was rather rapid.

Dairy cattle increased rapidly from 1880 to 1935. In 1880 the average number was 2.31, as compared to 4.65 in 1935, which indicates that the dairy industry is becoming more important in the agriculture of the county. This has been stimulated by increased marketing facilities for milk, largely manufacturing plants established in the nearby towns.

Table 6.- Numbers of Livestock, Reported by the United States  
Census, Floyd County, Virginia, 1880-1935.

Class	Years						
	1880	1890	1900	1910	1920	1930	1935
	<u>Total Number</u>						
Beef Cattle	5,573	7,124	5,392	7,308	5,162	4,749	<u>1/</u>
Dairy Cattle <u>2/</u>	3,555	4,322	6,345	7,850	6,943	9,242	11,229
Work Stock <u>3/</u>	2,579	2,886	3,323	3,785	4,305	2,850	2,482
Swine <u>4/</u>	10,610	10,504	11,251	7,679	6,289	8,658	5,638
Sheep <u>5/</u>	8,310	8,507	8,782	9,591	8,449	13,087	10,852
Chickens <u>6/</u>	28,511	39,913	38,604	63,535	86,440	90,090	<u>1/</u>
	<u>Average Number Per Farm</u>						
Beef Cattle	3.62	3.55	2.36	3.02	2.21	2.12	<u>1/</u>
Dairy Cattle	2.31	2.15	2.78	3.25	2.98	4.12	4.65
Work Stock	1.67	1.44	1.45	1.57	1.85	1.27	1.03
Swine	6.88	5.23	4.93	3.18	2.70	3.86	2.33
Sheep	5.39	4.24	3.84	3.97	3.62	5.83	4.49
Chickens	18.50	19.88	16.90	26.30	37.05	40.15	<u>1/</u>
	<u>Animal Units Per 100 Acres of Improved Land</u>						
Total	14.7	14.8	12.7	14.1	12.3	15.3	<u>1/</u>

1/ Data not available.

2/ Dairy cattle includes heifers 2 years old and older.

3/ Horses and mules.

4/ Swine on farms April 1.

5/ Does not include spring lambs except 1935.

6/ 1890 figures adjusted to January 1 basis.

The total number of work stock in the county reached a peak in 1920, and since that time it has declined 42.3 per cent. This decline in farm power has not been entirely offset by tractors, trucks, and other machinery, but has been associated with the change in intensity of crops caused by increased livestock production.



Swine have likewise decreased in numbers. After 1900 the decline was from an average of 6.88 to 2.33 per farm.

Sheep have shown a steady increase until 1935. The rough topography and cool climate are favorable to the sheep industry.

Chickens increased from an average of 18.5 per farm in 1880 to an average of 40.15 per farm in 1930. Most of this increase occurred after 1900.

## AN ECONOMIC CLASSIFICATION OF LAND IN THE ALUM RIDGE DISTRICT

Floyd County presents a problem that will be constantly facing the land economists until detail topographic maps, soil maps, and geological maps have been made for the entire United States. Maps of any of the three types mentioned above are not available for Floyd County. The lack of detailed information of this kind represents a handicap which necessitates rather careful and detailed surveys.

By studying the history of such an area it is thought that much information that is important to land economics can be obtained. History of the agriculture represents to some extent the efforts of farmers to meet pressing economic conditions as adequately as possible within their means.

A classification of land may be made for various purposes but this should not prevent it from being economically sound. According to C. P. Barnes, Head of Land Classification Unit, Resettlement Administration, "The form and requirements of land classification to be chosen depend in a large measure upon the objectives it is expected to serve". Again he says, "In general, the finer the distinctions between land types and their use capabilities and the more detailed the mapping of land types, the greater the number of purposes which the land classification will serve". <sup>1/</sup> Classification may be intended for the purpose of studying land taxes. In that case a very broad reconnaissance type, made without regard to the farm boundaries, may be satisfactory. In other cases a more detailed classification on the basis of the farm as a unit may be

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<sup>1/</sup> Barnes, C. P., Land Use Planning Publication No. 1, Resettlement Administration, Land Utilization Division, Land Use Planning Section, Washington, D. C.

required.

It is obvious in classifying an area from a broad reconnaissance standpoint that some of the land will be above and some below the classification assigned to the area. This is likewise true when classifying the farm as a unit; some of the land in the farm will be above and some below the classification assigned to the farm as a whole. The farm, nevertheless, is the economic unit upon which the operator is dependent for a livelihood. As such it is where the primary interest of the economist lies. In an area such as Floyd County, with its rough topography, a farm may consist of some land that is not adaptable to farming and will never be so under the present systems of farming and other land that is of good to excellent quality. It would be highly impracticable for a person to purchase only the best fields for his farm. No one would want the poorer lands, some of which could never be farmed except as "forest farms". These have not been developed as private enterprises. (For detailed discussion on reforestation by private enterprise, see Social Science Research Council Bulletin No. 2, pages 112 to 115, "A Particular Local Project", by Dr. George S. Wehrwein).

#### Taxation

Tax assessment in Floyd County is relatively low. The average assessed value of land per acre for the entire county in 1937 was \$4.62. The range was from \$3.75 in Indian Valley district to \$5.64 in



Little River district. Tax rates per \$100 of valuation varied from \$2.90 in Little River and Locust Grove districts to \$3.25 in Burkes Fork district.

The county at present is confronted with raising taxes to meet school needs. This proposed increase is meeting much opposition from the people.

The last general assessment of land in Floyd County was made in 1926. Since that time changes have been effected largely by transfers of property. A proposal to reassess the land was defeated.

Table 7.- Land Taxes, by Districts, Floyd County, Virginia Since 1926.

District	Acreage of assessed property	Rate per \$100 assessed value	Average assessed value per acre
Alum Ridge	26,947	\$ 3.00	\$ 4.88
Court House	48,222	3.15	4.89
Indian Valley	36,363	2.80	3.75
Locust Grove	39,413	2.90	4.93
Little River	39,243	2.90	5.64
Burkes Fork	45,142	3.25	3.72
County	235,330	-	4.62

Table 8.- Taxation Schedule of Floyd County, Virginia, 1937.

Purpose of levy	Alum Ridge District	County levy	County average
General State	\$ 0.00	\$ 0.00	\$ 0.00
General County	0.00	1.00	1.00
Bond issue (roads)	0.10	0.00	0.40
Public assistance	0.00	0.25	0.25
School levies	0.00	1.25	1.25
Land per \$100 of assessed value	3.00*	3.00	3.00

\* Levied by county.

### Definition of Land Classes

Land classes recommended by the Department of Agricultural Economics, Virginia Polytechnic Institute, are defined below. <sup>1/</sup> These recommended land class definitions were adopted but certain modifications were made later.

It should be remembered from the outset that land classification in this study is purely on a farm unit basis, with no attempt to adjust land classes within farms.

Land Class I. Comprises areas which are not adapted to arable farming and in which very little farming is now being done. This class is characterized by a high percentage of land that is idle or in woods, and by a high percentage of vacant farms. Such land is usually better adapted to forests and recreational uses than to farms.

Land Class II. This class differs from Class I in that a considerable amount of arable farming is still attempted. Most of the farms which remain in operation have small delapidated buildings, farm income having been comparatively low over a long period of years. The present intensity of use of Land Class II is higher than the productivity of the land will justify as evidenced by the fact that over the past 200 years or more those farmers who have attempted to operate it have failed to accumulate and maintain a sufficient capital investment to support even a moderate standard of living.

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<sup>1/</sup> Unpublished manuscript, Dr. H. N. Young.

Land Classes III, IV, V or more. In these classes productivity is high enough to justify continued use of the land for farming. Land Class III will repay only the most extensive agricultural use consistent with the type of farming of the area and can be expected to provide only the minimum farm income which is necessary to maintain occupancy of the land. Farmers in land Classes IV, V, and the higher classes are able to earn successively higher incomes from class to class and this is reflected by the fact that over a long period they have been able to accumulate and maintain successively greater amounts of capital per farm.

Land classes higher than IV are not thought to be found in Floyd County in sufficient quantities for mapping individual farms, but where more intensive agriculture is practiced, such as the Eastern Shore and Southside sections of Virginia.

Land classes are based on intensity of the present use of the land, and are expected to indicate the relative possibilities for future utilization. It is intended to answer the question, "what opportunity has the farmer to earn a living and accumulate and maintain capital on the land"? On land Classes I and II the farmer is operating a business that could hardly be expected to provide an adequate or increased income over a period of years.

#### Methods Used in Classifying Land

In communities that have been settled for more than one or two generations, as has Floyd County, it is thought that the present land



uses, which are a result of farmers' experiences and experimentations, for a period of years, are likely to be the most profitable uses for land of different character.

Some of the chief factors influencing type of farming, hence affecting intensity of land use in farming areas, are topography, climate, soil, transportation, distance to market or shipping point, relation of the type to other competing types in the region, price of land, and capital. <sup>1/</sup>

Physical factors to a great degree affect the intensity of land use. Other factors, such as value and state of repair of buildings, labor income, and labor efficiency are resultant factors of land use. "— the size and condition of barns, silos, and other buildings, in a region that has been settled many years, are indications of the productivity of the land and returns from farming". <sup>2/</sup>

Soil types are important in land-use questions but apparently cannot be used as a single measure for land classification. H. R. Kling found in his classification of the land in Wyoming County, New York, that practically all soils would grade into the five classifications used. The major portion of each type was in land Classes III and IV. <sup>3/</sup>

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<sup>1/</sup> Warren, G. F., Farm Management, The MacMillan Company, New York, New York, 1939.

<sup>2/</sup> An Economic Study of Land Utilization in Wyoming County, New York, Cornell University Agricultural Experiment Station Bulletin #707, H. R. Kling.

<sup>3/</sup> Ibid.

Farm management records were available for the 100 farms located in the area studied. From these records detailed information concerning production rates, intensity of use of land, value of buildings, and size of operation could be obtained.

At the outset a tentative classification was set up on the basis of value of buildings, which showed a high correlation with average crop index, average value of land, average production index, and average productive-man-work units per man.

Table 9. Tentative Classification of Land Using as a Constant Factor the Value of Buildings.

Value of buildings	Class	Frequency	Average Crop Index	Average Production Index	Average value of land	Average productive man work units per man
0 - 750	I & II	29	85	88	\$14.62	133
751 - 2250	III	47	95	99	17.90	163
2251 and up	IV	24	105	102	19.27	183

Classes I and II were combined since all classification in this study is done on a farm unit basis. For all practical present and future purposes Land Class II consists of land belonging in Class I that is being farmed at the time the classification is made. Only three land classes were recognized because of the fact that data did not indicate that any of the farms could qualify for a higher class.

When considering roads, transportation and markets as factors in land classification, practically all farms in this area are affected negatively.

Intervals of building values for the different classes were selected arbitrarily after an examination of the data. Since it was thought that a wider range of building values might occur on the higher than on the lower land classes, progressively wider value intervals were selected for successively higher classes.

When the farms were grouped into tentative land classes on the basis of building values, it was found that crop index, production index, land value per acre, and labor efficiency were directly related to the tentative land classification. (Table 9). The least variable of these factors between tentative classes was land value per acre. This is in line with the principle that poor lands are usually overvalued. The most variable factor between tentative land classes was labor efficiency, or productive work units per man, which was found to be a more important factor affecting income than were the rates of production. <sup>1/</sup>

An inspection of individual records revealed the fact that when all available factors were considered, i. e., crop index; production index; work units per man; acreage of tillable, untillable, permanent pasture and woodland, as well as farm income, the tenure status of the operator was important. The relationship between the factors used in Table 9 and the tentative land class based on building value when computed for either tenants or owners was positive, but the average building value

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<sup>1/</sup> An Economic Study of Farm Management and Land Utilization in North Central Floyd County, Virginia, 1937: Part I: Farm Business Analysis. F. L. Underwood and W. H. Fippin, V.P.I.-U.S.D.A., Multigraphed. 1939.





Figure 6. Underlying rock on Classes I and II. This formation is not limestone rock. (Notice vegetation and rail fence).



Figure 7. Dirt road in Land Classes I and II combined, area. This is a better than average road for the entire area. Excavation along this road reveals considerable mica in the formation.

for tenants was far below that for owners. This was to be expected since owners do not ordinarily invest more than is necessary in buildings for tenant operated farms. This limits the usefulness of a classification based altogether on the value of the buildings. (Table 10). This problem would seem to be increased as the percentage of tenancy is increased.

Table 10.- Relationships of Tenant Operated Farms to Owner Operated Farms.

Factor	Averages		
	All farms	Tenant operated	Owner operated, including owners with croppers
Crop Index	95.73	92.7	96.2
Production Index	97.25	91.7	98.2
Productive man work units per man	158.97	140.9	161.9
Value of buildings	\$1630.00	\$1173.00	\$1705.00
Labor Income	-\$92.67	-\$40.58	-\$101.15

The farms were again classified with building values as the primary factor, taking into account the sources of income, that is whether income was from animal and animal products or from crops. Along with the above, production index, crop index, and proportion of crop land to total land in the farm was also considered. The farms that had large miscellaneous receipts were studied carefully for indications of influence of such receipts on building values. In cases where such influence was thought to be indicated, each farm was treated individually and placed in a land class according to economic factors other than buildings.

Changes in the tentative classification of individual farms were much fewer than expected, which seemed to indicate that the value of the



Figure 8. An abandoned farm home on Land Classes I and II combined. Quartz outcroppings are prominent on this farm.



Figure 9. A typical farm home on Land Class IV.



buildings reflected to a considerable degree the productivity of the land in an area that has been farmed for a long period of time, and that buildings may be a good criterion for classification of the land when tenancy is taken into account.

After the final reclassification on the basis of all factors considered, relationships of the different land classes to four available factors were then computed. (Table 11). Crop and production indices showed positive relationships, as was to be expected. Productive man work

Table 11. Relationships of Selected Factors to Land Class.

Land Class	Number of farms	Average Crop Index	Average Production Index	Average value of land per acre	Average crop and livestock productive man work units per acre of farm
I & II	45	81	86	\$ 15.81	1.26
III	39	104	103	15.47	1.43
IV	16	117	117	24.34	1.45

units represented by livestock and crops per acre of farm land also showed a positive relationship, indicating a greater intensity of land use in successively higher classes. There was little difference, however, in the number of work units per acre between Class III and Class IV land, but similar intensity yielded poorer results as indicated by rates of crop and livestock production. Work units per acre on land of Classes I and II combined were relatively higher than on Classes III and IV, in proportion



Figure 10. Abandoned Flue-Cured Tobacco barn. This barn is now used for storage.

to their respective rates of production. (For land class map, see appendix).

Value of land per acre showed the same relationship, except more pronounced, as was shown by the tentative classification (Table 9), that is, the poorer land tended to be over-valued.

#### Mortgages

Of the 100 farms included in the study, 19 were known to be mortgaged. Of these, 10 were located on land of Classes I and II, 5 on land

of Class III and 4 on land of Class IV. Information was not available as to rate of repayment or duration of mortgages.

#### Modern Conveniences

Many of our present day modern conveniences such as screens are not only a convenience, but are sanitary measures. Electric lights as a modern convenience may also have a twofold benefit in that these lights are superior to the kerosene lamp and cause less eye strain. Electricity may be used to perform many other functions, such as grinding feed, pumping water, and other purposes where power machinery is adaptable.

Table 12.- Relation of Kind of Operator's House and Number of Selected Conveniences to Land Class.

Land Class	Total Operators	Structure			Lights		Tele-		
		Log	Brick	Frame	Electric	Other	Radio	phone	Screens
I & II	45	1	-	44	1	44	12	33	22
III	39	-	-	39	10	29	20	28	26
IV	16	-	1	15	9	7	11	13	15
Total	100	1	1	98	20	80	43	74	63

The telephone and radio, two of our most commonly used available means of communication, were found to be important in all land classes in the area studied. In land classes I and II combined, 73.4 per cent of



the farm operators had telephones, as compared to 71.8 per cent of those in land Class III, and 81.3 per cent of those in land Class IV. Radios were less numerous, but more directly related to land class. The radio provides only one-way communication and naturally would have less utility than a telephone in a rural area where roads are practically impassable during winter months. In addition, radio may be termed a somewhat more expensive communication instrument than a telephone and in some cases it may be possible that the availability of electric power has limited the use of radios. Practically all of the radios except those on farms of Class IV land were of the battery type.

Only one of the farm operators in Classes I and II combined had electric lights. This convenience increased directly with land class.

A majority of the farm operators' homes were of frame construction in all three land class groups. In Classes I and II combined there was one house completely of log construction, while in land Class III all houses were of frame or of frame-and-log construction, and in land Class IV all houses were of frame construction except for one which was of brick construction.

#### Roads

Only one all-weather (macadam) road has been constructed within the area. This road is State Highway Number 8, which traverses the area in a northwest-southeast direction. It is the main thoroughfare leading from Christiansburg to the town of Floyd and points south.

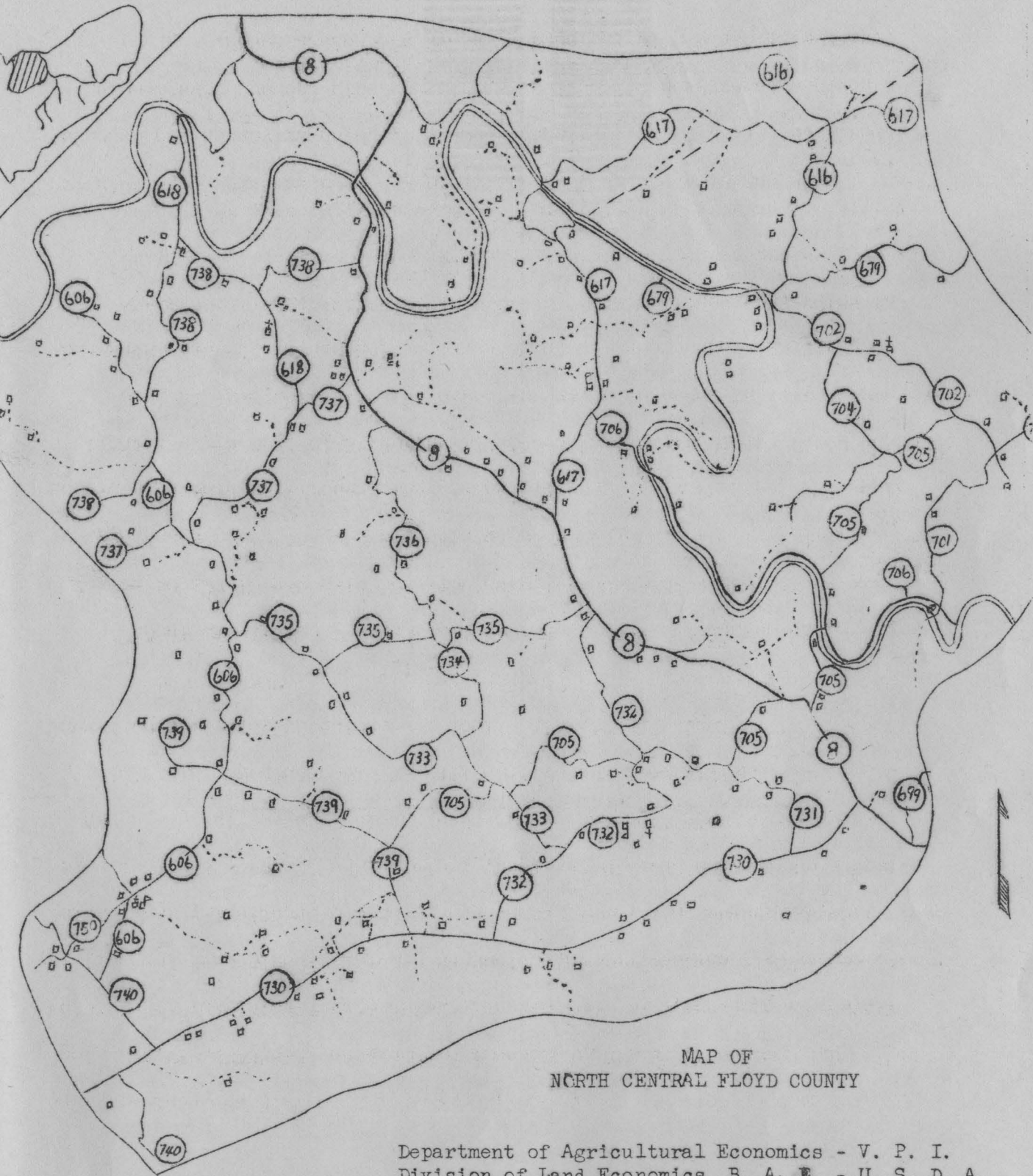
There are numerous dirt roads that lead from Highway Number 8 into the interior of the area studied, but only one gravel road (No. 730) (Figure 6) which serves the lower (southwest) section of the area. This road leads into an interior road (No. 740) which is also gravelled. A partially gravelled road (No. 737) leads from Highway Number 8 in a southwesterly direction, joining road Number 606, which terminates at Alum Ridge.

All other roads within the area are dirt roads that are practically impassable during winter months. A major portion of the Class IV land is within areas served by dirt roads.

Six secondary roads within the area lead to and beyond the river. However, only two bridges cross the river, the remaining four roads leading to fords which are impassable to motor traffic during periods of high water.

#### Classification of Land in Area Not Covered by Farm Management Records.

The scattered farms not covered by the farm management records available were classified by means of a personal investigation on the basis of the available information that was applicable to these farms. The number of farms classified by this method was small as the 100 records accounted for practically all of the land area.



MAP OF  
NORTH CENTRAL FLOYD COUNTY

Department of Agricultural Economics - V. P. I.  
Division of Land Economics B. A. E. - U. S. D. A.

Figure 11. Map Showing Roads Within the Area Studied.



## CONCLUSIONS

Soils in the area studied seemed to be a determining factor in land class. With very few exceptions the land of Class IV was found to consist mainly of alluvial soils, lying along Little River. Classes I and II combined, and Class III lands were found in some cases along Little River but these areas were dominated by cliffs, woods, and untillable land, and included relatively little alluvial soil. Rock outcroppings in the hilly soils were noticeable on most of the land of Classes I, II, and III.

Farm management data alone provide insufficient information for an adequate classification of the land. A personal investigation in conjunction with farm management data will tend to improve the classification.

Value and condition of buildings are an important factor in classifying land but too much importance should not be attached to this factor, especially in areas where lumber is relatively plentiful, as was the case in Floyd County. It seems, from the results of this study, that when the value and condition of buildings are used in classification of land that the tenure of the operator should be taken into consideration.

To attempt a land classification project without topographical and soils maps may easily result in many errors unless reliable farm management data be supplemented with information obtained by careful personal investigation. It is thought that on the basis of the procedure followed in this study a dependable classification is possible. However, the use of such maps should reduce considerably the difficulty and cost of making an adequate classification.

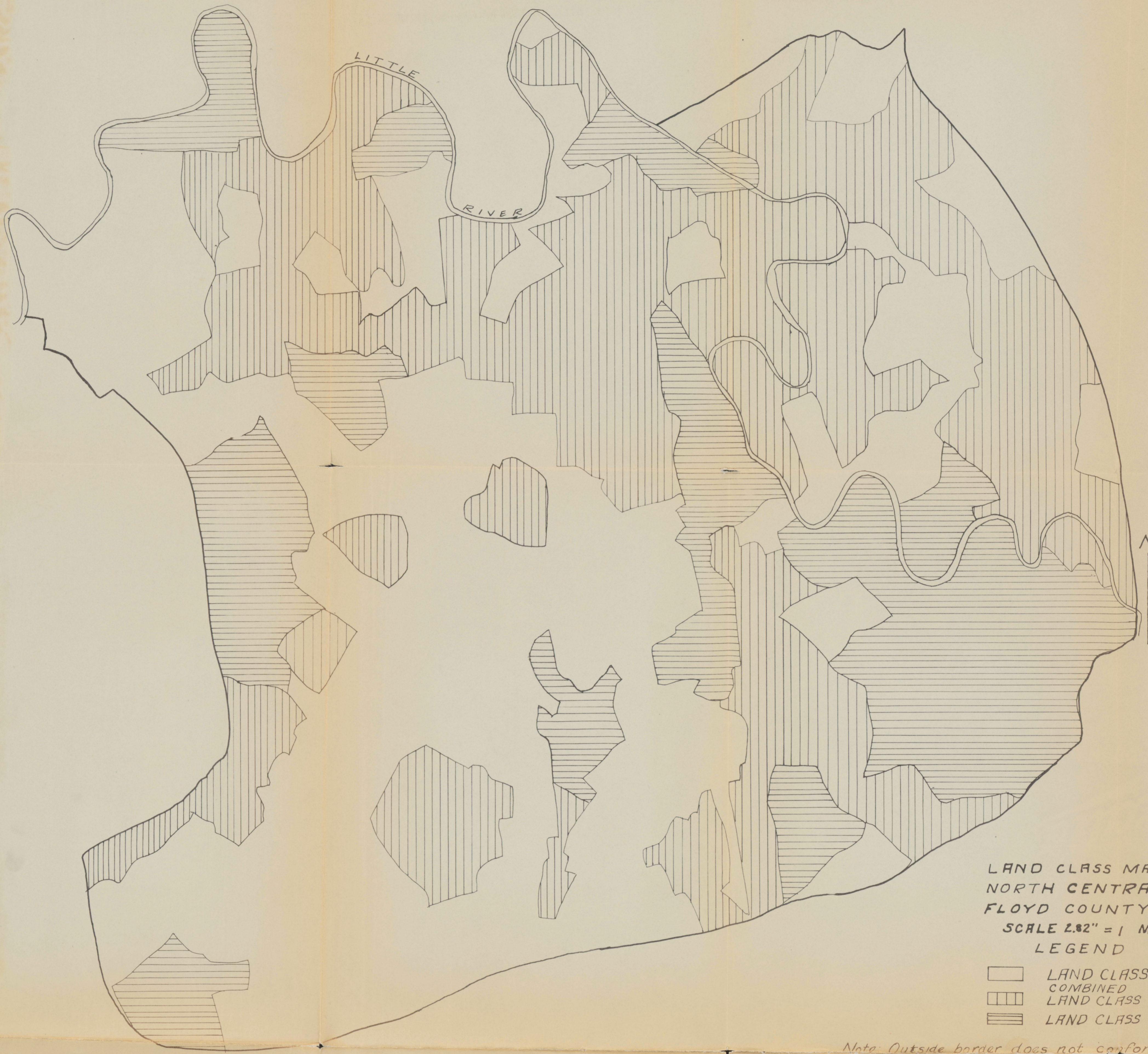
APPENDIX

Table 1.-- Tax Delinquency by Civil Districts for Years 1927-1938 on Total Real Estate, Not in Incorporated Towns of Floyd County, Virginia

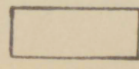
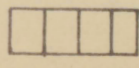
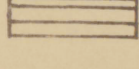
Year	District						County
	Alum Ridge	Burkes Fork	Court House	Indian Valley	Little River	Lecust Grove	
1927	55.84	13.69	199.96	53.60	54.09	241.67	618.85
1928	286.63	243.39	826.73	263.49	1010.98	381.50	3012.72
1929	106.24	346.26	657.85	290.02	687.92	258.28	2346.57
1930	302.14	532.66	887.79	693.58	454.78	760.95	3631.90
1931	393.57	1183.34	1625.79	1229.75	1259.85	1566.80	7259.10
1932	692.84	1124.90	1112.95	969.91	1332.66	1112.89	6346.15
1933	350.49	1097.70	1297.33	824.00	1145.98	1319.01	6034.51
1934	428.34	960.41	1063.83	808.24	1150.17	1262.25	5673.24
1935	555.21	934.34	936.68	810.23	1077.30	923.70	5237.46
1936	332.34	207.72	991.31	689.99	781.40	833.87	3836.63
1937	376.68	927.50	1113.24	826.68	866.75	862.91	4973.76
1938	486.14	984.08	1462.14	864.18	862.51	1123.07	5782.12

Source: Tax Delinquency Records, Floyd County, Virginia.





LAND CLASS MAP  
NORTH CENTRAL  
FLOYD COUNTY  
SCALE 2.82" = 1 MILE  
LEGEND

-  LAND CLASS I+II  
COMBINED
-  LAND CLASS III
-  LAND CLASS IV

*Note: Outside border does not conform  
to farm boundaries.*