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FEBRUARY 1941

An Economic Study of  
LAND UTILIZATION  
IN NEW CASTLE COUNTY,  
DELAWARE

by  
R. O. Bausman



NEW  
CASTLE

KENT

SUSSEX

Department of  
Agricultural Economics  
& Rural Sociology

Economic Aspects of Land Use

What are the trends in the production of the different crops and kinds of livestock in New Castle County? What proportion of the land of New Castle County is submarginal for agricultural use? What is the best economic use for this land? What proportion of the land is suited for agricultural use? What is the best economic use for this land? How do the different classes of land affect: acreage of crops grown . . . number and kind of livestock per farm . . . rates of production of crops . . . size of farm business . . . size and condition of buildings . . . proportion of roads hard-surfaced?

Social Aspects of Land Use

How do the different classes of land affect: standard of living of farm families . . . age of farmers . . . nationality of farmers . . . farm experience of farmers . . . number of farmers' sons who become farmers . . . size of farm families . . . education of farm children?

old roads

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## DIGEST

Of the 274,114 acres of land in New Castle County, 73,471 acres (26.8 per cent) were in land classes I and IR (mostly timber, brush, and marsh land); 20,097 acres (7.3 per cent) were in land classes II and IIR (mostly open untillable land); 84,787 acres (30.9 per cent) were in land classes III and IIIR (less intensively used than class IV land); 80,014 acres (29.2 per cent) were in land classes IV and IVR (most intensively used crop land); and 15,745 acres (5.8 per cent) were used for residential and industrial purposes, at the time of the survey, 1937. Land classes I and IR, and II and IIR, comprising about one-third of the land area, not being able under existing conditions to produce an adequate income from the land, could possibly be utilized to a better economic and social advantage as forests, wildlife preserves, and public recreation than for agricultural use.

In land classes I and IR, and II and IIR, the farmers were of an older age; a relatively large proportion of them came to the farms from non-agricultural vocations and were lacking in farm experience; many of them farmed for a period and returned to non-agricultural vocations; and fewer farmers' sons took up agriculture as a vocation than in the better land classes. Likewise in land classes I and IR, and II and IIR, the number of children per family was relatively large; a smaller proportion of the children took full advantage of the school facilities of the state; the farm incomes were relatively low; and a considerable proportion of the farmers found it necessary to supplement the farm incomes by doing work off the farm. These social aspects of land use would appear to indicate that the farmers in these poorer land classes may be able to enjoy a somewhat higher standard of living and a somewhat fuller life if they took up occupancy of farms in the better land classes, or possibly if they changed to non-agricultural vocations.

Land classes III and IIIR, and IV and IVR, comprising about three-fifths of the land area, are suited for agricultural use. As indicated by the larger proportion of the land devoted to cultivated crops, land classes IV and IVR appear to be suited for a more intensive type of land use than land classes III and IIIR.

# AN ECONOMIC STUDY OF LAND UTILIZATION IN NEW CASTLE COUNTY, DELAWARE

by

R. O. BAUSMAN

During the process when New Castle County was settled, most of the land was put under cultivation. Since that time, experience has shown that the land of New Castle County varies greatly in physical productivity and location value. Changes in economic conditions have brought about changes in the value of land for agricultural purposes. During this period, farmers have made progress in adjusting the use of land to the purpose for which it is better suited. The better classes of land have been used for the more intensive production of crops; other classes of land have been used for the production of livestock products; still others have been found to be poorly suited for agricultural uses and have been abandoned for these uses and allowed to revert to timber production. These reforested areas are supplying some of the lumber needs, providing shelter for our wildlife, and providing recreational areas for rural and city people. A portion of the rolling and hilly land in northern New Castle County has been acquired by private organizations and individuals and is being used for game preserves. The forested areas are also helping solve some of the social and economic problems of the county. These timbered areas tend to discourage city people and others, unfamiliar with the poorer classes of land, from purchasing land in these areas for agricultural purposes and thus from repeating some of the mistakes made by the early settlers. Likewise, the state and county are relieved, to a degree, of the financial obligation in these areas of providing the public services of improved roads, schools, and possibly drainage facilities.

## PURPOSE OF STUDY

The purpose of this study is to classify the land of New Castle County according to the present economic uses for which it is best suited in order that there may be factual bases:

1. For locating areas submarginal for cropping purpose for purchase by the federal and state governments, should they desire to do so.

Acknowledgment—The author is indebted to Mr. F. J. Marschner, Bureau of Agricultural Economics, U. S. Department of Agriculture, who gave invaluable advice relative to the technique in making the land-classification map. The author is also indebted to Messrs. J. E. H. Lafferty and W. J. Killough for doing the field work. Mr. Lafferty's careful observation of details is responsible, to a large degree, for the accuracy of the land-classification map.

2. In the event that future study should indicate the desirability of rural zoning in New Castle County, this study would serve as a basis for determining zoning areas and thus protect people unfamiliar with the lower classes of agricultural land from purchasing land in these areas for agricultural use.

3. For directing people who desire to purchase farms, to the areas of the better agricultural land.

4. As an aid to established farmers in making adjustments in the use of their land.

5. As an aid in appraising farms for placing mortgage and operating loans.

6. As an aid in determining the location of improved farm-to-market roads.

7. As an aid in determining the location of rural electric power lines and rural telephone lines.

8. As an aid in farm-management studies. Good farm-management practices in the best grade of land may be different from those in the next best grade.

9. As an accurate appraisal of the timber, marsh, pasture, and crop resources of the state.

10. As an aid in dealing with some of the rural social problems. Data are presented indicating the effect of the different land classes on age of farmers, nationality of farmers, farm experience of farmers, number of farmers' sons who become farmers, size of farm families, and education of farm children.

## DESCRIPTION OF NEW CASTLE COUNTY

### Climate

The climate is fairly uniform throughout the county. The winters are not severe and the summers are not excessively hot. However, the humidity is high and this tends to increase the oppressiveness of the heat. The mean temperature for the winter is 30.8 degrees F. and for the summer is 72.7 degrees F. Temperatures of 100 degrees above zero and 12 degrees below zero have been recorded in July and February, respectively, but such extremes are not frequent. The average date of the first killing frost in the fall is October 17 and that of the last killing frost in the spring is April 27. This gives an average growing season of about 173 days, which is sufficient for the crops grown in the county. The average annual precipitation is 44.2 inches, and its distribution is fairly uniform for the different months of the year, although it is somewhat greater in July and August.<sup>1</sup> However, during

<sup>1</sup> Soil Survey of New Castle County, Delaware, Bureau of Soils, U. S. Department of Agriculture, p. 8, 1917.

July and August, short periods of abnormally high rainfall and longer periods of abnormally low rainfall are not unusual.

### Soils

The topography in southern New Castle County is comparatively level, while in the northern part of the county the topography is rolling to hilly. One of the chief soil problems in the southern part of the county is inadequate drainage. In the northern part of the county, drainage is well established but some of the slopes are steep enough to make cultivation impractical.

The important soils fall into four general types; namely, the Sassafras series, the Chester series, the Elkton series, and the Leonardtown series. There are some Codorus silt loam and Cecil clay loam but these are relatively unimportant. The eastern side of the county has some wide areas of marsh land, some of which have an important economic value as habitats for muskrats and other wildlife.

The Sassafras soils vary from a yellowish to a brownish loam. These soils are inclined to be somewhat heavy but they are among the most productive soils of the county and are not difficult to cultivate, if not cultivated when wet. These soils are generally well-drained and are adapted to the production of general farm crops. The Chester soils consist of a brown, gritty loam in which are found small fragments of stone. These soils are productive and are well-drained. Owing to the rolling to hilly topography of these areas, erosion often becomes a problem. These soils are adapted to the production of general crops. Orchards, white potatoes, and truck crops are grown on a limited scale.

The Elkton soils vary from a gray to a brownish-gray in color. They are of a heavy type and are poorly drained. Much of these soils are in timber land; however, some areas of the better drained Elkton soils are under cultivation. These soils are difficult to cultivate and relatively low yields are usually obtained, especially during wet seasons.

The Leonardtown soil is of a light-brown or grayish color. The subsoil is compact. The drainage of the surface soil is fairly good but that of the subsoil is poor. The surface soil resembles the Sassafras soils somewhat and the subsoil resembles the Elkton soils. The Leonardtown soil is not as easily tilled as the Sassafras soils.<sup>2</sup>

### Markets

The City of Wilmington lies in the northern part of New Castle County and provides a market for much of the farm produce of the county. Much of the produce is sold directly to the consumer on the curb markets and through retail routes. New Castle County is easily accessible by highway and railroad to Philadelphia, Baltimore, New York City, and other eastern markets. Most of the fluid milk is marketed wholesale in Wilmington and Philadelphia. Grains are marketed mostly in Philadelphia and Baltimore.

<sup>2</sup> Soil Survey of New Castle County, Delaware, Bureau of Soils, U. S. Department of Agriculture, pp. 14-32, 1917.



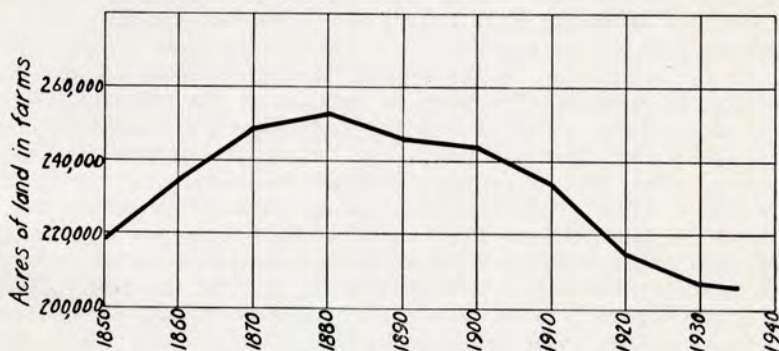
## TRENDS IN THE PRODUCTION OF IMPORTANT CROPS, KINDS OF LIVESTOCK, AND LIVESTOCK PRODUCTS IN NEW CASTLE COUNTY

The trend in the number of farms in New Castle County has been downward since 1910. From 1880 to 1935, the amount of land in farms in New Castle County, according to the United States Census, has decreased from 253,939 acres to 206,854 acres; a decrease of 18.5 per cent, Table 1 and Figure 1. A portion of this land that has been

**Table 1—Number of farms and acres of land in farms in Delaware and in New Castle County, Delaware, 1850 - 1935.<sup>1</sup>**

Year	Number of farms		Acres of land in farms		Index numbers of acres of land in farms 1935 = 100	
	Delaware	New Castle County	Delaware	New Castle County	Delaware	New Castle County
	number	number	acres	acres		
1850	6,063	—	956,144	218,948	104	106
1860	6,608	1,689	1,004,295	234,671	109	113
1870	7,615	1,787	1,052,322	248,825	114	120
1880	8,749	2,061	1,090,245	253,939	118	123
1890	9,381	2,180	1,055,692	246,847	114	119
1900	9,687	2,088	1,066,228	244,823	116	118
1910	10,836	2,208	1,038,866	234,423	113	113
1920	10,140	1,825	944,511	215,857	102	104
1925	10,257	1,967	899,641	211,008	98	102
1930	9,707	1,839	900,815	207,323	98	100
1935	10,381	1,839	921,251	206,854	100	100

<sup>1</sup> United States Census.



**Figure 1—Acres of land in farms, New Castle County, Delaware, 1850-1935.** The number of acres in farms has been decreasing since 1880. This is due, in part, to the use of land for rural residential sites, industrial developments, and private game preserves. However, it probably is due largely to the abandonment of the poorer land for agricultural use.

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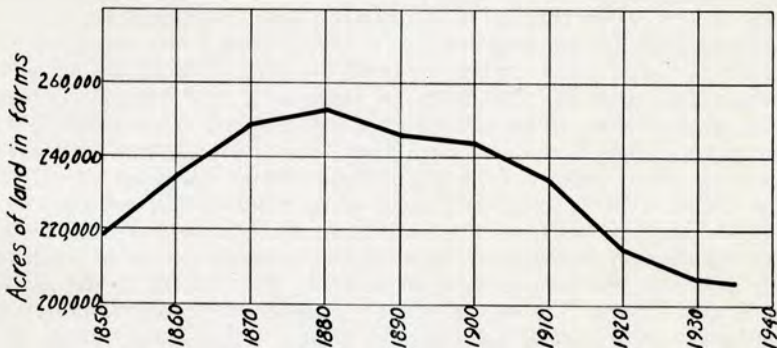
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taken out of farms is being used for the development of metropolitan areas, private game preserves, and to public improvements, such as

road right-of-ways. However, the greater proportion probably is due to the abandonment of the poorer grades of land for agricultural use. Because of changing economic conditions, such as increasing farm wages (with no permanent rise in the general price level) and the competition of better classes of land that have come into production, farmers have been forced to concentrate their labor and capital on the better classes of land.

The crops, livestock, and livestock products that are produced in New Castle County are determined by physical and economic conditions. The farmers of New Castle County have produced many kinds of crops and livestock products. Through the process of trial and error and economic profit and loss over a long period of years, farmers have found the crops and kinds of livestock that are most nearly adapted to New Castle County conditions. For those enterprises that were found to be less profitable, farmers have taken their losses and tried others, until at the present time the type of crop and livestock production in New Castle County, in general, is about the most profitable one under existing conditions.

The most important factors which determine the type of farming within an area are climate, soil, topography, and marketing costs. For example, the climate in New Castle County precludes the economic production of cotton. Cotton can be, and has been, grown in New Castle County but the economic production of cotton requires a warm climate and a long growing season. The heavy soils of New Castle County precludes the economic production of sweet potatoes. Economic production of sweet potatoes requires a light soil. Topography influences directly the economic use of machinery, horse labor, man labor, and the control of erosion. When the topography becomes too rough, the land is usually used for livestock production, or possibly the growing of timber. Marketing costs are conditioned by bulk and perishability of the products. Marketing costs are high for perishable products, such as eggs and fluid milk. Marketing costs place a handicap on the production of this type of product in areas distant from markets and give an advantage to areas near the eastern markets. Physical conditions in an area change only slightly but economic conditions are constantly changing. This necessitates farmers gradually adjusting their type of farming to meet these changing conditions. New Castle County, therefore, is tending towards the production of more of the perishable products, such as fluid milk and eggs for the fresh egg market, and less of the more staple or concentrated products, such as wheat, corn, butter, dressed pork, and dressed beef. Tables 2 to 7, and Figures 2 to 14, show the trends in the production of crops, livestock, and livestock products in New Castle County from 1840 to 1935.

**Table 2—Number of different kinds of livestock in New Castle County, Delaware, 1840 - 1935.<sup>1</sup>**

Kinds of animals	1840	1850	1860	1870	1880	1890	1900	1910	1920	1925	1930	1935
	number	number	number	number	number	number	number	number	number	number	number	number
Cows milked <sup>2</sup> . . . . .	—	8,759	11,228	11,733	13,036	16,329	15,839	16,487	13,939	13,370	12,120	12,287
Swine, all ages . . . . .	14,094	10,918	10,118	9,988	11,978	14,569	13,638	13,679	12,304	7,448	8,469	7,508
Sheep & lambs, all ages . . . . .	7,471	5,908	4,169	5,185	7,795	5,187	4,748	1,869	1,337	648	2,358	1,385
Chickens over 3 mos. old . . . . .	—	—	—	—	78,156	168,080	134,478	213,202 <sup>3</sup>	154,828	189,392	161,772	183,471

<sup>1</sup> United States Census.

<sup>2</sup> Prior to 1925, dairy cows 2 years old and over.

<sup>3</sup> Poultry of all kinds.

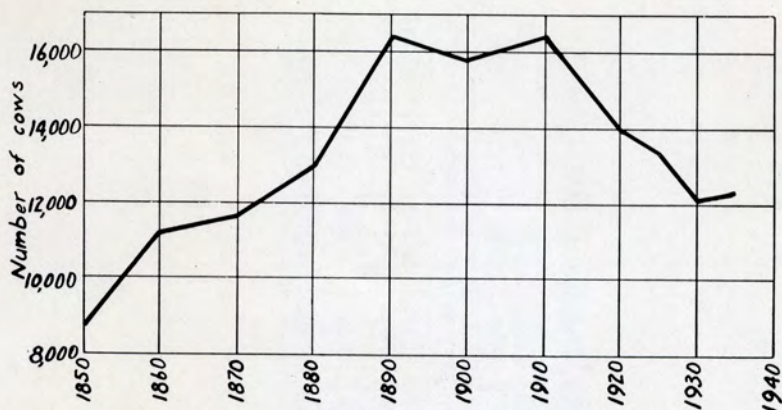


Figure 2—Number of cows milked, New Castle County, Delaware, 1850-1935.

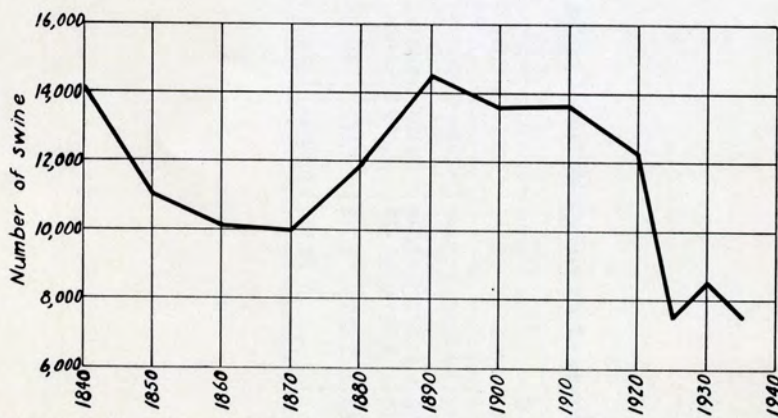


Figure 3—Number of swine in New Castle County, Delaware, 1840-1935.



Figure 4—Number of sheep and lambs in New Castle County, Delaware, 1840-1935.

**Table 3—Production and sale of dairy products in New Castle County, Delaware, 1850 - 1935.<sup>1</sup>**

Kind of products	1850	1860	1870	1880	1890	1900	1910	1920	1930	1935
Milk produced, gals. . . . .	—	—	—	—	6,316,676	7,035,155	6,207,101	5,879,473	6,792,378	6,287,112
Milk sold, gals. . . . .	—	—	752,969	938,867	—	4,105,742	3,671,442	4,492,749	5,821,941	—
Cream sold, gals. . . . .	—	—	—	—	—	14,229	20,498	5,758	2,800	—
Butter churned, lbs. . . . .	766,803	981,380	765,746	1,072,350	941,096	675,948	550,512	298,879	138,616	88,141
Butter sold, lbs. . . . .	—	—	—	—	—	541,256	447,018	272,014	115,293	—

<sup>1</sup> United States Census. Data apply to year preceding census date.

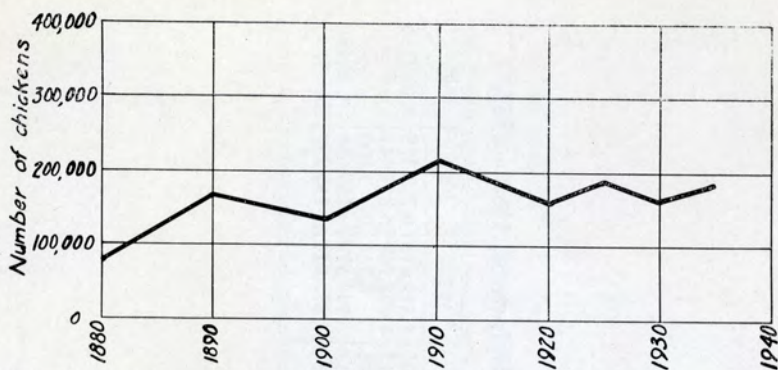


Figure 5—Number of chickens, New Castle County, Delaware, 1880-1935

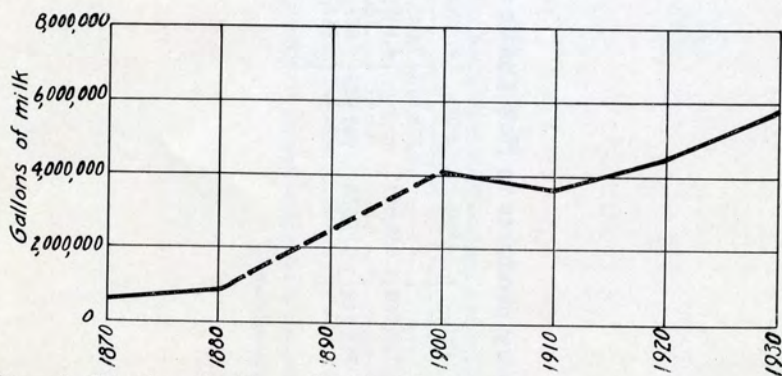


Figure 6—Number of gallons of fluid milk sold, New Castle County, Delaware, 1870-1930

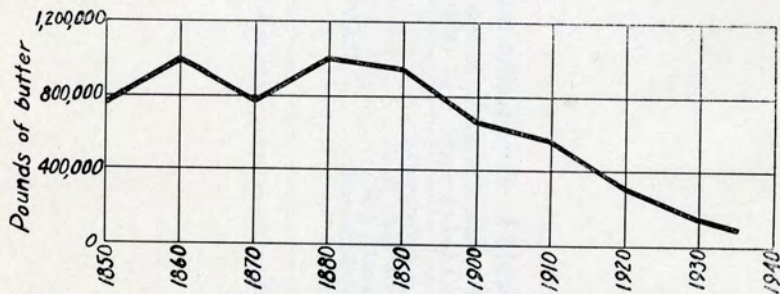
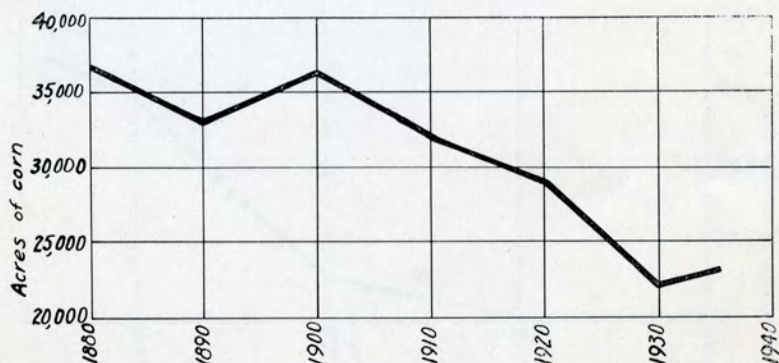


Figure 7—Number of pounds of butter churned, New Castle County, Delaware, 1850-1935.

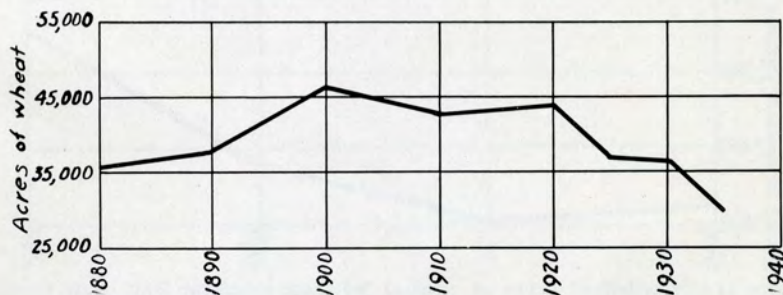
**Table 4—Acreage of grain crops in New Castle County, Delaware, 1880 - 1935.<sup>1</sup>**

Kinds of grain	1880	1890	1900	1910	1920	1925	1930	1935
	acres	acres	acres	acres	acres	acres	acres	acres
Corn for grain. . .	36,543	33,012	36,145	32,062	29,138	23,968	22,192	22,954
Wheat threshed	35,736	38,322	46,493	43,142	44,111	37,048	36,579	29,696
Rye threshed. . .	76	52	37	186	166	104	63	184

<sup>1</sup> United States Census. Data apply to year preceding census date.



**Figure 8—Number of acres of corn for grain, New Castle County, Delaware, 1880-1935.**



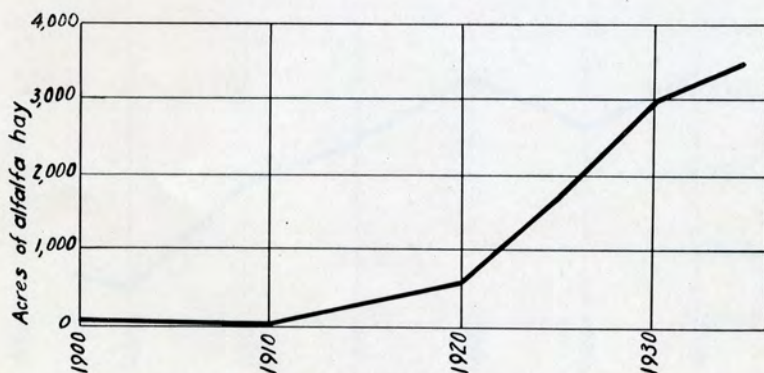
**Figure 9—Number of acres of wheat, New Castle County, Delaware, 1880-1935.**



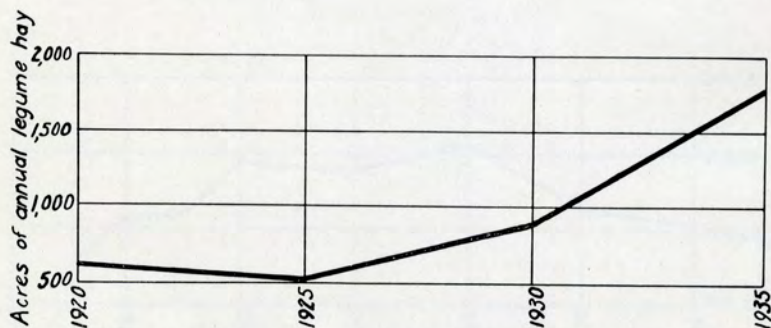
**Table 5—Acreage of hay crops in New Castle County, Delaware, 1880 - 1935.<sup>1</sup>**

Kinds of hay crops	1880	1890	1900	1910	1920	1925	1930	1935
	acres	acres	acres	acres	acres	acres	acres	acres
All hay.....	29,366	36,262	33,183	30,864	27,447	30,190	23,226	24,155
Alfalfa hay....	—	—	56	43	544	1,717	2,953	3,506
Timothy and clover, alone or mixed.....	—	—	—	29,199	24,470	27,257	19,025	17,666
Annual legumes saved for hay..	—	—	—	—	572	507	894	1,771

<sup>1</sup> United States Census. Data apply to year preceding census date.



**Figure 10—Number of acres of alfalfa hay, New Castle County, Delaware, 1900-1935.**



**Figure 11—Number of acres of annual legumes used for hay, New Castle County, Delaware, 1920-1935.**

**Table 6—Acreage of truck crops in New Castle County, Delaware, 1880 - 1935.<sup>1</sup>**

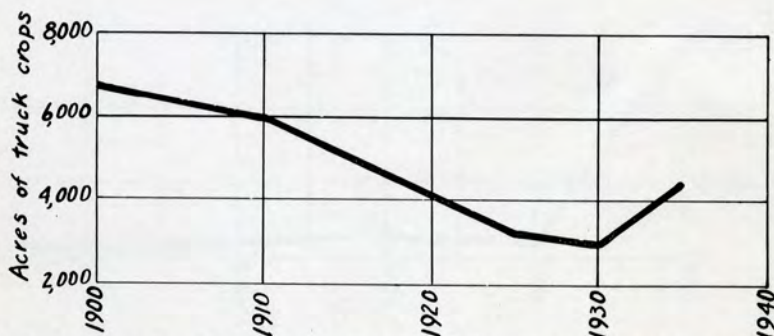
Kinds of truck crops	1880	1890	1900	1910	1920	1925	1930	1935
	acres	acres	acres	acres	acres	acres	acres	acres
Total vegetables harvested for sale <sup>2</sup> . . . . .	—	—	4,516	3,627	2,053	2,058 <sup>3</sup>	2,081	3,178
White potatoes . . . . .	—	2,037	2,128	2,341	1,903	1,134	866	1,326
Sweet potatoes . . . . .	88	40	24	44	71	9	21	29
Total truck crops . . . . .	—	—	6,668	6,012	4,027	3,201	2,968	4,533

<sup>1</sup> United States Census.

<sup>2</sup> Does not include acreage for sweet corn, white potatoes, and sweet potatoes except the years 1910 and 1900 which do include the acreage of sweet corn.

<sup>3</sup> Includes acreage for cabbage, cantaloupes and muskmelons, lettuce, onions, tomatoes, and watermelons, only.

Data apply to year preceding census date.



**Figure 12—Number of acres of truck crops, New Castle County, Delaware, 1900-1935.**

**Table 7—Number of fruit trees in New Castle County, Delaware, 1890 - 1935.<sup>1</sup>**

Kinds of fruit trees	1890	1900	1910	1920	1925	1930	1935
	number	number	number	number	number	number	number
Apple trees of bearing age . . . . .	85,279	79,069	54,200	58,797	59,323	44,405	48,983
Peach trees of bearing age . . . . .	588,119	37,689	58,175	37,725	—	20,489	22,801

<sup>1</sup> United States Census. Data apply to year preceding census date.

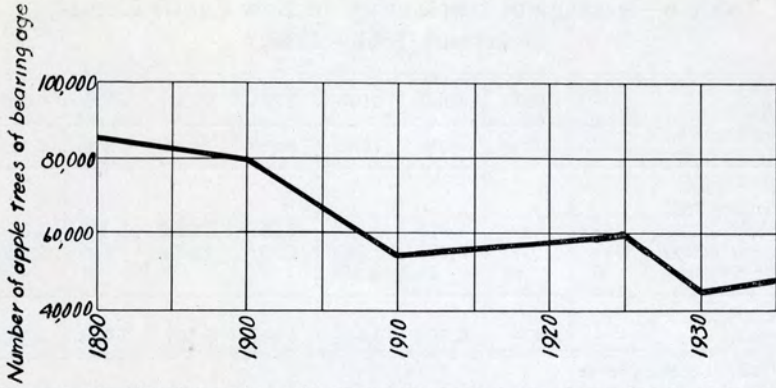


Figure 13—Number of apple trees of bearing age, New Castle County, Delaware, 1890-1935.

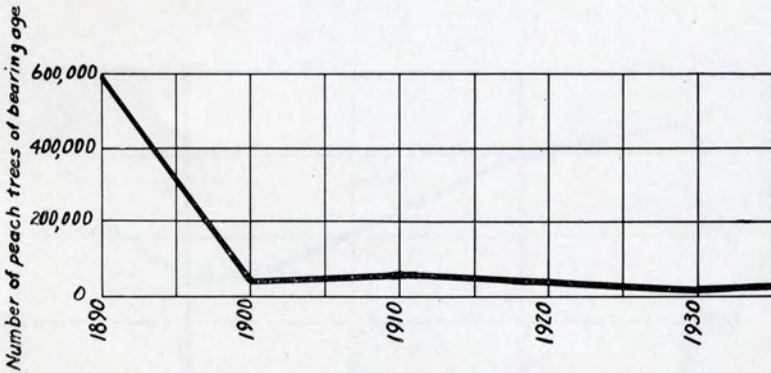
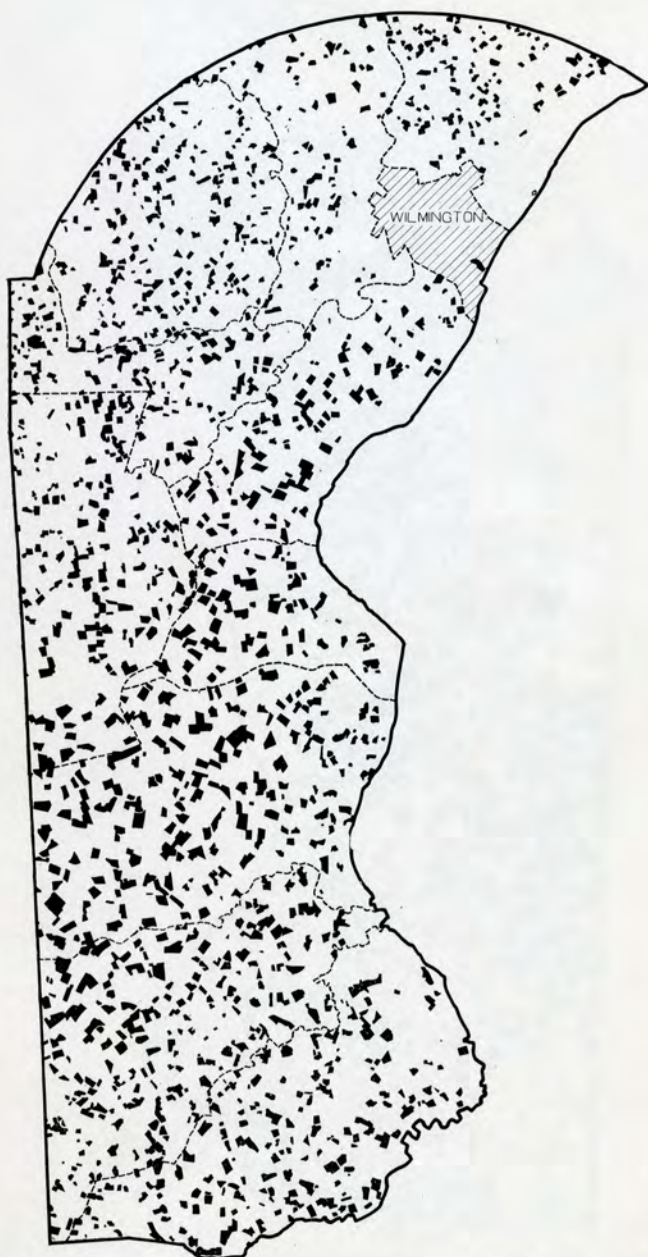


Figure 14—Number of peach trees of bearing age, New Castle County, Delaware, 1890-1935.

## DISTRIBUTION OF IMPORTANT CROPS AND KINDS OF LIVESTOCK IN NEW CASTLE COUNTY

Type of soil, drainage, and topography are the chief factors determining the distribution of crops and kinds of livestock within New Castle County. The distribution of crops and livestock are shown in Figures 15 to 22.



**Figure 15—Distribution of the acreage of corn, New Castle County, Delaware, 1937.**

The acreage of corn is fairly well distributed over the county. However, in the central to the south-central portion of the county the parcels of corn are larger and there is a somewhat greater concentration. This area comprises some of the most productive soil in the county.

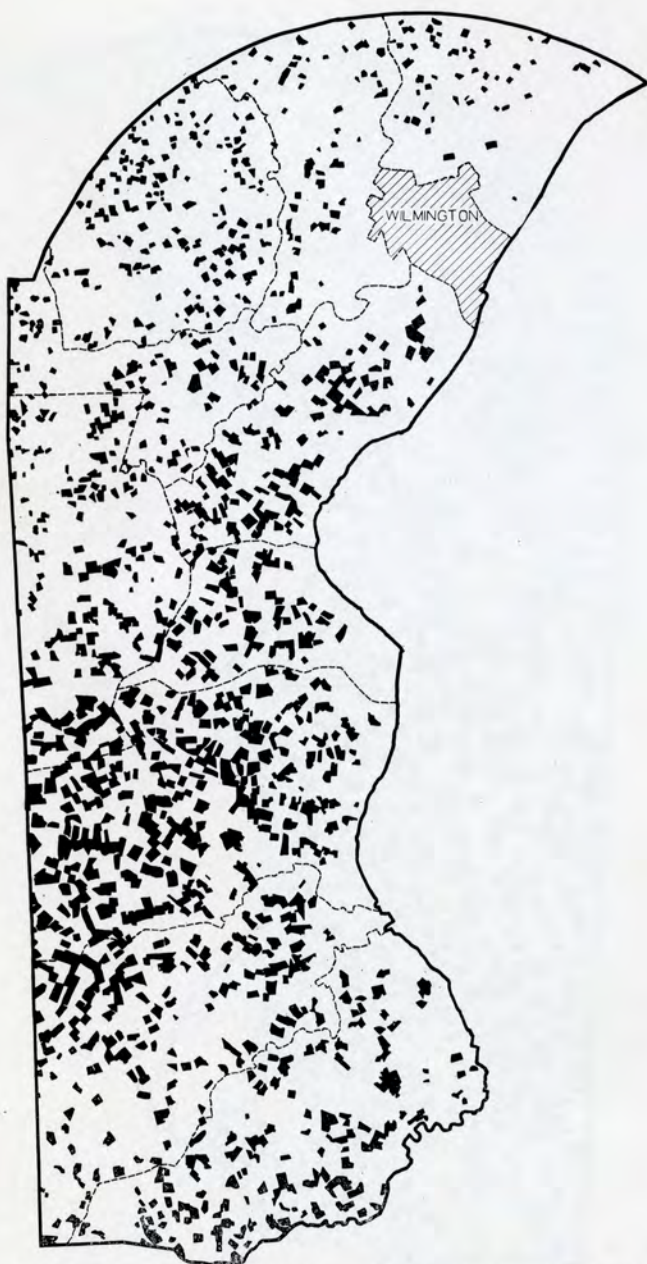
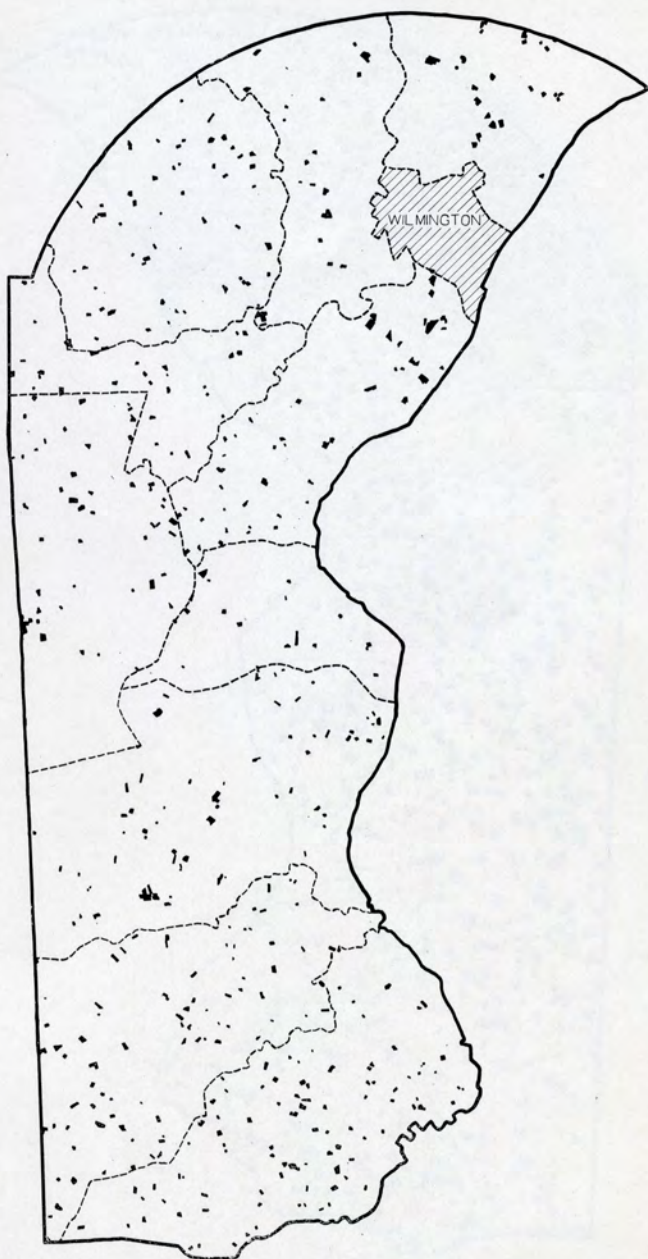


Figure 16—Distribution of the acreage of wheat, New Castle County, Delaware, 1937.

Wheat is grown over the entire county; however, there is a greater concentration in the south-central part of the county. In this area, acreages of wheat, ranging from 75 to 100 acres per farm, are not uncommon.



**Figure 17—Distribution of the acreage of truck and cannery crops, New Castle County, Delaware, 1937.**

There is a sparse acreage of truck and cannery crops distributed over most of the county.

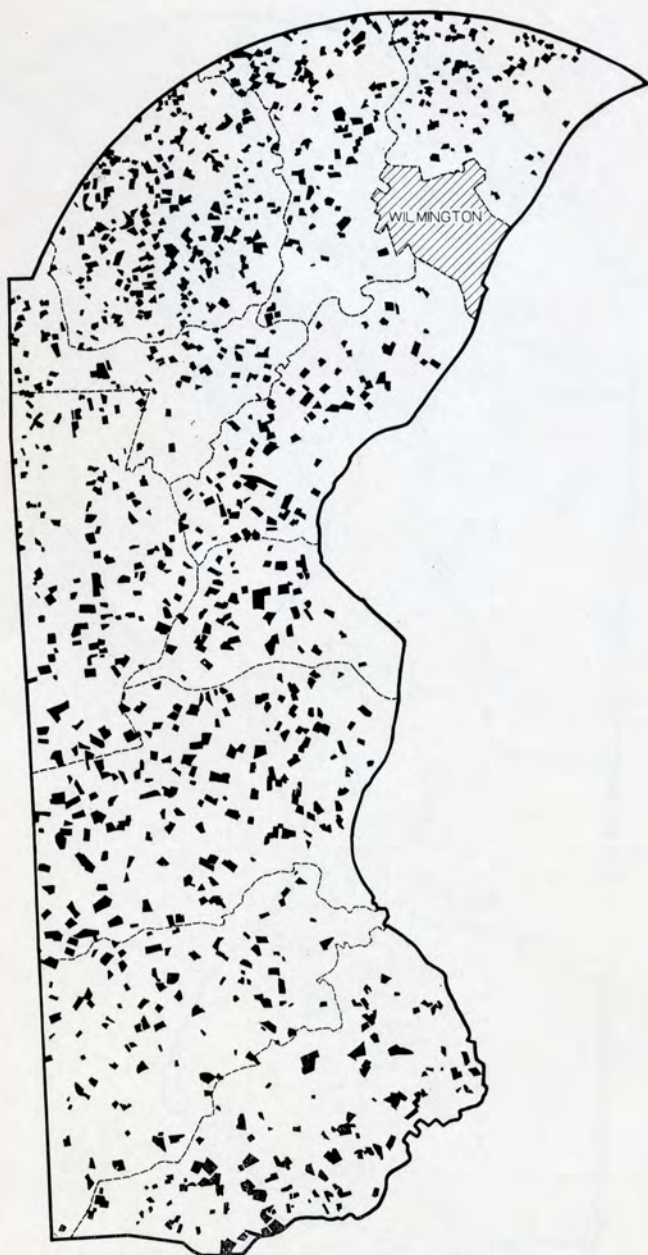
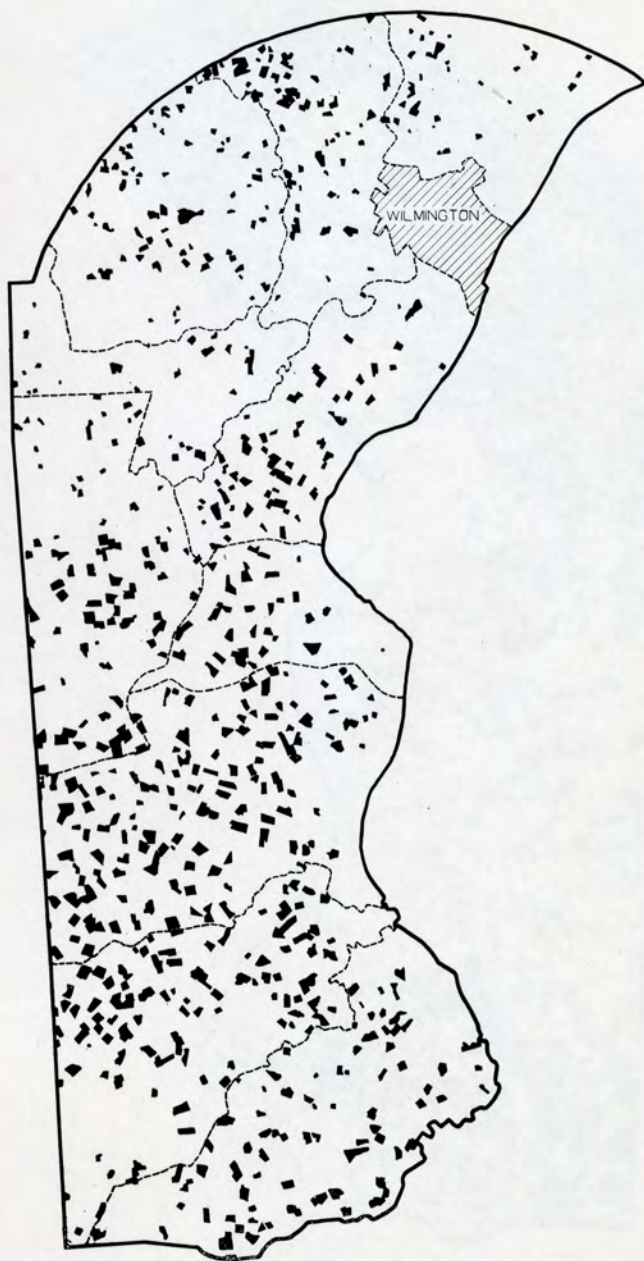


Figure 18—Distribution of the acreage of hay, New Castle County, Delaware, 1937.

Hay is fairly evenly distributed over the county; however, the larger parcels are in the central part of the county.



**Figure 19—Distribution of the acreage of tillable pasture, New Castle County, Delaware, 1937.**

There is a greater concentration of tillable pasture in the central to the south-central portion of the county. In this area tillable pasture is a part of a rather rigid crop rotation.





**Figure 20—Distribution of the acreage of timber, brush, and open unillable land, New Castle County, Delaware, 1937.**

Timber, brush, and open unillable land are found largely in the north to north-western and in the southern portions of the county. In the north to north-western portion, the topography is rolling to hilly. In the south, much of the land is poorly drained.

# REPRESENTATIVE DISTRICTS

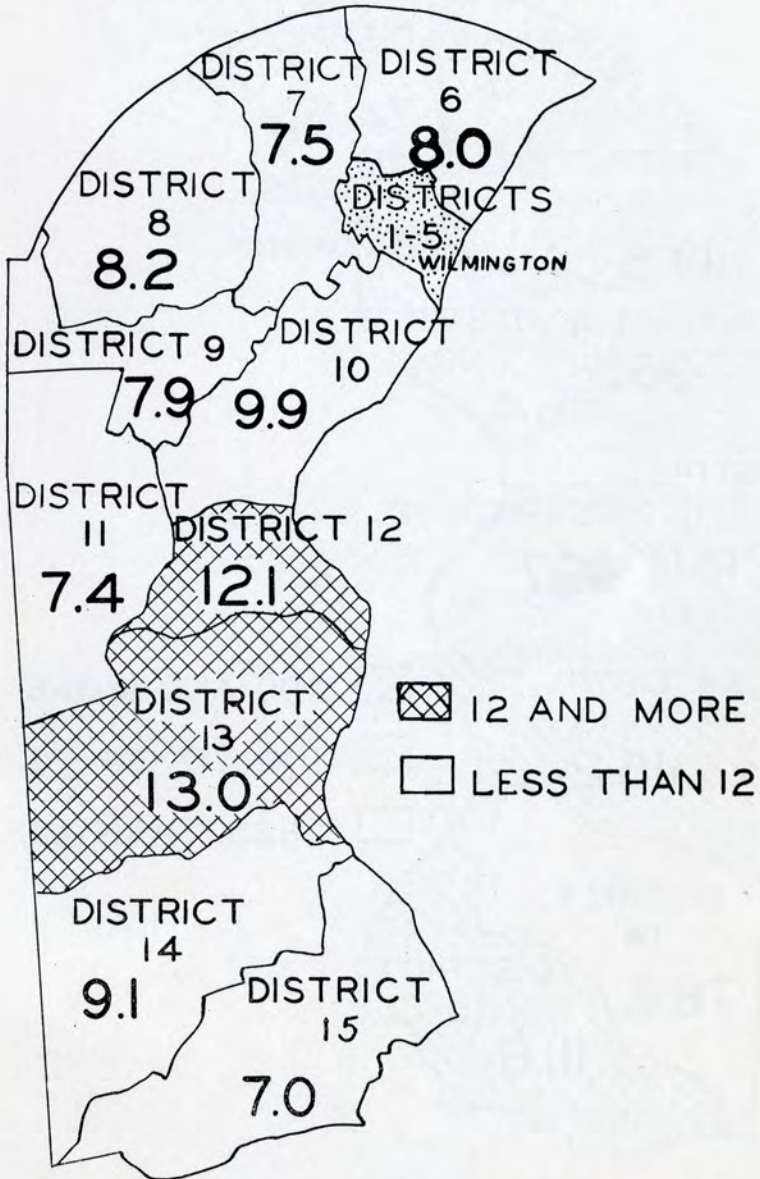


Figure 21—Number of cows per farm, by representative districts, New Castle County, Delaware, 1937.

Dairy cattle are distributed over the entire county; however, there is a greater concentration in the south-central portion of the county. In this area, the farms are large and hay and pasture are a part of a rather rigid crop rotation.

# REPRESENTATIVE DISTRICTS

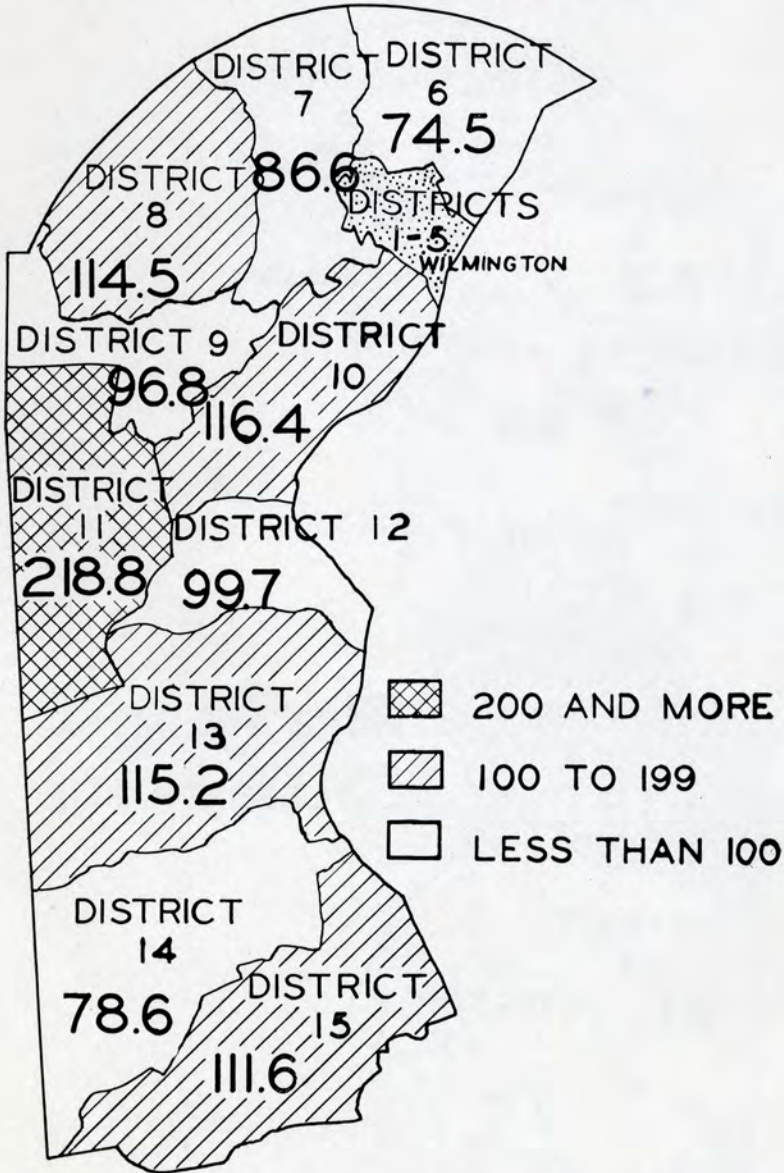


Figure 22—Number of chickens per farm, by representative districts, New Castle County, Delaware, 1937.

By far, the greatest concentration of chickens is in the west-north-central part of the county.

## METHODS USED

### Measures of Land Classes

There is no precise measure of land classes. Four measures of land classes, therefore, have been used in this study, each of which acts as a check on the others. These measures are use of land, type of soil, size and condition of buildings, and crop yields.

**Use of Land.** The use farmers are making of the land is the most important measure of land classes and has formed the chief basis for the land classification in this study. Farmers, over a long period of years, through the process of trial and error and economic gain and loss, have found the use for which the different types of land are best suited. It is true there is usually a lag in land-use adjustment. It is also true that under a different state of economic conditions some of the land classifications in this study would need readjusting. For example, if farm wages were to continue to increase over a reasonably long period of years without an accompanying rise in the general price level, some of the land which has been classified as suitable for cropping purposes would need to be reclassified as submarginal for cropping purposes.

Aerial photographs of New Castle County were obtained through the courtesy of the United States Geological Survey and the Delaware Highway Department. The negatives have been printed on dull, double-weight printing paper in order that they would take the land-use symbols and stand up under the weather conditions in the field. The photographs are of a scale of approximately four inches to one mile. Field men marked on the photographs the symbols which indicate the use of each parcel of land. The use of some parcels of land could be observed from the road while other parcels required considerable walking to get a view of them. In some cases fields had been divided since the photograph was taken. In these cases where no land marks were available, such as a house or a tree, considerable pacing was necessary.

Following the completion of the field work the boundaries and symbols of the different parcels of land were transcribed on topographic maps of the United States Geological Survey. The set of topographic maps of New Castle County was enlarged to the same scale as the photographs. This was done through the courtesy of the Bureau of Agricultural Economics of the United States Department of Agriculture. These enlarged maps were super-imposed on the photographs and the boundaries and symbols of the parcels of land were transcribed through the use of a light table. Each parcel of land, whether it be a field crop, marsh, or timber, was measured with planimeters and the area of the parcels indicated on the map. These are known as the land-use maps.

These land-use maps were then in shape to serve as a guide in the initial laying out of the boundaries of the different land classes. This was done by super-imposing tracing sheets on the land-use maps

and tentatively drawing the land-class boundaries on the tracing sheets. The intensity of use of land was the determining factor in this initial laying out of the boundaries. The most intensive crop land, composed the best class of land while the least intensively used land, namely timber and brush, composed the poorest class of land.

**Soils.** The type of soil is a reasonably good measure of land classes. As topography has an important bearing on the economic productivity of land, topography was considered along with soil types. The soil map of New Castle County made by the Bureau of Soils of the United States Department of Agriculture was made use of in this respect. The United States Bureau of Agricultural Economics made enlargements of the soil map of New Castle County to the same scale as the aerial photographs. This made it possible to super-impose the tracing sheets (which had the tentative land-class boundaries laid out) on the enlarged soil map. The tentative land classes were then checked against the soil types and topography. Where the land classes checked reasonably closely with the soil types of corresponding economic productivity, more confidence was had in the tentative land-class boundaries. Where there was some discrepancy between the land classes and the soil types of corresponding productivity, adjustments were made in the land-class boundaries. The tentative land-class boundaries up to this point, then, were a compromise between these two measures.

**Size and Condition of Buildings.** The size and long-time condition of buildings, disregarding the condition resulting from the depression, in general, is a good measure of the class of land. Normally, the better classes of land support and necessitate buildings of a reasonably large size in a reasonably good condition. There are, of course, cases where buildings in poor condition are found on good land and where good buildings are found on poor land.

Field men classified the farm buildings and rural residences in New Castle County. They traveled together by automobile and checked the judgment of each other in regard to the classification of each set of buildings. No attempt was made to inspect the interior of the buildings. If close to the road, judgment was made without driving into the farmsteads. In other cases, it was necessary to drive into the farmsteads.

The following classifications for farm buildings were used; excellent, good, fair to good, fair to poor, poor, and buildings standing but unusable. For rural residences not farms, the following classifications were used; good (occupied), good (unoccupied), poor (occupied), and poor (unoccupied). For other buildings, including schools, churches, and commercial buildings; used and unused. The field men supplied themselves with a set of New Castle County topographic maps made by the United States Geological Survey. Each set of buildings was located on the map and its class was indicated by a symbol on the map. These condition-of-buildings maps also were enlarged to the same scale as the aerial photographs. The tracing sheets showing the land classes

were then super-imposed on the condition-of-buildings maps. Where the land classes, in a general way, checked reasonably well with buildings of a corresponding size and condition, more evidence was had as to the correctness of the land-class boundaries. Where there was a reasonably large discrepancy between the land classes and the size and condition of buildings suitable adjustments were made in the land-class boundaries.

**Crop Yields.** Crop yields for the previous five-year periods were taken on every fourth farm. Every fourth farm was taken rather than every farm in order to reduce the expense. It is believed that every fourth farm gave a representative sample of the farms in the different land classes. This rule was followed rigidly in order that the farms on which yields were obtained would be representative. In New Castle County, crop yields were obtained on 291 farms. Each of these farms was located and indicated on the map. A crop-yield index was calculated and the figure indicated on the map opposite each farm. The tracing sheets were then super-imposed on the crop-yield map and the land classes were checked against the crop-yield data.

On the same farms for which crop yields were taken, data were obtained relative to size of farms, acreages of different crops grown, kinds and number of livestock kept, and data relating to the personal history of the farmers and their families.

The final land-class boundaries, then, were a compromise between these four measures. As a final check the land-class boundaries were checked in the field. During the growing season, field men traveled over every road in the entire county and checked each parcel of land and satisfied themselves that each parcel was properly classified. The land-class boundaries having now become final, the area of each parcel of land was then tabulated according to use and according to the land class. This tabulation shows the acreage of each crop, timber, brush, and marsh in each land class.

The printing of the map was accomplished by using as a base map the United States Geological Survey Sheets. Towns, streams, railroads, and other features appearing on the United States Geological Survey Sheets also appear on the printed land-classification map. The tracing sheets showing the final land classes were printed over the base map.

### **Definition of Land Classes**

Class I land, as used in this study, is the poorest grade of land. It is made up, largely, of timber, brush, and marsh land. Marsh land is indicated as Im. Most of the farms in this land class have been abandoned for agricultural use; however, many of the buildings are occupied by persons engaged in non-agricultural pursuits. Some of the land is still cultivated but with relatively few exceptions the land is poorly drained or is hilly. Most of the land in this class will probably remain permanently in its present predominate use; namely, forests, wildlife preservation, and public recreation.

Class II land comprises largely open untillable land. There is some crop land in this land class but most of the farms have been abandoned for agricultural use, although many of the buildings are occupied by persons engaged in non-agricultural pursuits. Most of this land is either poorly drained or is hilly. The land use, the soil types, the size and condition of the buildings, and the crop-yield indices, indicate that the land in this class is poorly suited for agricultural purposes.

Class III land comprises largely crop land that is less intensively used than class IV land. The majority of the land in this class probably will remain permanently in agricultural use. Most of it is either level with fair drainage, or is rolling to fairly hilly. The farm buildings generally are of a fair size and in fair condition.

Class IV land is the best grade of crop land. In general, the land in this class is well-drained, is fairly level to moderately rolling, and is more intensively used than is the land in class III. The farm buildings generally are of good size and in reasonably good condition.

Land classes IR, IRm, IIR, IIIR, and IVR are the same as land classes I, Im, II, III, and IV, except that land classes IR, IRm, IIR, IIIR, and IVR, have a considerable number of rural residences, recreational sites, private game preserves, and commercial and industrial plants, and the number of these probably will increase. Most of the land in classes IR, IRm, and IIR probably could not be bought at a reforestation price because of its value for the purposes indicated. It should be clear that it is not stated that a large proportion of these areas is, or may be, used for the purposes indicated. It is stated that these uses are much in evidence in these areas and in addition to rural problems of an economic and social nature, these areas have now and probably will continue to have, on an increasing scale, urban problems of an economic and social nature. It is not possible to indicate these areas precisely; however, it is thought that Representative Districts 6 to 10, inclusive, conform reasonably close with the definition. It will be noted that Districts 1 to 5, inclusive, comprise the corporate area of the City of Wilmington.

It is impractical to endeavor to classify land in great detail. There are, therefore, some of the poorer grades of land in class IV but the areas are too small to make separate classifications practical. Likewise, class III comprises some land which is of a class IV character, but the areas are too small to deal with in practical land classification. Furthermore, the location of land influences its economic use. For example, a parcel of land which is not suited for cropping purposes



**Figure 23—A falling farm house in land class IR.**



**Figure 24—A fallen barn in land class IR.**

Figures 23 and 24 constitute the buildings of one farmstead. Class I land is mostly timber, brush, and marsh land. Many of the buildings in class I land are gone or falling and most of them have been abandoned for agricultural use.





**Figure 25—Falling buildings in class II land.**

Class II land is made up largely of abandoned land, although some of the land is still being farmed. Some of the buildings are falling and many have been abandoned for agricultural use.



**Figure 26—An occupied farmstead in class II land.**

Some of the buildings in land class II are still occupied for agricultural use but most of them are small and in poor condition.



**Figure 27—A farmstead in class III land.**

Class III land is mostly crop land but is less intensively used than class IV land. Normally, the buildings in class III land are smaller and less well kept than in class IV land.



**Figure 28—A farmstead in class IV land.**

Class IV land is the best grade of crop land. Normally, the buildings are of a good size and are in reasonably good condition.

but does produce fairly good pasture, if located adjacent to class II land, would be classified as II land. However, if the same parcel of land were located adjacent to class IV land it may be classified as IV land. A parcel of land in itself may be sub-marginal for agricultural purposes but when managed in connection with a good farm it may become supra-marginal for agricultural purposes. Untillable pasture land may be a distinct asset to a "going" farm. The same principle is true in regard to the location of land in relation to shipping points and markets.

Land classification does not pretend to show the precise economic status of each individual parcel of land, or even each individual farm, but it does show the economic status of the area in which a parcel of land or a farm may be located. Furthermore, it is seldom that there is a distinct boundary between land classes. Usually, the land classes grade into one another and the transition area commonly approaches the average of the two adjacent land classes.

## EXTENT OF LAND CLASSES IN NEW CASTLE COUNTY

Table 8 shows the extent of the different land classes by representative districts. Table 9 shows the percentage of the land classes in the different representative districts. These land classes are shown in the land-classification map in the folder in the back of this publication.

Land classes I, Im, IR, and IRm, comprised 26.8 per cent of the land area of the county; classes II and IIR, 7.3 per cent of the land area; classes III and IIIR, 30.9 per cent; classes IV and IVR, 29.2 per cent; and the residential and industrial areas constituted 5.8 per cent.

Although a larger proportion of the land in the northern districts is classified as IIIR land than as IVR land, this does not indicate that the farmers in class IIIR land are not relatively prosperous. According to the definition, land classes III and IIIR are somewhat less intensively used than are land classes IV and IVR and that they are suited for permanent agricultural use. The districts in the northern part of the county afford an opportunity for income that does not exist to the same degree in the southern part of the county. Due largely to the close proximity to the Wilmington retail market, more than

one-third of the gross income of farmers in land classes IIR and IVR is derived from the sale of poultry products, garden products, flowers, cooked foods, and mushrooms. These enterprises have relatively little relationship to land use but they offer opportunity for increased farm incomes in these land classes.

**Table 8—Land area by land classes and by representative districts, New Castle County, Delaware, 1937.**

Representative districts	Land classes								Residential and industrial	District (total)
	IR & IRm	I & Im	IIR	II	IIIR	III	IVR	IV		
	acres	acres	acres	acres	acres	acres	acres	acres		
1 - 5.....	1,483		403		62		—		4,514	6,462
6.....	6,485		1,748		7,472		—	4,381	20,086	
7.....	4,564		2,321		10,442		151	3,486	20,964	
8.....	4,172		5,190		15,912		1,887	543	27,704	
9.....	4,624		1,402		7,846		722	801	15,395	
10.....	5,353		2,341		6,842		8,451	1,133	24,120	
11.....		7,472		3,148		9,479		8,998	80	29,177
12.....		3,307		1,082		3,349		6,436	231	14,405
13.....		7,959		377		4,052		30,219	415	43,022
14.....		12,792		844		6,992		15,240	125	35,993
15.....		15,260		1,241		12,339		7,910	36	36,786
County.....	26,681	46,790	13,405	6,692	48,576	36,211	11,211	68,803		
County (total)....	73,471		20,097		84,787		80,014		15,745	274,114

**Table 9—Percentage of land area by land classes and by representative districts, New Castle County, Delaware, 1937.**

Representative districts	Land classes								Residential and industrial	District (total)
	IR & IRm	I & Im	IIR	II	IIIR	III	IVR	IV		
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent		
1 - 5.....	22.9		6.2		1.0		—		69.9	100.0
6.....	32.3		8.7		37.2		—		21.8	100.0
7.....	21.8		11.1		49.8		.7		16.6	100.0
8.....	15.1		18.7		57.4		6.8		2.0	100.0
9.....	30.0		9.1		51.0		4.7		5.2	100.0
10.....	22.2		9.7		28.4		35.0		4.7	100.0
11.....		25.6		10.8		32.5		30.8	.3	100.0
12.....		23.0		7.5		23.2		44.7	1.6	100.0
13.....		18.5		.9		9.4		70.2	1.0	100.0
14.....		35.5		2.3		19.4		42.4	.4	100.0
15.....		41.5		3.4		33.5		21.5	.1	100.0
County.....	9.7	17.1	4.9	2.4	17.7	13.2	4.1	25.1		
County (total)....	26.8		7.3		30.9		29.2		5.8	100.0

Approximately three-fifths of the land of New Castle County appears to be suited for agricultural use, while about one-third probably could be more profitably utilized for reforestation, wildlife preserves, and public recreation. This appears to be especially true in

view of the fact that much of the poorer classes of land lies adjacent to the City of Wilmington and relatively close to other large metropolitan areas. Tables 8 and 9 and the land-classification map indicate the location of land classes IR, IRm, IIR, IIIR, and IVR. These areas now have a considerable number of rural residences, recreational sites, private game preserves, and commercial and industrial plants, and it appears probable that the number of these will increase. These areas have now and probably will continue to have on an increasing scale, urban problems of an economic and social nature in addition to the rural problems. It is also probable that these urban problems will continue to influence the rural problems. Among these may be mentioned land values, taxation, improvement of roads, providing electric power and telephone facilities, and a scarcity of farm labor and increasing farm wage rates due to the competition of urban enterprises for labor.

## USE OF LAND

It has been indicated previously that the degree of intensity in the use of land is an important measure of land classes.

### Use of Land in the Different Land Classes

The amount of land in land classes I, Im, IR, and IRm which was devoted to grain crops was negligible, but the amount of grain crops ranged up to 54.9 per cent of the land in land classes IV and IVR. The amount of hay crops in classes I, Im, IR, and IRm was negligible, while in land classes IV and IVR, 15.3 per cent of the land was in hay crops. However, in the poorest land class, 90.6 per cent of the land was in timber, marsh, and wasteland, while in land classes IV and IVR, only 3.8 per cent of the land was devoted to these uses, Tables 10 and 11. As indicated by the larger proportion of the land devoted to cultivated crops, land classes IV and IVR appear to be suited for a more intensive type of land use than land classes III and IIIR.

Even though land classes I, Im, IR, and IRm, and II and IIR were devoted largely to timber, marsh, and wasteland, many valuable uses may be made of this land. Portions of these poorer land classes are now being utilized reasonably well in the production of timber and as wildlife preserves. To fully utilize other portions of these land classes, the purchase of them by the state or federal government may prove to be desirable. It appears evident that the full utilization of these areas would involve many problems in reforestation, forest management, wildlife management, and probably in providing public recreational facilities. It will be pointed out later that many complex social problems apparently must be dealt with along with these economic problems.

**Table 10—Acres of land used for the different purposes by land classes, New Castle County, Delaware, 1937.**

Use of land	Land classes				Residential and industrial	County
	I, Im, IR, & IRm	II & IIR	III & IIIR	IV & IVR		
	acres	acres	acres	acres		
Corn - grain, sweet corn, and silage.....	269	570	14,617	17,063	—	32,519
Wheat.....	102	134	13,589	26,666	—	40,491
Other grains.....	3	31	1,796	231	—	2,061
Total grain crops.....	374	735	30,002	43,960	—	75,071
Clover and timothy hay.....	65	179	5,467	6,776	—	12,487
Clover hay.....	7	12	766	1,357	—	2,142
Alfalfa hay.....	3	19	1,301	631	—	1,954
Soybean or cowpea hay <sup>1</sup> .....	46	34	2,388	1,686	—	4,154
Other non-legume hay.....	55	160	3,713	1,770	—	5,698
Total hay crops.....	176	404	13,635	12,220	—	26,435
Total truck crops <sup>2</sup> .....	146	243	2,650	901	—	3,940
Total cannery crops <sup>3</sup> .....	27	11	653	482	—	1,173
Total fruit crops <sup>4</sup> .....	14	19	1,023	368	—	1,424
Tillable land lying out.....	753	1,896	9,672	1,318	—	13,639
Tillable pasture.....	99	257	8,797	12,307	—	21,460
Open, untillable pasture.....	2,665	3,554	3,761	1,035	—	11,015
Brush pasture.....	1,289	134	244	217	—	1,884
Total pasture.....	4,053	3,945	12,802	13,559	—	34,359
Timber.....	33,155	2,519	2,233	2,066	—	39,973
Brush not pastured.....	5,542	1,016	939	475	—	7,972
Marsh land.....	25,179	208	262	197	—	25,846
Other wasteland.....	—	2,534	—	24	—	2,558
Open, untillable idle land.....	2,643	5,023	1,395	249	—	9,310
Total timber, marsh, and wasteland.....	66,519	11,300	4,829	3,011	—	85,659
Farmsteads.....	103	204	2,763	1,720	—	4,790
Other houses.....	526	368	1,907	401	—	3,202
Roads.....	353	292	2,176	1,477	—	4,298
Railroads.....	197	124	448	198	—	967
Miscellaneous <sup>5</sup> .....	230	556	2,227	399	—	3,412
Total development.....	1,409	1,544	9,521	4,195	—	16,669
Residential and industrial.....	—	—	—	—	15,745	15,745
Total land area.....	73,471	20,097	84,787	80,014	15,745	274,114
Internal water area <sup>6</sup> .....	3,745	3	26	43	0	3,817
Total land and water area.....	77,216	20,100	84,813	80,057	15,745	277,931
Per cent of land area in each land class.....	26.8	7.3	30.9	29.2	5.8	100.0

<sup>1</sup> Some probably was harvested for seed.

<sup>2</sup> Includes white potatoes, asparagus, and miscellaneous truck crops.

<sup>3</sup> Mostly tomatoes.

<sup>4</sup> Mostly apples and peaches.

<sup>5</sup> Includes land used for recreation, cemeteries, schools, and churches.

<sup>6</sup> Internal water areas classified according to the land class they border.

**Table 11—Percentage of land used for the different purposes by land classes, New Castle County, Delaware, 1937.**

Use of land	Land classes				Residential & industrial	County
	I, Im, IR, & IRm	II & IIR	III & IIIR	IV & IVR		
	per cent	per cent	per cent	per cent	per cent	per cent
Corn - grain, sweet corn, and silage.....	.4	2.8	17.3	21.3	---	11.9
Wheat.....	.1	.7	16.0	33.3	---	14.7
Other grains.....	*	.2	2.1	.3	---	.8
Total grain crops.....	.5	3.7	35.4	54.9	---	27.4
Clover and timothy hay.....	.1	.9	6.5	8.5	---	4.6
Clover hay.....	*	*	.9	1.7	---	.8
Alfalfa hay.....	*	.1	1.5	.8	---	.7
Soybean or cowpea hay <sup>1</sup> .....	.1	.2	2.8	2.1	---	1.5
Other non-legume hay.....	.1	.8	4.4	2.2	---	2.1
Total hay crops.....	.3	2.0	16.1	15.3	---	9.7
Total truck crops <sup>2</sup> .....	.2	1.2	3.1	1.1	---	1.4
Total cannery crops <sup>3</sup> .....	*	.1	.8	.6	---	.4
Total fruit crops <sup>4</sup> .....	*	.1	1.2	.5	---	.5
Tillable land lying out.....	1.0	9.4	11.4	1.6	---	5.0
Tillable pasture.....	.1	1.3	10.4	15.4	---	7.8
Open, untillable pasture.....	3.6	17.6	4.4	1.3	---	4.0
Brush pasture.....	1.8	.7	.3	.2	---	.7
Total pasture.....	5.5	19.6	15.1	16.9	---	12.5
Timber.....	45.1	12.5	2.7	2.6	---	14.6
Brush not pastured.....	7.6	5.1	1.1	.6	---	2.9
Marsh land.....	34.3	1.0	.3	.2	---	9.4
Other wasteland.....	—	12.6	—	.1	---	.9
Open, untillable idle land.....	3.6	25.0	1.6	.3	---	3.4
Total timber, marsh, and wasteland.....	90.6	56.2	5.7	3.8	---	31.2
Farmsteads.....	.1	1.0	3.3	2.2	---	1.7
Other houses.....	.7	1.8	2.2	.5	---	1.2
Roads.....	.5	1.5	2.6	1.9	---	1.6
Railroads.....	.3	.6	.5	.2	---	.4
Miscellaneous <sup>5</sup> .....	.3	2.8	2.6	.5	---	1.2
Total development.....	1.9	7.7	11.2	5.3	---	6.1
Residential and industrial.....	—	—	—	—	100.0	5.8
Total land area.....	100.0	100.0	100.0	100.0	100.0	100.0

\* Less than .05 per cent.

1 - 5. See footnotes 1 to 5 to Table 10.

### Farm Tenancy and the Use of Land

In land classes I and IR, II and IIR, III and IIIR, and IV and IVR, the percentage of the farms that were operated by tenants was 15.4, 22.2, 36.7, and 60.7, respectively, Table 12. Apparently, this situation is due, largely, to the relative amounts of capital required

to own farms in the different land classes. It will be shown later that it required approximately twice as much capital to own a farm in land classes IV and IVR as it did in the classes of poorer land.

**Table 12—Percentage of owner-operators and tenants by land classes, New Castle County, Delaware, 1937.\***

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
	per cent	per cent	per cent	per cent	per cent
Owner-operators . . . . .	84.6	77.8	63.3	39.3	54.6
Tenants . . . . .	15.4	22.2	36.7	60.7	45.4
Total . . . . .	100.0	100.0	100.0	100.0	100.0

\* According to the United States Census, 1935, New Castle County had 56.6 per cent owner-operators, 2.6 per cent owners-additional, 40.8 per cent tenant farmers. Owners-additional are farmers who operate rented land in addition to the land they own.

## SOILS

One square inch on the land-classification map represents approximately 640 acres of land. It is apparent, therefore, as has previously been indicated, that land classification deals with the larger areas and no attempt was made to classify separately small, isolated parcels of land. It also has been indicated that the location of a parcel of land in relation to other classes of land and in relation to markets, influences its economic value and, therefore, the land class into which it may be placed. Some land of the poorer soil types, therefore, may be placed in the better land classes and some land of the better soil types may be placed in the poorer land classes.

### Distribution of Soil Types in the Different Land Classes

The Sassafras soil series constituted approximately one-half of the soils in New Castle County. The Sassafras soils constituted 27.3 per cent of the land in the poorest land class and it ranged up to 84.9 per cent of the land in classes IV and IVR. The Chester soils were found largely in land classes IIR and IIIR. The Chester soils included land of the more hilly topography in class IIR and of the fairly hilly to the more rolling topography in class IIIR. Many small areas of the Chester soils were of sufficiently high productivity to warrant their classification in land class IVR; however, the areas usually were too small to justify separate land classes. However, where the topography was only moderately rolling and sufficiently large areas lay in one block, the Chester soils were classified as IVR land. The Elkton soils were largely in the poorer land classes with a relatively small percentage in the better land classes, Table 13.



**Table 13—Percentage distribution of the general soil types by land classes, New Castle County, Delaware, 1937.**

General soil types	Land classes				County <sup>6</sup>
	I, Im, IR, and IRm	II & IIR	III & IIIR	IV & IVR	
	per cent	per cent	per cent	per cent	per cent
Sassafras series <sup>1</sup> .....	27.3	32.8	47.5	84.9	52.4
Chester series <sup>2</sup> .....	11.7	36.0	27.3	1.2	15.4
Elkton series <sup>3</sup> .....	20.2	14.6	10.1	8.8	12.9
Leonardtown series <sup>4</sup> .....	5.0	8.9	12.5	3.0	7.1
Cecil series <sup>5</sup> .....	1.0	.8	.5	0	.5
Marsh.....	34.8	6.9	2.1	2.1	11.7
Total.....	100.0	100.0	100.0	100.0	100.0
Acres of land in each land class <sup>7</sup> .....	73,469	20,131	84,960	81,792	260,352 <sup>10</sup>
Per cent error.....	— .003 <sup>9</sup>	+ .2 <sup>9</sup>	+ .2 <sup>9</sup>	+ 2.2 <sup>9</sup>	+ .8 <sup>8</sup>

<sup>1</sup> Includes Sassafras Loamy Sand, Sassafras Loam, Sassafras Gravelly Loam, Sassafras Sandy Loam, Sassafras Silt Loam, and Sassafras Silt Loam (Shallow Phase).

<sup>2</sup> Chester Loam and Chester Silt Loam.

<sup>3</sup> Elkton Loam, Elkton Sandy Loam, and Elkton Silt Loam.

<sup>4</sup> Leonardtown Silt Loam. The name of this soil type has more recently been changed to Woodstown Silt Loam.

<sup>5</sup> Cecil Clay Loam.

<sup>6</sup> Land occupied by industrial and residential areas not included.

<sup>7</sup> The areas of Codorus Silt Loam were too small to measure separately with the method herein used.

<sup>8</sup> Calculated by using as the base, planimeter measurements made of the county by the Division of Land Economics of the U. S. Bureau of Agricultural Economics.

<sup>9</sup> Calculated by using as the base, planimeter measurements made of the land classes by the Department of Agricultural Economics, Delaware Agricultural Experiment Station.

<sup>10</sup> The 15,745 acres of land used for residential and industrial purposes are not included.

The importance of considering topography along with soil types appears evident. According to the soil map of New Castle County<sup>3</sup>, the soils on the steep slopes are of the Chester soils, the same as on the moderately rolling land in this area. Largely because of the differences in topography, there is little comparison in the economic productivity of the different areas of land within the Chester soils. The topography in some areas is so rough that the land is untillable. In other areas, although more of the land is tillable, the topography is such that the control of erosion is a problem, the fields are relatively small, and machinery, man labor, and horse labor are used at a relative disadvantage. In the limited number of areas in the Chester soils where the topography is moderately rolling, these same problems become of less importance.

It is not maintained that the economic productivity of the land in class IIIR in the northern part of the county is identical with that of class III land in the southern part of the county. There necessarily has to be some latitude within a land class. If a comparison were to be made between land class IIIR and land class III, it would become a

<sup>3</sup> Soil Survey of New Castle County, Delaware, Bureau of Soils, U. S. Department of Agriculture, 1917.

matter of balancing the many factors that are pertinent with the Chester soils as against the factors which are relevant with the Sassafras soils, supplemented with the Leonardtown and Elkton soils. The Chester soils in land class IIIR have a relatively high physical productivity and are somewhat lighter in character; however, the fields are smaller, erosion is a problem, the topography is fairly hilly to markedly rolling with the previously indicated economic disadvantages which accompany this type of topography. The soils in the southern part of the county in class III land have a lower physical productivity and are somewhat heavier in character; however, the fields are larger, erosion is relatively unimportant, and the topography is reasonably level with the economic advantages which accompany this type of topography. It should be noted that almost one-half of the land in classes III and IIIR is of the Sassafras soils and only about one-tenth of the land is of the Elkton soils. Most of the Elkton soils in this land class is parcels that are too small to classify separately in a lower land class or have a location value so that they may be utilized to an advantage in such use as pasture in connection with a good farm. About one-twelfth of the land in classes IV and IVR is of the Elkton soils for the same reasons just indicated. Table 14 shows the percentage of the land in the different representative districts made up of the various general soil types.

**Table 14—Percentage distribution of the general soil types by representative districts, New Castle County, Delaware, 1937.**

General soil types	Representative districts <sup>9</sup>										County <sup>6</sup>
	6	7	8	9	10	11	12	13	14	15	
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	
Sassafras series <sup>1</sup> . . . .	67.1	22.3	11.2	35.6	69.5	58.4	68.0	71.2	71.1	37.0	52.4
Chester series <sup>2</sup> . . . .	14.2	66.1	82.7	22.0	0	3.3	0	0	0	0	15.4
Elkton series <sup>3</sup> . . . .	9.9	4.1	.3	15.5	1.9	32.4	4.5	7.6	16.2	24.9	12.9
Leonardtown series <sup>4</sup> . . . .	6.9	2.1	5.8	19.8	11.9	1.2	3.3	7.2	.7	14.4	7.1
Cecil series <sup>5</sup> . . . .	0	0	0	1.5	0	3.6	0	0	0	0	.5
Marsh . . . . .	1.9	5.4	0	5.6	16.7	1.1	24.2	14.0	12.0	23.7	11.7
Total . . . . .	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Acres of land in each district <sup>7</sup> . . . . .	14,784	17,174	26,659	15,101	22,637	29,174	14,189	44,074	37,181	37,546	260,352
Per cent error <sup>8</sup> . . . . .	-5.9	-1.7	-1.8	+3.5	-1.5	+ .3	+ .1	+3.4	+3.7	+2.2	+ .8

<sup>1-7</sup> See footnotes 1 to 7 to Table 13.

<sup>8</sup> Calculated by using as the base, planimeter measurements made of the districts by the Division of Land Economics of the U. S. Bureau of Agricultural Economics.

<sup>9</sup> Representative districts 1 - 5 constitute the corporate area of the City of Wilmington.

### Soil Types and Crop Yields

Table 15 shows that the physical productivity of the different general soil types, as indicated by the crop-yield indices, was as

follows: Chester series 119, Sassafras series 100, Leonardtown series 93, and the Elkton series 82. The relatively high crop-yield index of the Chester series probably was due, in part, to the larger amount of livestock and probably the larger amount of farmyard manure in proportion to the acreage of cultivated crops in this area. In Districts 7 and 8 (largely Chester series) there was an average of 4.0 acres of cultivated crops per cow, while in Districts 12, 13, and 14 (largely Sassafras series) there was an average of 7.9 acres of cultivated crops per cow. However, crop yields are only one of many factors which influence land classification.

**Table 15—Crop-yield indices<sup>1</sup> on 291 farms by general soil types, New Castle County, Delaware, 1937.**

Soil types	Number of fields	Crop index
Chester series.....	200	119
Sassafras series.....	817	100
Leonardtown series.....	123	93
Elkton series.....	47	82
Total or average.....	1,187	100

<sup>1</sup> Unweighted. Includes corn, wheat, and hay.

## SIZE AND CONDITION OF BUILDINGS

Size and condition of buildings, in general, is a valuable measure of productivity of soil and of land classes. Productive soils usually require larger buildings for storing crops and sheltering livestock. Likewise, productive soils usually necessitate and support an improved condition of buildings. Obviously, other factors, such as the human factor and the investment of capital derived from sources off the farms, may have an influence on the size and condition of buildings. These at times make exceptions to the rule; however, in general, this situation prevails.

### Size of Business on Farms with the Different Classes of Buildings

Table 16 indicates that the farms with the better classes of buildings were larger in size, had a larger amount of capital invested, had more productive man-work units, and had more animal units than did the farms with the poorer classes of buildings.

### Classification of Farm Buildings and Rural Residences in the Different Land Classes

Of the total number of buildings in the different land classes, the percentage of occupied farmsteads increased from the poorer land

**Table 16—Size of business per farm on farms with the different classes of buildings, New Castle County, Delaware, 1937.**

Classes of buildings	Number of farms	Total acres per farm	Total capital per farm <sup>1</sup>	P.M.W.U. per farm <sup>2</sup>	Animal units per farm <sup>3</sup>
	number	acres	dollars	number	number
Excellent.....	18	192.8	19,350	665.4	33.7
Good.....	103	139.5	13,325	506.2	25.4
Fair to good.....	96	161.7	11,336	464.3	21.2
Fair to poor.....	61	156.2	8,686	380.7	16.6
Poor.....	6	77.0	5,725	218.9	9.3

<sup>1</sup> Real estate and machinery.

<sup>2</sup> A productive man-work unit is the average amount of productive work accomplished by a man in one day. For example, producing and harvesting one acre of corn for grain comprises 6 productive man-work units, an acre of white potatoes 8, and one acre of tomatoes for the cannery 12. Caring for one cow for a year comprises 15 productive man-work units and caring for 100 hens for a year, involves 20 productive man-work units.

<sup>3</sup> An animal unit represents an average mature horse, or cow, or the equivalent in other livestock, based on the amount of feed eaten and manure produced.

classes to the better land classes, Tables 17 and 18. The number of vacant farmsteads was small in all land classes and there was no significant difference in the percentage of vacant farmsteads in the

**Table 17—Number of farmsteads, rural residences, and other buildings, occupied or vacant, by land classes, New Castle County, Delaware, 1937.<sup>1</sup>**

Classes of buildings	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
	number	number	number	number	number
Farmsteads					
Occupied.....	62	83	781	488	1,414
Vacant.....	2	2	4	1	9
Rural residences					
Occupied					
Good.....	224	170	854	199	1,447
Poor.....	74	33	78	46	231
Unoccupied					
Good.....	5	1	4	1	11
Poor.....	12	5	18	16	51
Other buildings <sup>2</sup>					
Occupied.....	48	29	139	60	276
Vacant.....	3	3	8	4	18
Buildings standing but unusable.....	85	61	130	95	371
Total.....	515	387	2,016	910	3,828

<sup>1</sup> In addition there were 168 unclassified buildings, such as tenant houses, which were located apart from the farmsteads but were used in conjunction with the farmsteads.

<sup>2</sup> Includes school houses, churches, and commercial establishments.  
No count was made of hamlets and towns having 20 or more houses.

**Table 18—Percentage of farmsteads, rural residences, and other buildings, occupied or vacant, by land classes, New Castle County, Delaware, 1937.<sup>1</sup>**

Classes of buildings	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
	per cent	per cent	per cent	per cent	
Farmsteads					
Occupied.....	12.0	21.4	38.8	53.6	36.9
Vacant.....	.4	.5	.2	.1	.2
Rural residences					
Occupied					
Good.....	43.5	43.9	42.4	21.9	37.8
Poor.....	14.4	8.5	3.9	5.0	6.0
Unoccupied					
Good.....	1.0	.3	.2	.1	.3
Poor.....	2.3	1.3	.9	1.8	1.4
Other buildings <sup>2</sup>					
Occupied.....	9.4	7.4	6.8	6.6	7.2
Vacant.....	.6	.9	.4	.4	.5
Buildings standing but unusable.....	16.4	15.8	6.4	10.5	9.7
Total.....	100.0	100.0	100.0	100.0	100.0
Number of farmsteads and other buildings...	515	387	2,016	910	3,828

<sup>1</sup> See footnote 1 to Table 17.

<sup>2</sup> See footnote 2 to Table 17.

No count was made of hamlets and towns having 20 or more houses.

different land classes. However, many of the farmsteads in the lower land classes had been abandoned for agricultural purposes but most of them were occupied by persons engaged in non-agricultural pursuits. The percentage of buildings standing, but unusable, was appreciably greater in the poorer land classes. The percentage of occupied rural residences was smaller in land classes IV and IVR than in the poorer land classes, apparently due to many industrial workers building residences on the poorer land where sites could be bought at nominal prices. It was also probably due to much of the poorer land classes being located nearer industrial and commercial centers.

Of greater significance than the data presented in Tables 17 and 18, is the classification of occupied farmsteads according to the different land classes. Table 19 indicates that the percentage of the farmsteads classed as "good" and "excellent," was greater in the better land classes, whereas the percentage of farmsteads classified as "poor" and "fair to poor" was appreciably greater in the poorer land classes. Mention should be made of the fact that due to the peculiar conditions in New Castle County, the buildings in the different land classes in the northern part of the county graded higher than in the respective land classes in the southern part. This was probably

due to the larger proportion of owner-operator farms, the investment of more capital derived from sources other than from farm operations, higher land values, and possibly the larger proportion of hard-surface roads in the northern part of the county than in the southern part.

**Table 19—Percentage classification of occupied farmsteads by land classes, New Castle County, Delaware, 1937.**

Classes of buildings	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
	per cent	per cent	per cent	per cent	per cent
Excellent.....	1.6	6.0	10.2	13.1	10.6
Good.....	16.1	24.1	30.5	37.3	31.8
Fair to good.....	22.6	21.7	27.7	32.4	28.7
Fair to poor.....	32.3	27.7	22.3	14.1	20.3
Poor.....	27.4	20.5	9.3	3.1	8.6
Total.....	100.0	100.0	100.0	100.0	100.0
Number of farmsteads..	62	83	781	488	1,414

**CROP YIELDS**

Crop yields are of value as a measure of land classes; however, as is true with most measures of land classes, it is subject to limitations. On most farms in the poorer land classes, only the better fields are cultivated. The poorer fields usually are in pasture or may be idle. The crop yields in these cases represent the yields only on the better parcels of land, and no index of the productivity of the poorer parcels of land is obtained. It is also usual on these farms to grow a relatively small acreage of cultivated crops and to put all the manure on these limited areas. Under these circumstances, the crop yields are larger than if the usual proportion of the farms had been in cultivated crops. The crops grown and the proportion of the land in cultivated crops (intensity of land use) apparently is a more reliable measure of the economic productivity of land than is crop yields.

**Crop Yields in the Different Land Classes**

Table 20 indicates a reasonably close relationship between crop yields and land classes. However, the relatively small increase in crop yields in land classes IV and IVR over that of land classes III and IIIR warrants comment. Apparently this is due to a large proportion of the land in classes III and IIIR being in the Chester soil series in the northern part of the county. The relatively high crop yields in the Chester soil series has been discussed previously.

**Table 20—Yields per acre of major crops and crop-yield indices by land classes, New Castle County, Delaware, for the five-year period, 1933 - 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
Kinds of crops					
Wheat, bu . . . . .	16.1	17.9	20.8	21.2	20.8
Corn, bu . . . . .	32.2	35.4	43.8	44.5	43.4
Hay, ton <sup>1</sup> . . . . .	9	1.0	1.2	1.3	1.2
Crop-yield index <sup>2</sup> . . . . .	75	85	100	104	100

<sup>1</sup> Mixed hay, clover hay, and soybean hay.

<sup>2</sup> Unweighted index of wheat, corn, and hay.

### SIZE OF BUSINESS

In this study, size of farms, capital invested per farm, amount of livestock per farm, and the number of productive-man-work units per farm are used as measures of size of business.

#### Size of Farms and Use of Land Per Farm in the Different land Classes

The average size of farms was materially greater in the better land classes and the number of tillable acres per farm in land classes IV and IVR was approximately three times greater than that of the farms in the poorer land classes. In land classes I and IR, 22.0 per cent of the land per farm was in crops, while in land classes IV and IVR, 60.7 per cent of the land was in crops, Tables 21 and 22.

**Table 21—Size of farms and use of land per farm by land classes,  
New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
Total land operated per farm, acres . . . . .	103.8	70.7	138.5	180.7	152.6
Tillable land per farm, acres . . . . .	50.4	35.8	80.2	136.6	101.1
Use of land	acres	acres	acres	acres	acres
Corn for grain . . . . .	9.5	8.4	16.0	25.7	19.5
Corn for silage . . . . .	—	—	1.1	.8	.9
Sweet corn . . . . .	.1	.6	2.0	4.5	2.9
Wheat . . . . .	4.3	8.0	19.7	48.3	30.7
Rye . . . . .	—	—	.1	.1	.1
Soybeans for grain . . . . .	—	—	1.3	.3	.8
Oats . . . . .	1.0	1.7	2.2	.5	1.4
Barley . . . . .	—	—	.5	.4	.5
Clover and timothy hay . . . . .	3.5	4.5	14.4	22.0	16.8
Clover hay . . . . .	—	—	.2	.6	.3
Alfalfa hay . . . . .	.1	—	1.7	1.4	1.4
Soybean and cowpea hay . . . . .	.5	.9	1.7	1.4	1.5
Other legume hay . . . . .	.4	—	.1	—	.1
Other non-legume hay . . . . .	.2	—	.4	.5	.4
Total extensive crops . . . . .	19.6	24.1	61.4	106.5	77.3
White potatoes . . . . .	.4	.4	.6	.2	.4
Tomatoes (cannery) . . . . .	1.0	.6	1.2	.7	1.0
Asparagus . . . . .	.1	—	*	.1	*
Peas (cannery) . . . . .	—	.1	.2	.1	.2
Other truck crops . . . . .	.4	.1	.9	.8	.8
Apples . . . . .	.5	—	.8	.5	.6
Peaches . . . . .	—	.4	.1	.1	.1
Garden . . . . .	.8	.7	.7	.8	.7
Total intensive crops . . . . .	3.2	2.4	4.5	3.3	3.8
Total crops . . . . .	22.8	26.5	65.9	109.8	81.1
Acres double cropped . . . . .	—	—	.8	.8	.7
Difference = acres in crops . . . . .	22.8	26.5	65.1	109.0	80.4
Tillable land lying out . . . . .	14.7	6.5	4.9	2.3	4.3
Tillable pasture . . . . .	12.9	2.8	10.2	25.3	16.4
Total tillable land . . . . .	50.4	35.8	80.2	136.6	101.1
Woods not pastured . . . . .	41.0	5.0	26.1	14.5	21.3
Woods pastured . . . . .	.4	.3	.8	.8	.8
Untillable pasture . . . . .	6.9	22.8	13.6	7.4	10.9
Farmsteads, roads, and fence rows . . . . .	3.7	4.5	5.5	5.8	5.5
Marsh . . . . .	.2	.7	8.3	11.9	9.3
Other wasteland . . . . .	1.2	1.6	4.0	3.7	3.7
Total untillable land . . . . .	53.4	34.9	58.3	44.1	51.5
Total land per farm . . . . .	103.8	70.7	138.5	180.7	152.6

\* Less than .05 acres.



**Table 22—The percentage of land devoted to the various uses per farm by land classes, New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms.....	13	9	147	122	291
Total land operated per farm, acres.....	103.8	70.7	138.5	180.7	152.6
Tillable land per farm, acres.....	50.4	35.8	80.2	136.6	101.1
Use of land	per cent	per cent	per cent	per cent	per cent
Corn for grain.....	9.2	11.9	11.6	14.2	12.7
Corn for silage.....	—	—	.8	.4	.6
Sweet corn.....	.1	.8	1.4	2.5	1.9
Wheat.....	4.1	11.3	14.2	26.7	20.1
Rye.....	—	—	.1	.1	.1
Soybeans for grain.....	—	—	.9	.2	.5
Oats.....	1.0	2.4	1.6	.3	.9
Barley.....	—	—	.4	.2	.3
Clover and timothy hay.....	3.3	6.4	10.4	12.1	11.0
Clover hay.....	—	—	.1	.3	.2
Alfalfa hay.....	.1	—	1.2	.8	.9
Soybean and cowpea hay.....	.5	1.3	1.2	.8	1.0
Other legume hay.....	.4	—	.1	—	.1
Other non-legume hay.....	.2	—	.3	.3	.3
Total extensive crops.....	18.9	34.1	44.3	58.9	50.6
White potatoes.....	.4	.6	.4	.1	.3
Tomatoes (cannery).....	.9	.9	.9	.3	.7
Asparagus.....	.1	.1	*	.1	*
Peas (cannery).....	—	.1	.1	.1	.1
Other truck crops.....	.4	.1	.7	.4	.5
Apples.....	.5	—	.6	.3	.4
Peaches.....	—	.6	.1	.1	.1
Garden.....	.8	1.0	.5	.4	.4
Total intensive crops.....	3.1	3.4	3.3	1.8	2.5
Total crops.....	22.0	37.5	47.6	60.7	53.1
Acres double cropped.....	—	—	.6	.4	.4
Difference = acres in crops.....	22.0	37.5	47.0	60.3	52.7
Tillable land lying out.....	14.2	9.1	3.5	1.3	2.8
Tillable pasture.....	12.4	4.0	7.4	14.0	10.8
Total tillable land.....	48.6	50.6	57.9	75.6	66.3
Woods not pastured.....	39.5	7.1	18.8	8.0	14.0
Woods pastured.....	.4	.4	.6	.4	.5
Untillable pasture.....	6.6	32.2	9.8	4.1	7.1
Farmsteads, roads, and fence rows.....	3.5	6.4	4.0	3.2	3.6
Marsh.....	.2	1.0	6.0	6.6	6.1
Other wasteland.....	1.2	2.3	2.9	2.1	2.4
Total untillable land.....	51.4	49.4	42.1	24.4	33.7
Total land per farm.....	100.0	100.0	100.0	100.0	100.0

\* Less than .05 per cent.

### Capital Per Farm in the Different Land Classes

The value per farm of farm real estate in land classes IV and IVR was approximately twice as great as that of the farms in the poorer land classes, Table 23. Interviews with a large number of farmers residing in the poorer land classes, indicate that the small amount of capital involved has influenced many people unfamiliar with the land, to buy farms in the poorer land classes. After these people found that the land afforded only a low standard of living, some of them were unable to dispose of the land and were forced to spend the remainder of their lives under these conditions. However, others were able to sell the farms, oftentimes to people who also were unfamiliar with the land, and thus the economic fallacy has been continued. Furthermore, the fact that, on the average, farm real estate in land classes I and IR was valued at \$58 per acre and in land classes IV and IVR at \$69 per acre, indicates that the real estate in the poorer land classes was greatly over-valued for agricultural purposes. Apparently, the location value for rural residences, for private game preserves, and commercial and industrial uses has had an important influence in determining the price of farm real estate in these areas.

**Table 23—Capital<sup>1</sup> per farm in real estate by land classes, New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
Total acres per farm . . . . .	103.8	70.7	138.5	180.7	152.6
Real estate	dollars	dollars	dollars	dollars	dollars
Land . . . . .	2,846	2,622	5,026	7,201	5,752
Buildings . . . . .	3,131	3,645	4,905	5,333	4,962
Total buildings and land	5,977	6,267	9,931	12,534	10,714

<sup>1</sup> Farmers' estimates.

### Productive Man-Work Units Per Farm in the Different Land Classes

There was a close relationship between the size of business and land classes. The number of productive man-work units per farm in land classes IV and IVR was approximately three and one-half times greater than for the farms in the poorer land classes, Table 24.

**Table 24—Productive man-work units<sup>1</sup> per farm by land classes, New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
	P.M.W.U.	P.M.W.U.	P.M.W.U.	P.M.W.U.	P.M.W.U.
Livestock . . . . .	72	72	200	290	228
Crops . . . . .	95	88	205	306	239
Total . . . . .	167	160	405	596	467

<sup>1</sup> See footnote 2 to Table 16.

**Livestock Per Farm in the Different Land Classes**

In land classes I and IR, the average number of cows per farm was 2.7, while in land classes IV and IVR, there was an average of 15.0 cows per farm. The total number of animal units in land classes I and IR was 8.0 per farm, and 28.1 per farm in land classes IV and IVR, Table 25.

**Table 25—Number of livestock and total number of animal units per farm by land classes, New Castle County, Delaware, 1937.<sup>2</sup>**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
Kinds of livestock	number	number	number	number	number
Cows . . . . .	2.7	2.9	10.1	15.0	11.6
Heifers (1 yr. or over) . . . . .	1.1	.8	2.2	3.3	2.5
Heifers (under 1 yr.) . . . . .	.7	.6	2.1	2.6	2.2
Herd bulls . . . . .	.3	.3	.8	1.1	.9
Total dairy cattle . . . . .	4.8	4.6	15.2	22.0	17.2
Other cattle . . . . .	—	—	.1	.1	.1
Horses . . . . .	2.1	2.1	2.9	4.9	3.7
Mules . . . . .	.3	—	.4	.3	.3
Colts . . . . .	.1	—	.5	1.1	.7
Ewes, and lambs weaned . . . . .	—	—	.6	*	.3
Brood sows . . . . .	.5	.4	.8	1.1	.9
Other hogs . . . . .	1.8	1.7	2.6	5.0	3.6
Pigs, weaned . . . . .	1.9	2.2	2.6	4.7	3.5
Chickens . . . . .	93.1	125.2	151.9	183.8	161.8
Turkeys & other poultry . . . . .	25.4	18.4	27.5	40.2	32.5
Total poultry . . . . .	118.5	143.6	179.4	224.0	194.3
Total animal units <sup>1</sup> per farm . . . . .	8.0	7.6	19.1	28.1	22.0

\* Less than .05 of an animal.

<sup>1</sup> See footnote 3 to Table 16.

<sup>2</sup> On hand December 31.

## Summary of Size of Business Factors

Table 26 shows a summary of size of business factors per farm according to the different land classes. Table 27 shows a summary of size of business factors per 100 acres of land according to the different land classes. This latter table although not eliminating the influence of differences in size of farms, may make it possible to compare size of business factors more nearly on a land-class basis. It previously has been indicated that the value of land, especially in the lower land classes in New Castle County, is influenced by factors other than for agricultural uses. With this exception, Table 27 shows that there is a close relationship between size of business factors and land classes.

**Table 26—Summary of size of business per farm by land classes, New Castle County, Delaware, 1937.**

Land classes	Acres per farm	Capital in real estate per farm	Dairy cows per farm	Animal units per farm <sup>2</sup>	Total P.M.W.U. per farm <sup>1</sup>
	acres	dollars	number	number	number
I and IR.....	103.8	5,977	2.7	8.0	167.3
II and IIR.....	70.7	6,267	2.9	7.6	160.3
III and IIIR.....	138.5	9,931	10.1	19.1	405.3
IV and IVR.....	180.7	12,534	15.0	28.1	596.0
County average.....	152.6	10,714	11.6	22.0	467.1

<sup>1</sup> See footnote 2 to Table 16.

<sup>2</sup> See footnote 3 to Table 16.

**Table 27—Summary of size of business per 100 acres of land by land classes, New Castle County, Delaware, 1937.**

Land classes	Capital in real estate per 100 acres	Dairy cows per 100 acres	Animal units per 100 acres <sup>2</sup>	Total P.M.W.U. per 100 acres <sup>1</sup>
	dollars	number	number	number
I and IR.....	5,758	2.6	7.7	161.2
II and IIR.....	8,864	4.1	10.7	226.7
III and IIIR.....	7,170	7.3	13.8	292.6
IV and IVR.....	6,936	8.3	15.6	329.8
County average.....	7,021	7.6	14.4	306.1

<sup>1</sup> See footnote 2 to Table 16.

<sup>2</sup> See footnote 3 to Table 16.

## SOCIAL ASPECTS OF LAND USE

It has been indicated that a sound program in land utilization would necessitate a knowledge of the social aspects of land use as well as a knowledge of the economic aspects. Many of the most perplexing land-use problems that arise are of a social nature. What procedure

would most nearly assure the welfare of the people who reside in the poorer land classes? What procedure would best serve the tax payers of the county and state? The effect of land utilization on the standard of living of farmers as indicated by size of business and crop yields in the different land classes, has already been referred to. What is the effect of land use on the age of farmers residing within an area and on the age at which they retire? From where did the farmers come who reside in the different land classes? That is, were they local people or did they come to New Castle County from other states and foreign countries? Are the farmers residing in the different land classes experienced in farming, or is their experience largely confined to city occupations? What is the influence of land utilization on the size of farm families and the education of farm children? And last, does land utilization have an influence on the number of farmers' sons who become farmers?

### Age of Farmers in the Different Land Classes

In land classes I and IR, II and IIR, III and IIIR, and IV and IVR, 15.4 per cent, 11.1 per cent, 6.9 per cent, and 4.1 per cent, respectively, of the farmers were 70 years of age and over. In the same respective land classes, 53.8 per cent, 33.3 per cent, 29.5 per cent, and 25.4 per cent of the farmers were 60 years of age and over, Table 28. In the poorest land class, approximately one-half of the farmers were 60 years of age and over, while in the best land class approximately one-fourth of the farmers were in this age group. Apparently, more of the farmers in the better land classes were able to accumulate enough capital to enable them to retire at an earlier age, whereas more of the farmers in the poorer land classes were forced to reside on the farms during their declining years, endeavoring to make a living. However, the difference in ages of farmers in land classes III and IIIR, and in land classes IV and IVR was not marked.

**Table 28—Percentage of farmers by age groups who reside in the different classes of land, New Castle County, Delaware, 1937.**

Age - years	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
	per cent	per cent	per cent	per cent	per cent
Less than 30.....	—	—	3.4	2.5	2.8
30 - 39.9.....	7.7	—	13.7	20.5	15.9
40 - 49.9.....	23.1	44.5	21.2	26.2	24.1
50 - 59.9.....	15.4	22.2	32.2	25.4	28.3
60 - 69.9.....	38.4	22.2	22.6	21.3	22.7
70 and over.....	15.4	11.1	6.9	4.1	6.2
Total.....	100.0	100.0	100.0	100.0	100.0

### Amount of Time Devoted by Farmers to Work Off the Farm in the Different Land Classes

Nearly one-fourth of the farmers in the poorer land did work off the farm, while in land classes IV and IVR, only 4.2 per cent of the farmers did work off the farm. Of the farmers in the poorer land classes, 13.7 per cent devoted more than 50 per cent of their time to work off the farm, Table 29. Apparently, many farmers in the poorer land classes found that the income from the farms was inadequate and they were forced to supplement their incomes by doing other types of work. The difference in the amount of work done off the farm in land classes III and IIIR, and in classes IV and IVR, was unimportant.

**Table 29—Percentage of farmers devoting different amounts of their time to work off the farm, by land classes, New Castle County, Delaware, 1937.**

	Land classes			County
	I & IR, & II & IIR	III & IIIR	IV & IVR	
Number of farms.....	22	147	119	288
Per cent of time	per cent of farmers	per cent of farmers	per cent of farmers	per cent of farmers
None.....	77.3	92.5	95.8	92.7
1 - 25 per cent.....	4.5	2.1	1.7	2.1
26 - 50 per cent.....	4.5	2.7	1.7	2.4
51 per cent and more.....	13.7	2.7	8	2.8
Total.....	100.0	100.0	100.0	100.0

### Birthplace of Farmers in the Different Land Classes

In land classes I and IR, II and IIR, III and IIIR, and IV and IVR, 61.5 per cent, 44.4 per cent, 29.3 per cent, and 27.0 per cent, respectively, were born outside of rural Delaware. In these same respective land classes, 23.1 per cent, 11.1 per cent, 3.4 per cent, and 0.8 per cent of the farmers were born in foreign countries, Table 30.

**Table 30—Birthplace of farmers by land classes, New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
Birthplace	per cent	per cent	per cent	per cent	per cent
Kent County . . . . .	15.4	—	7.5	9.0	8.3
Sussex County . . . . .	—	11.1	2.0	.8	1.7
Rural New Castle County . . . . .	23.1	44.5	61.2	63.2	59.8
Total rural Delaware . . . . .	38.5	55.6	70.7	73.0	69.8
Wilmington, Delaware . . . . .	7.7	22.2	4.1	.8	3.4
Other states of the United States . . . . .	30.7	11.1	21.8	25.4	23.4
Foreign countries . . . . .	23.1	11.1	3.4	.8	3.4
Total outside rural Delaware . . . . .	61.5	44.4	29.3	27.0	30.2
Total . . . . .	100.0	100.0	100.0	100.0	100.0

According to Table 31, more than three-fourths of the fathers of farmers in land classes I and IR were born outside of Delaware and approximately one-fourth of the fathers of farmers in land classes IV and IVR were born outside of Delaware.

**Table 31—Birthplace of fathers of farmers by land classes, New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms . . . . .	13	9	147	122	291
Birthplace	per cent	per cent	per cent	per cent	per cent
Delaware . . . . .	23.1	55.6	56.5	73.6	62.1
Other states of the United States . . . . .	30.8	33.3	31.3	22.3	27.6
Foreign countries . . . . .	46.1	11.1	12.2	4.1	10.3
Total outside Delaware . . . . .	76.9	44.4	43.5	26.4	37.9
Total . . . . .	100.0	100.0	100.0	100.0	100.0

**Former Place of Residence of Farmers in the Different Land Classes**

In the poorer land classes, nearly three-fifths of the farmers resided

outside of rural Delaware immediately before going on the farm occupied at the time of the survey. In land classes IV and IVR, only about one-tenth of the farmers resided outside of rural Delaware before going on the farm occupied at the time of the survey, Table 32. These data support a previous statement that many of the farmers in the poorer land classes were unfamiliar with the class of land when they took up occupancy of the farms.

**Table 32—Place of residence of farmers immediately before going on farm occupied in 1937 (at time of survey) by land classes, New Castle County, Delaware.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
Number of farms reporting.....	12	7	128	116	263
Place of residence	per cent	per cent	per cent	per cent	per cent
Kent County.....	—	—	4.7	6.0	4.9
Rural New Castle County.....	41.7	42.8	73.4	83.6	75.6
Sussex County.....	—	—	1.6	—	.8
Total in rural Delaware.....	41.7	42.8	79.7	89.6	81.3
Wilmington, Delaware.....	25.0	14.3	7.0	.9	5.3
Pennsylvania.....	16.7	28.6	8.6	.9	6.1
Maryland.....	8.3	—	2.3	6.8	4.5
New York.....	—	—	.8	.9	.8
Vermont.....	—	—	.8	—	.4
Missouri.....	—	—	—	.9	.4
Virginia.....	—	14.3	—	—	.4
Canada.....	8.3	—	—	—	.4
France.....	—	—	.8	—	.4
Total outside rural Delaware.....	58.3	57.2	20.3	10.4	18.7
Total.....	100.0	100.0	100.0	100.0	100.0

### Experience of Farmers in the Different Land Classes

In land classes I, IR, II, and IIR, 36.8 per cent of the farmers pursued vocations other than farming immediately before going on the farm occupied at the time of the survey. However, only 14.5 per cent of the farmers in land classes IV and IVR were engaged in vocations other than farming at the time of the survey, Table 33. It is apparent in the poorer land classes, that in addition to the disadvantages of endeavoring to cultivate poor land, many farmers were handicapped by a lack of practical farm experience.



**Table 33—Occupation of farmers immediately before going on farm occupied in 1937 (at time of survey) by land classes, New Castle County, Delaware.**

	Land classes			County
	I & IR, & II & IIR	III & IIIR	IV & IVR	
Number of farms reporting	19	129	117	265
Occupation	per cent	per cent	per cent	per cent
Farming.....	63.2	76.7	85.5	79.6
Other than farming.....	36.8	23.3	14.5	20.4
Total.....	100.0	100.0	100.0	100.0

Of the living farmers who occupied the farms immediately preceding the incumbent at the time of the survey, more than four times the proportion in the poorer land classes went into non-agricultural vocations after leaving the farms as did in land classes IV and IVR, Table 34. It appears for a considerable proportion of farmers in the poorer land classes, that farming is simply an interlude in their careers. They come to the farms from non-agricultural vocations and leave the farms and return to non-agricultural vocations.

**Table 34—Occupation immediately after leaving the farms, of living farmers who preceded the incumbent of 1937 (at time of survey) by land classes, New Castle County, Delaware.**

	Land classes			County
	I & IR, & II & IIR	III & IIIR	IV & IVR	
Number of farms reporting	12	82	83	177
Occupation	per cent	per cent	per cent	per cent
Farming.....	41.7	61.0	78.3	67.8
Non - agricultural occupations.....	41.7	17.0	9.6	15.3
Retired.....	16.6	22.0	12.1	16.9
Total.....	100.0	100.0	100.0	100.0

### Size of Farm Families in the Different Land Classes

It is commonly thought that the average size of farm families in the poorer land classes is larger than in the better land classes. In Kent County, Delaware<sup>4</sup>, no significant difference in the size of families in the different land classes was indicated. However, in New Castle County the number of children per farm family did average approximately one child more in the poorer land classes than in the better land classes, Table 35. The larger size of families combined with the lower standard of living in the poorer land classes, emphasizes an important rural social problem.

**Table 35—Number of children now living, born per farm family by land classes, New Castle County, Delaware, 1937.**

	Land classes			County
	I & IR, II & IIR	III & IIIR	IV & IVR	
Number of farms.....	22	147	122	291
	average number	average number	average number	average number
Females.....	1.8	1.1	1.1	1.2
Males.....	1.7	1.4	1.3	1.4
Total.....	3.5	2.5	2.4	2.6

### Education of Farm Children in the Different Land Classes

Tables 36 and 37 indicate that the farm children in the better land classes took advantage of the school facilities of the state to a greater degree than did the children in the poorer land classes. This situation appears to prevail, despite the fact that, in general, the children in the different land classes attended the same schools and there was, therefore, no apparent difference in the school facilities available to the children in the different land classes.

At the age of 15 years, 51.1 per cent of the children in the poorer land classes had left school, whereas in land classes IV and IVR, only 37.9 per cent of the children had left school at the age of 15 years. At the age of 17 years, 82.4 per cent of the children in the poorer land classes had left school, and in land classes IV and IVR, only 54.4 per cent of the children had left school.

<sup>4</sup> Bausman, R. O., An Economic Study of Land Utilization in Kent County, Delaware, Delaware Agricultural Experiment Station Bulletin 224, pp. 75 - 76, 1940.

**Table 36—Percentage of farm children who left school<sup>1</sup> at the different ages, by land classes, New Castle County, Delaware, 1937.**

	Land classes			County
	I & IR, & II & IIR	III & IIIR	IV & IVR	
Number of farms.....	22	147	122	291
Ages children left school	per cent	per cent	per cent	per cent
Less than 12 years.....	2.0	—	1.0	.6
12 years.....	2.0	—	4.9	1.8
13 years.....	4.0	2.3	7.8	4.2
14 years.....	11.9	29.4	25.3	25.4
15 years.....	51.1	49.7	37.9	46.2
16 years.....	68.7	62.1	44.7	57.7
17 years.....	82.4	72.9	54.4	68.6
18 years.....	100.0	98.3	100.0	99.1
Over 18 years.....	100.0	100.0	100.0	100.0

<sup>1</sup> Grade school and high school.

**Table 37—Percentage of farm children who left the grade schools or high schools at the end of the different grades and who attended other institutions of learning, by land classes, New Castle County, Delaware, 1937.**

	Land classes			County
	I & IR, & II & IIR	III & IIIR	IV & IVR	
Number of farms.....	22	147	122	291
Number of children.....	77	368	297	742
Grade children left school	per cent	per cent	per cent	per cent
Less than 3d grade.....	—	—	—	—
3d grade.....	—	—	.7	.2
4th grade.....	—	—	1.4	.4
5th grade.....	1.9	—	3.6	1.4
6th grade.....	3.8	4.3	5.8	4.7
7th grade.....	3.8	5.6	9.4	6.6
8th grade.....	48.0	43.3	36.2	41.5
9th grade.....	59.6	46.3	39.1	45.5
10th grade.....	76.9	51.9	42.0	51.7
11th grade.....	80.8	56.7	45.6	56.0
12th grade.....	96.2	78.4	78.2	80.5
Nurses training <sup>1</sup> .....	1.9	—	2.2	1.0
Business college <sup>1</sup> .....	1.9	13.0	14.5	12.1
Teachers training <sup>1</sup> .....	—	.4	—	.2
Four-year college course <sup>1</sup> .....	—	8.2	5.1	6.2
Total.....	100.0	100.0	100.0	100.0

<sup>1</sup> Children attending indicated institutions are not counted under grade schools or high schools.

In the poorer land classes, 48.0 per cent of the children had left school by the end of the eighth grade, whereas in land classes IV and IVR, 36.2 per cent of the children had left school by the end of the eighth grade. In the poorer land classes, 76.9 per cent of the children had left school by the end of the tenth grade and in land classes IV and IVR, only 42.0 per cent of the children had left school by the end of the tenth grade. Furthermore, in the poorer land classes there were no children who attended a four-year college but in land classes III and IIIR and IV and IVR, 8.2 per cent and 5.1 per cent, respectively, of the children attended four-year colleges. There was a tendency for the children in the different land classes in the northern part of the county to take advantage of the school facilities to a greater degree than in the respective land classes in the southern part of the county.

Apparently, the parents of the children in the better land classes were better able to relieve their children from the farm work and to give them a greater degree of financial and moral support in taking advantage of the more advanced school facilities. It should be kept in mind that the present school laws were not effective when many of the children in question were of school age. It is recognized that as the parents of children in the poorer land classes were of a somewhat older age, possibly somewhat more of the children in the poorer land classes may have been of school age when the school attendance laws were less binding and when the school facilities were less adequate.

### Occupation of Mature Farm Children in the Different Land Classes

Approximately three times the proportion of farmers' sons reared in land classes IV and IVR in Districts 11 to 15, took up farming as a vocation as did in the poorer land classes, Table 38. Apparently, farmers' sons reared in the better land classes in Districts 11 to 15,

**Table 38—Occupation of mature farm children\* by land classes, representative districts 11-15, New Castle County, Delaware, 1937.**

	Land classes			County
	I & IR, & II & IIR	III & IIIR	IV & IVR	
Number of farms.....	12	64	95	171
Occupation	per cent	per cent	per cent	per cent
Farmers.....	5.0	6.8	15.6	10.9
Farm laborers.....	—	3.4	—	1.3
Housewives.....	40.0	39.0	39.0	39.1
Non-agricultural vocations	55.0	50.8	45.4	48.7
Total.....	100.0	100.0	100.0	100.0

\* Mature children who have entered a vocation.

either received more financial aid from their parents in becoming established in farming or they anticipated greater opportunities in farming than did sons reared in the poorer land classes. There appeared to be no significant difference in the vocations of farmers' sons in the northern part of the county (Districts 6 to 10).

Summarizing the social aspects of land use, as compared with farmers residing in the better land classes, a larger proportion of the farmers in the poorer land classes were older men; a larger proportion of them were born outside of rural Delaware and in foreign countries; and a smaller proportion had farm experience.

Likewise, a smaller proportion of the farm children residing in the poorer land classes had taken full advantage of the school facilities offered by the state; a smaller proportion of farmers' sons took up farming as a vocation; and the number of living children per family was somewhat greater than in the better land classes, despite an appreciably lower standard of living.

In view of the preceding discussion, unless they have an income from non-land-use enterprises, it would appear that the farmers residing in the poorer land classes may be able to enjoy a somewhat higher standard of living and a somewhat fuller life, if they took up occupancy of farms in the better land classes or if they changed to non-agricultural vocations. It has been indicated that this tendency is now underway but it is largely nullified by other people taking occupancy of the vacated farms.

## ROADS

A system of improved farm-to-market roads appears to be an important service in the full utilization of the land resources of a county. The attached land-classification map shows a system of improved farm-to-market roads for New Castle County. The map shows the hard-surface roads which were complete at the time of the survey, 1937. It indicates the dirt roads that it would appear desirable eventually to hard-surface. It also indicates the dirt roads that it would appear desirable to allow to remain as dirt roads. Obviously, the hard-surfacing of the indicated dirt roads would be contingent on available funds.

The bases used for the laying out of this system of roads are the classes of land, the classes of farms, and the concentration of farms. Group A roads are, at present, dirt roads and serve the largest number of the better farms and rural residences per mile of road, largely in classes IV and IVR land. Group B roads are dirt roads that serve largely farms in land classes III and IIIR. These roads serve fewer of the better farms and rural residences per mile of road than Group A roads. Group C includes dirt roads that are used somewhat for agricultural purposes and serve as connecting roads. These roads often times extend through the poorer land classes. Group D roads are largely in land classes III and IIIR and IV and IVR but because they

serve so few farms they will probably remain as dirt roads. Group E are dirt roads in or tributary to land classes I and IR and II and IIR. If land classes II and IIR were reforested some of these roads may be closed. Most of them probably would be needed for forest-trail purposes. Group G roads appear on the United States Geological Survey Maps, but are now closed and receive little or no use.

### **Classification of Roads in the Different Land Classes**

According to the United States Geological Survey Maps, New Castle County had 847.1 miles of roads in 1937. Of this mileage, 536.5 miles, or 63.3 per cent, was hard-surfaced at that time, Tables 39 and 40. Of land classes I, II, III, and IV, 31.4 per cent, 48.3 per cent, 46.9 per cent, and 52.6 per cent, respectively, were hard-surfaced. The percentage of hard-surface roads in land classes IR, IIR, IIIR, and IVR was somewhat greater because these land classes were used to a greater extent for residential and commercial purposes.

Group A roads constituted 87.2 miles, or 10.3 per cent, of the roads of the county. Group A roads made up 34.4 per cent of the roads in land class IV and 10.7 per cent of the roads in land class IVR. Group B roads constituted 88.9 miles, or 10.5 per cent of the roads of the county. Group B roads made up 24.9 per cent of the roads in land class III, and 12.0 per cent of the roads in land class IIR.

The present hard-surface roads plus road groups A, B, and C comprised 716.0 miles of roads, or 84.5 per cent of the roads of the county. This is the mileage that would appear desirable eventually to have hard-surfaced. The present hard-surface roads plus road groups A, B, and C comprised 53.4 per cent, 73.8 per cent, 76.1 per cent, and 90.7 per cent of the roads in land classes I, II, III, and IV, respectively. The percentage of the roads constituted by these road groups was somewhat greater in land classes IR, IIR, IIIR, and IVR. The mileage of hard-surface roads in the poorer land classes is relatively large because it was often times necessary to project hard-surface roads through these land classes in order to connect roads in the better land classes.

**Table 39—Miles of road in the different road groups by land classes, New Castle County, Delaware, 1937.**

Road groups	Land classes								Residential and industrial	County <sup>2</sup>
	I	II	III	IV	IR	IIR	IIIR	IVR		
	miles	miles	miles	miles	miles	miles	miles	miles		
Hard-surface roads										
Concrete.....	6.6	4.1	39.1	52.1	3.9	5.6	39.9	22.5	25.5	199.3
Macadam.....	6.0	2.9	29.7	57.8	13.7	20.5	136.4	20.6	49.6	337.2
Total.....	12.6	7.0	68.8	109.9	17.6	26.1	176.3	43.1	75.1	536.5
Dirt roads desirable eventually to hard-surface										
Group A <sup>1</sup> .....	1.7	—	5.1	71.8	.4	.2	1.9	5.8	.3	87.2
Group B <sup>1</sup> .....	6.0	2.6	36.6	7.7	2.5	3.4	28.6	1.5	—	88.9
Group C <sup>1</sup> .....	1.1	1.1	1.2	—	—	—	—	—	—	3.4
Total.....	8.8	3.7	42.9	79.5	2.9	3.6	30.5	7.3	.3	179.5
Permanent dirt roads										
Group D <sup>1</sup> .....	9.9	3.5	29.6	16.3	5.1	3.5	22.6	2.7	—	93.2
Roads that might be closed or used for forest purposes, if land were reforested										
Group E <sup>1</sup> .....	4.9	—	1.6	—	1.4	.6	.2	—	—	8.7
Unused or abandoned roads										
Group G <sup>1</sup> .....	3.9	.3	3.8	3.1	4.5	4.1	8.6	.9	—	29.2
Grand total....	40.1	14.5	146.7	208.8	31.5	37.9	238.2	54.0	75.4	847.1
Present hard - surface roads plus										
Group A.....	14.3	7.0	73.9	181.7	18.0	26.3	178.2	48.9	75.4	623.7
Groups A & B....	20.3	9.6	110.5	189.4	20.5	29.7	206.8	50.4	75.4	712.6
Groups A, B, & C	21.4	10.7	111.7	189.4	20.5	29.7	206.8	50.4	75.4	716.0

<sup>1</sup> Group A roads are dirt roads which serve the largest number of the better farms and rural residences per mile of road, largely in land classes IV and IVR. Group B roads are dirt roads which serve largely farms in land classes III and IIIR. These roads serve fewer of the better farms and rural residences per mile of road than Group A roads. Group C includes dirt roads used somewhat for agricultural purposes and for connecting roads. These roads often times extend through the poorer land classes. Group D roads are largely in land classes III and IIIR and IV and IVR but because they serve so few farms they will probably remain as dirt roads. Group E are dirt roads in or tributary to land classes I and IR and II and IIR. If land classes II and IIR were reforested some of these roads may be closed. Most of them probably would be needed for forest trail purposes. Group G roads appear on the United States Geological Survey Maps, but are now closed and receive little or no use.

<sup>2</sup> This mileage includes the roads to the boundaries of towns, with the exception of Route 13, the entire mileage of which is included to the corporate boundary of the City of Wilmington. The Delaware Highway Department reported 989.8 miles of roads in New Castle County in 1938. Part of the difference between this mileage and that gotten by measuring the roads on the United States Geological Survey Maps, is due to the fact that the Delaware Highway Department included some towns and city streets which are under its supervision.

**Table 40—Percentage of road mileage in the different road groups by land classes, New Castle County, Delaware, 1937.**

Road groups	Land classes								Residential and industrial	County <sup>2</sup>
	I	II	III	IV	IR	IIR	IIIR	IVR		
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent
Hard-surface roads										
Concrete.....	16.4	28.3	26.7	25.0	12.4	14.8	16.8	41.7	33.8	23.5
Macadam.....	15.0	20.0	20.2	27.6	43.5	54.1	57.2	38.1	65.8	39.8
Total.....	31.4	48.3	46.9	52.6	55.9	68.9	74.0	79.8	99.6	63.3
Dirt roads desirable eventually to hard-surface										
Group A <sup>1</sup> .....	4.2	—	3.5	34.4	1.3	.5	.8	10.7	.4	10.3
Group B <sup>1</sup> .....	15.0	17.9	24.9	3.7	7.9	9.0	12.0	2.8	—	10.5
Group C <sup>1</sup> .....	2.8	7.6	.8	—	—	—	—	—	—	.4
Total.....	22.0	25.5	29.2	38.1	9.2	9.5	12.8	13.5	.4	21.2
Permanent dirt roads										
Group D <sup>1</sup> .....	24.7	24.1	20.2	7.8	16.2	9.2	9.5	5.0	—	11.0
Roads that might be closed or used for forest purposes, if land were reforested										
Group E <sup>1</sup> .....	12.2	—	1.1	—	4.4	1.6	.1	—	—	1.0
Unused or abandoned roads										
Group G <sup>1</sup> .....	9.7	2.1	2.6	1.5	14.3	10.8	3.6	1.7	—	3.5
Grand total....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Present hard-surface roads plus										
Group A.....	35.6	48.3	50.4	87.0	57.2	69.4	74.8	90.5	100.0	73.6
Groups A & B.....	50.6	66.2	75.3	90.7	65.1	78.4	86.8	93.3	100.0	84.1
Groups A, B, & C.....	53.4	73.8	76.1	90.7	65.1	78.4	86.8	93.3	100.0	84.5

<sup>1</sup> See footnote 1 to Table 39.

<sup>2</sup> See footnote 2 to Table 39.

### Classification of Farms and Rural Residences in the Different Road Groups

Of all farms in the county, 72.9 per cent were served by the present hard-surface roads and 24.2 per cent were located on road Groups A, B, and C. If road Groups A, B, and C were eventually hard-surfaced, 97.1 per cent of the farms would be located on hard-surface roads, Table 41.

Of all rural residences in the county, 83.7 per cent were on hard-surface roads and 13.0 per cent were on road Groups A, B, and C. If road Groups A, B, and C were eventually hard-surfaced, 96.7 per cent of the rural residences would be on hard-surface roads.

### Concentration of Farms and Rural Residences per Mile of Road in the Different Road Groups

The present hard-surface roads served 1.92 farms per mile of road and road Groups A, B, and C served an average of 1.91 farms per mile



**Table 41—Percentage of farms and rural residences of the different classes in the various road groups, New Castle County, Delaware, 1937.**

Road groups	Farms							Rural residences				Commercial establishments, churches, schools	Buildings standing but unusable	County total of all buildings
	Excel- lent	Good	Fair to good	Fair to poor	Poor	Vacant	County total <sup>2</sup>	Good occupied	Poor occupied	Vacant	County total <sup>2</sup>			
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent			
Hard-surface roads														
Concrete.....	34.7	29.6	27.8	24.8	30.3	—	28.5	33.9	39.4	19.4	34.1	47.3	27.5	32.4
Macadam.....	42.6	48.4	45.2	41.3	35.3	55.6	44.4	53.8	25.5	41.9	49.6	45.2	40.7	46.5
Total.....	77.3	78.0	73.0	66.1	65.6	55.6	72.9	87.7	64.9	61.3	83.7	92.5	68.2	78.9
Dirt roads desirable eventually to hard-surface														
Group A <sup>1</sup> .....	12.0	12.7	12.2	8.7	3.3	11.1	10.9	4.2	9.5	6.4	5.0	1.7	7.3	7.1
Group B <sup>1</sup> .....	10.7	8.7	13.0	19.6	15.5	33.3	13.0	6.9	12.6	11.3	7.8	4.1	9.7	9.6
Group C <sup>1</sup> .....	—	.2	.3	.7	—	—	.3	—	1.3	—	.2	.7	.2	.3
Total.....	22.7	21.6	25.5	29.0	18.8	44.4	24.2	11.1	23.4	17.7	13.0	6.5	17.2	17.0
Permanent dirt roads														
Group D <sup>1</sup> .....	—	.4	1.5	4.9	14.8	—	2.8	1.2	11.3	19.4	3.2	1.0	14.6	4.0
Roads that might be closed or used for forest purposes, if land were reforested														
Group E <sup>1</sup> .....	—	—	—	—	.8	—	.1	—	.4	1.6	.1	—	—	.1
Unused or abandoned roads														
Group G <sup>1</sup> .....	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Present hard - surface roads plus														
Group A.....	89.3	90.7	85.2	74.8	68.9	66.7	83.8	91.9	74.4	67.7	88.7	94.2	75.5	86.0
Groups A & B.....	100.0	99.4	98.2	94.4	84.4	100.0	96.8	98.8	87.0	79.0	96.5	98.3	85.2	95.6
Groups A, B, & C.....	100.0	99.6	98.5	95.1	84.4	100.0	97.1	98.8	88.3	79.0	96.7	99.0	85.4	95.9
Total number of farmsteads, rural residences, and commercial establishments..	150	450	406	286	122	9	1,423	1,447	231	62	1,740	294	371	3,828

<sup>1</sup> See footnote 1 to Table 39.

<sup>2</sup> Despite the fact that a larger proportion of the better farm buildings are on road Group A than on road Group B, a smaller proportion of the total farm buildings and rural residences in New Castle County are on road Group A. This is due to road Group B serving largely land classes III and IIIIR. Land class IIIIR is located in the northern part of the county where there is a greater concentration of farm buildings and rural residences.

Table 42—Number of farms and rural residences of the different classes per mile of road in the various road groups, New Castle County, Delaware, 1937.

Road groups	Farms per mile of road							Rural residences per mile of road				Commercial establishments, churches, schools, per mile of road	Buildings standing but unusable per mile of road	County total of all buildings per mile of road
	Excel- lent	Good	Fair to good	Fair to poor	Poor	Vacant	County total <sup>2</sup>	Good occu- pied	Poor occu- pied	Vacant	County total <sup>2</sup>			
	number	number	number	number	number	number	number	number	number	number	number			
<b>Hard-surface roads</b>														
Concrete.....	.26	.67	.56	.36	.18	—	2.03	2.46	.46	.06	2.98	.70	.51	6.22
Macadam.....	.19	.65	.54	.35	.13	.01	1.87	2.31	.17	.08	2.56	.39	.45	5.27
Average.....	.22	.65	.54	.35	.15	.01	1.92	2.37	.28	.07	2.72	.51	.47	5.62
<b>Dirt roads desirable eventually to hard-surface</b>														
Group A <sup>1</sup> .....	.21	.65	.56	.29	.04	.01	1.76	.70	.25	.05	1.00	.06	.31	3.13
Group B <sup>1</sup> .....	.18	.44	.59	.63	.21	.03	2.08	1.12	.33	.08	1.53	.13	.41	4.15
Group C <sup>1</sup> .....	—	.30	.29	.59	—	—	1.18	—	.88	—	.88	.59	.29	2.94
Average.....	.19	.54	.57	.46	.13	.02	1.91	.90	.30	.06	1.26	.10	.36	3.63
<b>Permanent dirt roads</b>														
Group D <sup>1</sup> .....	—	.02	.07	.15	.19	—	.43	.18	.28	.13	.59	.03	.58	1.63
<b>Roads that might be closed or used for forest purposes, if land were reforested</b>														
Group E <sup>1</sup> .....	—	—	—	—	.11	—	.11	—	.12	.11	.23	—	—	.34
<b>Unused or abandoned roads</b>														
Group G <sup>1</sup> .....	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average.....	.18	.53	.47	.34	.14	.01	1.67	1.71	.27	.07	2.05	.35	.44	4.51
<b>Present hard - surface roads plus</b>														
Group A.....	.21	.65	.55	.34	.14	.01	1.90	2.13	.28	.07	2.48	.44	.45	5.27
Groups A & B.....	.21	.63	.55	.38	.14	.01	1.92	2.01	.28	.07	2.36	.40	.45	5.13
Groups A, B, & C.....	.21	.63	.55	.38	.14	.01	1.92	2.00	.28	.07	2.35	.41	.44	5.12

<sup>1</sup> See footnote 1 to Table 39.

<sup>2</sup> See footnote 2 to Table 41.

of road, Table 42. The present hard-surface roads had 2.72 rural residences per mile of road and road Groups A, B, and C had an average of 1.26 rural residences per mile of road.

### Farm Capital per Mile of Road in the Different Road Groups

Farm capital per mile of road was almost as great for the average of road Groups A, B, and C as it was per mile of the present hard-surface roads. However, farm capital per mile of Group D and Group E roads was much less, Table 43.

**Table 43—Calculated total farm capital per mile of road in the different road groups, New Castle County, Delaware, 1937.**

Road groups	Total farm capital per mile of road <sup>2</sup>
	dollars
Hard-surface roads	
Concrete.....	24,464
Macadam.....	22,242
Average.....	22,938
Dirt roads desirable eventually to hard-surface	
Group A <sup>1</sup> .....	21,821
Group B <sup>1</sup> .....	22,708 <sup>3</sup>
Group C <sup>1</sup> .....	12,410
Average.....	22,074
Permanent dirt roads	
Group D <sup>1</sup> .....	3,451
Roads that might be closed or used for forest purposes, if land were reforested	
Group E <sup>1</sup> .....	630
Average.....	19,628
Present hard-surface roads plus	
Group A.....	22,715
Groups A and B.....	22,797
Groups A, B, and C.....	22,797

<sup>1</sup> See footnote 1 to Table 39.

<sup>2</sup> Real estate and farm machinery.

<sup>3</sup> Farm capital per mile of road for road Group B is greater than road Group A because Group B roads serve largely land classes III and IIIR, and land class IIIR lies in the northern part of the county where land values are higher.

### Hard-Surface Roads and the Amount of Livestock Per Farm

In order to market farm products with the greatest degree of economy, hard-surface-farm-to-market roads are essential. This is particularly true of perishable products, such as fluid milk, which have to be marketed daily. Tables 44 and 45 indicate that hard-surface roads had an influence on the size of the livestock business on the different farms, particularly the size of the dairy herds.

**Table 44—Relation of class of road and of class of land to number of animal units per farm in land classes III and IIIR, and IV and IVR, New Castle County, Delaware, 1937.**

Road groups	Number of animal units per farm <sup>1</sup>		Difference
	Land classes IV & IVR	Land classes III & IIIR	
Hard-surface roads.....	29.0	20.1	8.9
Dirt roads desirable eventually to hard-surface (A, B, and C).....	25.6	16.8	8.8
Difference.....	3.4	3.3	

<sup>1</sup> See footnote 3 to Table 16.

**Table 45—Relation of class of road and of class of land to number of cows per farm in land classes III and IIIR, and IV and IVR, New Castle County, Delaware, 1937.**

Road groups	Number of cows per farm		Difference
	Land classes IV & IVR	Land classes III & IIIR	
Hard-surface roads.....	15.6	10.9	4.7
Dirt roads desirable eventually to hard-surface (A, B, and C).....	13.5	8.1	5.4
Difference.....	2.1	2.8	

As between types of roads in the same land class, there was an average of nearly three and one-half more animal units per farm on the farms located on hard-surface roads than on farms on dirt roads. As between types of roads in the same land class, there was an average of approximately two and one-half cows more per farm on farms located on the hard-surface roads. As between land classes on the same type of road, there was an average of approximately five cows more per farm on farms in land classes IV and IVR than on farms in land classes III and IIIR. Differences in the size of farms in the different land classes and road groups may have had some influence on these data. However, it would appear that the type of road had about one-half the influence on the size of the dairy herds as did the class of land. The significant point here is that little can be done about the class of land other than to make the best possible use of it as is, but much can be accomplished in improving farm-to-market roads.

## ELECTRIC POWER AND TELEPHONE SERVICES

Electric power and telephones are important services in making the fullest use of land. Where the class of land and the concentration of farms warrants, electric power and telephone services should be available for farm use.

### Farms Having Electric Power and Telephone Services in the Different Land Classes

Table 46 indicates that there were 1,414 occupied farms in New Castle County. Of this number 46.7 per cent had electric power connections and 44.0 per cent had telephone connections. Table 47 indicates 1,954 occupied rural residences, school houses, churches and commercial establishments in New Castle County. Of this number 65.4 per cent had electric power connections and 36.3 per cent had telephone connections.

**Table 46—Percentage of occupied farms having electric power connections and telephone connections by land classes, New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
	per cent	per cent	per cent	per cent	per cent
Electric power connections <sup>1</sup> .....	40.3	47.0	54.7	34.6	46.7
Telephone connections <sup>1</sup> .....	16.1	32.5	46.0	46.5	44.0
Total number of occupied farms.....	62	83	781	488	1,414

<sup>1</sup> Some farmsteads probably had electric power and telephone connections but did not have electric power or telephones.

There appears to be no close relationship between land classes and the percentage of farms and other buildings having electric power and telephone connections. This is due, in part, to land class IV being located largely in the southern half of the county where the electric power and telephone service is not as complete as in the northern part of the county. It is also due, in part, to many of the commercial poultry farms being located in the poorer land classes. Most commercial poultry plants necessarily have electric power service.

**Table 47—Percentage of occupied buildings other than farmsteads<sup>1</sup> having electric power connections and telephone connections by land classes, New Castle County, Delaware, 1937.**

	Land classes				County
	I & IR	II & IIR	III & IIIR	IV & IVR	
	per cent	per cent	per cent	per cent	per cent
Electric power connections <sup>2</sup> .....	51.2	61.2	74.4	52.8	65.4
Telephone connections <sup>2</sup> .....	29.5	31.0	41.4	30.5	36.3
Total number of buildings other than farmsteads.....	346	232	1,071	305	1,954

<sup>1</sup> Buildings other than farmsteads include rural residences, school houses, churches, and commercial establishments.

<sup>2</sup> See footnote 1 to Table 46.

## SUMMARY AND CONCLUSIONS

### Trends in the Production of the Different Crops and Kinds of Livestock

From 1880 to 1935, the amount of land in farms in New Castle County appears to have decreased from 253,939 acres to 206,854 acres; a decrease of 18.5 per cent. This trend is due, to a considerable extent, to the abandonment of the poorer classes of land. Apparently, many farmers have learned that it pays to farm only the better classes of land.

Since 1840, the trend of agriculture in New Castle County, in general, has been an increase in the production of the more perishable products and a decrease in the production of the more staple and concentrated products. This has involved a marked increase in the production of fluid milk and poultry products and a decrease in the production of hogs, sheep, butter, field corn, and wheat. There has been an increase in the acreage of legume hays. There has been no increase in the production of fruit and vegetable crops, apparently due to the rather heavy type of soil and to the capital involved. In the production of the more perishable products, New Castle County farmers experience less competition from areas more distant from the eastern markets.

### Extent of Land Classes

As used in this study, land classes I and IR are the poorest classes of land. They are made up largely of timber, brush, and wasteland. These land classes comprised 26.8 per cent of the land of New Castle County. Land classes II and IIR comprised largely open untillable land and constituted 7.3 per cent of the land area of the county. Land classes III and IIIR are made up largely of the crop land that is less

intensively used than class IV land, and comprised 30.9 per cent of the land. Land classes IV and IVR are the best grade of crop land and amounted to 29.2 per cent of the land. Approximately one-third of the land of New Castle County was submarginal for agricultural purposes, and about three-fifths was reasonably well suited for agricultural purposes under prevailing conditions.

As this submarginal land is not able under existing conditions to produce an adequate farm income, it would appear probable that it could possibly be used to a better economic and social advantage for forests, wildlife preserves, and for public recreation than for agricultural purposes.

One square inch on the land-classification map represents approximately 640 acres of land. It is evident, therefore, that land classification does not indicate the precise economic status of each parcel of land or even each farm. It does indicate the economic status of the area in which the parcel of land or the farm may be located.

### **Relation of Farm Practices to Land Classes**

In general, there was a close relationship between the land classes and the intensity of agricultural practices.

Of the land in land classes I and IR, II and IIR, III and IIIR, and IV and IVR, 0.5 per cent, 3.7 per cent, 35.4 per cent, and 54.9 per cent, respectively, were devoted to grain crops. However, of the same land classes, 90.6 per cent, 56.2 per cent, 5.7 per cent, and 3.8 per cent, respectively, were devoted to timber, marsh, and wasteland.

Of the land in the four land classes, ranging from the poorest class to the best, 27.3 per cent, 32.8 per cent, 47.5 per cent, and 84.9 per cent, respectively, of the land were of the Sassafras soil series. Conversely, the percentage of the land in the different land classes made up of the Elkton soil series, decreased from the poorer land classes to the better classes.

In the four land classes, ranging from the poorest class to the best, 17.7 per cent, 30.1 per cent, 40.7 per cent, and 50.4 per cent, respectively, of the farm buildings were classified as "good" and "excellent."

The crop-yield indices in land classes I and IR, II and IIR, III and IIIR, and IV and IVR were 75, 85, 100, and 104, respectively.

Capital in real estate per farm in land classes I and IR, II and IIR, III and IIIR, IV and IVR were \$5,977, \$6,267, \$9,931, and \$12,534, respectively. Apparently farm real estate in the poorer land classes was over-valued for agricultural use.

Productive man-work units per farm in land classes I and IR, II and IIR, III and IIIR, IV and IVR were 167, 160, 405, and 596, respectively.

Average number of cows per farm in the four land classes, ranging from the poorest class to the best, were 2.7, 2.9, 10.1, and 15.0, respectively. Animal units per farm, for the same land classes and in the same order, were 8.0, 7.6, 19.1, and 28.1, respectively.

As indicated by the larger proportion of the land devoted to cultivated crops, land classes IV and IVR appear to be suited for a more intensive type of land use than land classes III and IIIR.

### **Social Aspects of Land Use**

It appears that the different land classes involve distinctly different social problems.

Apparently, the farmers in the better land classes were able to retire at an earlier age. In land classes I and IR, II and IIR, III and IIIR, and IV and IVR, the number of the farmers 60 years of age and over was approximately 53 per cent, 33 per cent, 29 per cent, and 25 per cent, respectively.

A smaller proportion of the farmers in the poorer land classes were born in rural Delaware and a larger proportion were born in foreign countries. In land classes I and IR, 38.5 per cent of the farmers were born in rural Delaware, while in land classes IV and IVR, 73.0 per cent were born in rural Delaware. In land classes I and IR, 23.1 per cent of the farmers were born in foreign countries and in land classes IV and IVR only 0.8 per cent were born in foreign countries.

Farmers in the poorer land classes had less farm experience. In land classes I, IR, II, and IIR, 36.8 per cent of the farmers were engaged in non-agricultural vocations at the time they took up occupancy of the farm on which they resided at the time of the survey. However, in land classes IV and IVR, only 14.5 per cent of the farmers were engaged in non-agricultural vocations at the time they took up occupancy of the farm on which they resided at the time of the survey.

A relatively large proportion of the farmers in the poorer land classes returned to non-agricultural vocations after leaving the farms. In land classes I, IR, II, IIR, and IV and IVR, 41.7 per cent and 9.6 per cent, respectively, of the farmers returned to non-agricultural vocations after leaving the farms.

Despite a lower standard of living among farmers in the poorer land classes, the average number of children now living, born per family in land classes I, IR, II, and IIR was 3.5, while in land classes IV and IVR, the average number was 2.4.

At the end of the eleventh grade, 80.8 per cent of the farm children in land classes I, IR, II, and IIR had discontinued school, whereas in land classes IV and IVR, only 45.6 per cent of the children had discontinued school at the end of the eleventh grade.

In land class IV, approximately three times the proportion of



farmers' sons took up farming as a vocation as did in the poorer land classes.

A considerable proportion of the farmers in the poorer land classes found it necessary to supplement the farm incomes by doing work off the farm.

These social aspects of land use would appear to indicate that the farmers residing in land classes I, IR, II, and IIR, may be able to enjoy a somewhat higher standard of living and a somewhat fuller life, if they took up occupancy of farms in the better land classes or possibly if they changed to non-agricultural vocations.

Many of the economic and social aspects of land use, indicate a somewhat higher degree of development in the different land classes in the northern part of the county than in the respective land classes in the southern portion. This probably is due to the many influences associated with the location of the two areas in relation to the City of Wilmington. Among others, more than one-third of the income of the farmers in the northern part of the county is derived from the sale at retail prices of poultry products, garden products, flowers, cooked foods, and mushrooms. These enterprises have little relationship to land use but they offer opportunity for increased farm incomes in this part of the county that does not exist to the same degree in the southern part of the county.

### **Farm-to-Market Roads in the Different Land Classes**

In land classes I, II, III, and IV, 31.4 per cent, 48.3 per cent, 46.9 per cent, and 52.6 per cent, respectively, of the roads were hard-surfaced in 1937. In land classes IR, IIR, IIIR, and IVR, 55.9 per cent, 68.9 per cent, 74.0 per cent, and 79.8 per cent, respectively, of the roads were hard-surfaced in 1937. For the county as a whole, 63.3 per cent of the roads were hard-surfaced in 1937. If the roads in Groups A, B, and C were hard-surfaced, 53.4 per cent, 73.8 per cent, 76.1 per cent, and 90.7 per cent of the roads in land classes I, II, III, and IV, respectively, would be hard-surfaced. A somewhat higher percentage of the roads in land classes IR, IIR, IIIR, and IVR would be hard-surfaced. For the county as a whole, 84.5 per cent of the roads would be hard-surfaced.

For the county as a whole, 72.9 per cent of the farms were served by hard-surface roads in 1937. If the roads in Groups A, B, and C were hard-surfaced, 97.1 per cent of the farms would be served by hard-surface roads.

Within the same land class, there was an average of approximately 2.5 cows more per farm on the farms located along hard-surface roads than on farms located along dirt roads. It appears that the type of road had about one-half the influence on the intensity of the dairy business as did the class of land.

## APPENDIX

**Table A—Acres of land used for the different purposes by representative districts,  
New Castle County, Delaware, 1937.**

Use of land	Representative districts											County
	1 - 5 <sup>6</sup>	6	7	8	9	10	11	12	13	14	15	
	acres	acres	acres	acres	acres	acres	acres	acres	acres	acres	acres	
Corn - grain, sweet corn, and silage.....	101	1,357	1,106	2,884	1,766	2,592	3,689	2,011	7,111	5,713	4,189	32,519
Wheat.....	—	869	1,212	2,435	1,546	4,219	4,749	2,255	11,897	6,322	4,987	40,491
Other grains.....	—	247	257	812	229	150	210	38	3	65	50	2,061
<b>Total grain crops.....</b>	<b>101</b>	<b>2,473</b>	<b>2,575</b>	<b>6,131</b>	<b>3,541</b>	<b>6,961</b>	<b>8,648</b>	<b>4,304</b>	<b>19,011</b>	<b>12,100</b>	<b>9,226</b>	<b>75,071</b>
Clover and timothy hay.....	—	1,171	1,032	1,540	321	842	1,194	270	3,540	1,513	1,064	12,487
Clover hay.....	—	34	80	201	146	143	49	202	539	318	430	2,142
Alfalfa hay.....	—	129	448	570	35	169	156	—	116	186	145	1,954
Soybean or cowpea hay <sup>1</sup> .....	—	58	70	236	212	236	249	286	426	397	1,984	4,154
Other non-legume hay.....	—	82	325	1,526	686	592	1,212	692	500	76	7	5,698
<b>Total hay crops.....</b>	<b>—</b>	<b>1,474</b>	<b>1,955</b>	<b>4,073</b>	<b>1,400</b>	<b>1,982</b>	<b>2,860</b>	<b>1,450</b>	<b>5,121</b>	<b>2,490</b>	<b>3,630</b>	<b>26,435</b>
Total truck crops <sup>2</sup> .....	9	390	255	589	318	582	495	124	437	318	423	3,940
Total cannery crops <sup>3</sup> .....	—	14	28	27	23	10	50	48	210	394	369	1,173
Total fruit crops <sup>4</sup> .....	—	138	103	295	50	81	233	63	74	189	198	1,424
Tillable land lying out.....	12	1,077	1,365	2,202	1,628	2,038	2,263	631	630	619	1,174	13,639
Tillable pasture.....	—	589	1,662	1,482	655	1,554	2,511	1,174	5,129	3,903	2,801	21,460
Open, untillable pasture.....	—	1,068	1,528	2,629	1,006	656	980	454	932	991	771	11,015
Brush pasture.....	—	75	55	316	427	184	339	61	145	161	121	1,884
<b>Total pasture.....</b>	<b>—</b>	<b>1,732</b>	<b>3,245</b>	<b>4,427</b>	<b>2,088</b>	<b>2,394</b>	<b>3,830</b>	<b>1,689</b>	<b>6,206</b>	<b>5,055</b>	<b>3,693</b>	<b>34,359</b>

Table A—Acres of land used for the different purposes by representative districts, New Castle County, Delaware, 1937 (continued)

County	Representative districts										
	1 - 5 <sup>a</sup>	6	7	8	9	10	11	12	13	14	15
Use of land	acres	acres	acres	acres	acres	acres	acres	acres	acres	acres	acres
Timber.....	28	4,408	2,850	3,863	2,605	1,556	6,116	115	2,414	8,475	7,543
Brush not pastured.....	99	999	594	701	721	747	1,452	438	886	706	629
Marsh land.....	1,271	352	846	—	575	3,171	3,101	5,809	3,210	7,511	25,846
Other wasteland.....	387	1,242	1,053	2,130	518	916	489	446	309	817	1,003
Open, unutilizable idle land.....	1,785	7,001	5,343	6,694	4,419	6,942	9,243	4,853	9,485	13,208	16,686
Total timber, marsh, and wasteland.....	1,785	7,001	5,343	6,694	4,419	6,942	9,243	4,853	9,485	13,208	16,686
Farmsteads.....	3	351	1,105	576	173	226	188	128	114	186	150
Other houses.....	5	351	1,105	576	173	226	188	128	114	186	150
Roads.....	—	383	402	665	262	441	444	226	500	504	501
Railroads.....	37	56	131	93	159	153	110	62	55	75	36
Miscellaneous <sup>b</sup> .....	1	208	495	760	245	766	170	373	132	169	93
Total development.....	46	1,420	2,607	2,719	1,124	1,997	1,475	1,009	1,430	1,495	1,347
Residential and industrial.....	4,509	4,367	3,488	547	804	1,133	80	234	418	125	40
Total land area.....	6,462	20,086	20,964	27,704	15,395	24,120	29,177	14,405	43,022	35,993	36,786
Internal water area.....	375	66	400	21	63	173	367	337	726	605	684
Total land and water area.....	6,837	20,152	21,364	27,725	15,458	24,293	29,544	14,742	43,748	36,598	37,470
	277,931										

1 - 5 See footnotes 1 - 5 to Table 10.

<sup>a</sup> Representative districts 1 - 5 are within the corporate boundaries of the City of Wilmington.

There is some discrepancy between these data and those of the U. S. Census, 1935. However, in view of the care and methods used in this study, it is believed these data are correct. A part of the discrepancy may be explained by the fact that the two sets of data represent different years.

Table B—Percentage of land used for the different purposes by representative districts,  
New Castle County, Delaware, 1937.

Use of land	Representative districts										County	
	1 - 5 <sup>6</sup>	6	7	8	9	10	11	12	13	14		15
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent		per cent
Corn - grain, sweet corn, and silage.....	1.6	6.8	5.3	10.4	11.5	10.8	12.6	14.0	16.5	15.9	11.4	11.9
Wheat.....	—	4.3	5.8	8.8	10.0	17.5	16.3	15.6	27.7	17.5	13.6	14.7
Other grains.....	—	1.2	1.2	2.9	1.5	.6	.7	.3	*	.2	.1	.8
Total grain crops.....	1.6	12.3	12.3	22.1	23.0	28.9	29.6	29.9	44.2	33.6	25.1	27.4
Clover and timothy hay.....	—	5.8	4.9	5.6	2.1	3.5	4.1	1.9	8.2	4.2	2.9	4.6
Clover hay.....	—	.2	.4	.7	.9	.6	.2	1.4	1.2	.9	1.2	.8
Alfalfa hay.....	—	.6	2.1	2.1	.2	.7	.5	—	.3	.5	.4	.7
Soybean or cowpea hay <sup>1</sup> .....	—	.3	.3	.8	1.4	1.0	.8	2.0	1.0	1.1	5.4	1.5
Other non-legume hay.....	—	.4	1.6	5.5	4.5	2.4	4.2	4.8	1.2	.2	—	2.1
Total hay crops.....	—	7.3	9.3	14.7	9.1	8.2	9.8	10.1	11.9	6.9	9.9	9.7
Total truck crops <sup>2</sup> .....	.1	1.9	1.2	2.1	2.1	2.4	1.7	.9	1.0	.9	1.1	1.4
Total cannery crops <sup>3</sup> .....	—	.1	.1	.1	.1	.1	.2	.3	.5	1.1	1.0	.4
Total fruit crops <sup>4</sup> .....	—	.7	.5	1.1	.3	.3	.8	.4	.2	.5	.5	.5
Tillable land lying out.....	.2	5.4	6.5	7.9	10.6	8.4	7.8	4.4	1.5	1.7	3.2	5.0
Tillable pasture.....	—	2.9	7.9	5.3	4.3	6.4	8.6	8.1	11.9	10.8	7.6	7.8
Open, untillable pasture.....	—	5.3	7.3	9.5	6.5	2.7	3.3	3.2	2.2	2.8	2.1	4.0
Brush pasture.....	—	.4	.3	1.2	2.8	.8	1.2	.4	.3	.4	.3	.7
Total pasture.....	—	8.6	15.5	16.0	13.6	9.9	13.1	11.7	14.4	14.0	10.0	12.5

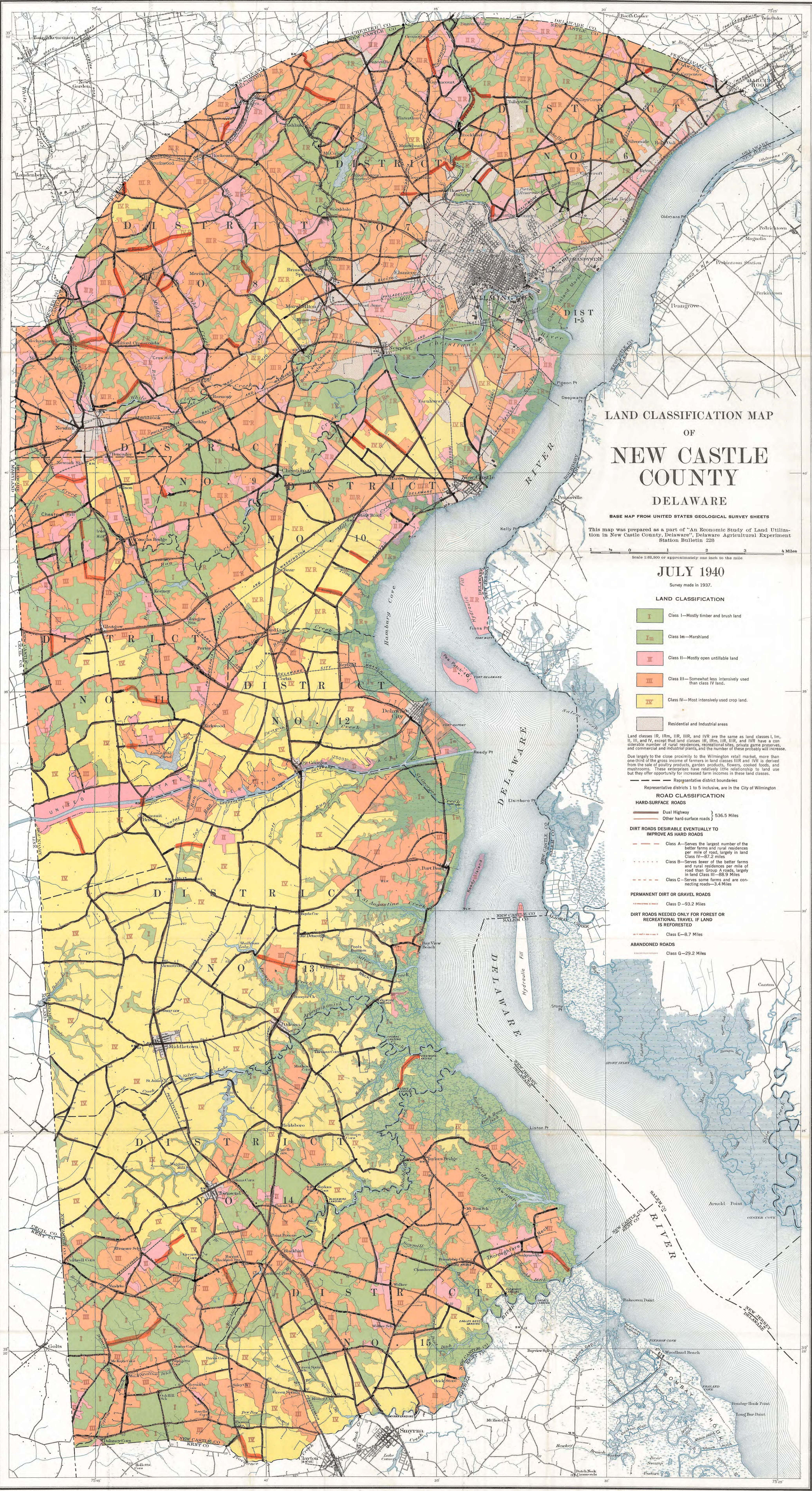
Table B—Percentage of land used for the different purposes by representative districts, New Castle County, Delaware, 1937. (continued)

County	Representative districts														
	1-5 <sup>a</sup>	6	7	8	9	10	11	12	13	14	15	per cent	per cent	per cent	per cent
Timber.....	4	21.9	13.6	14.0	17.0	6.5	21.0	.8	5.6	23.5	20.5	14.6	1.5	1.7	
Brush not pastured.....	1.5	5.0	2.9	—	4.7	3.1	5.0	—	2.0	2.0	1.7	2.9	1.5	1.7	
Marsh land.....	19.7	1.8	4.0	—	3.7	13.1	—	21.5	13.5	20.4	9.4	14.6	1.2	1.2	
Open, unutilizable idle land.....	6.0	6.2	5.0	7.7	3.3	2.3	4.1	—	.2	3.4	.9	1.6	1.2	1.2	
Total timber, marsh, and wasteland.....	27.6	34.9	25.5	24.2	28.8	28.8	31.7	33.7	22.0	45.4	31.2	1.7	1.7	1.7	
Farmsteads.....	*	2.1	2.3	2.3	1.9	1.8	1.9	1.5	1.4	1.6	1.5	1.7	1.7	1.7	
Other houses.....	.1	1.8	5.2	2.1	1.1	.9	.6	.9	.3	.5	.4	1.2	1.2	1.2	
Roads.....	—	1.9	1.9	2.4	1.7	1.7	1.5	1.6	1.2	1.4	1.4	1.6	1.2	1.2	
Railroads.....	.6	.3	.6	.3	.7	.4	.4	.4	.1	.1	.4	1.4	1.2	1.2	
Miscellaneous <sup>b</sup> .....	*	1.0	2.4	2.7	1.6	3.2	.6	2.6	.3	.5	.3	1.2	1.2	1.2	
Total development.....	.7	7.1	12.4	9.8	7.3	8.3	5.0	7.0	3.3	3.7	6.1	6.1	6.1	6.1	
Residential and industrial.....	69.8	21.7	16.7	2.0	5.2	4.7	.3	1.6	1.0	.4	5.8	5.8	5.8	5.8	
Total land area.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

\* Less than .05 per cent.

<sup>a</sup> - See footnotes 1 - 5 to Table 10.

<sup>b</sup> See footnote 6 to Appendix Table A.



LAND CLASSIFICATION MAP  
OF  
**NEW CASTLE COUNTY**  
DELAWARE

BASE MAP FROM UNITED STATES GEOLOGICAL SURVEY SHEETS  
This map was prepared as a part of "An Economic Study of Land Utilization in New Castle County, Delaware" Delaware Agricultural Experiment Station Bulletin 228

Scale 1:62,500 or approximately one inch to the mile

**JULY 1940**  
Survey made in 1937.

**LAND CLASSIFICATION**

- Class I—Mostly timber and brush land
- Class Im—Marshland
- Class II—Mostly open unutilized land
- Class III—Somewhat less intensively used than class IV land.
- Class IV—Most intensively used crop land.
- Residential and Industrial areas

Land classes IR, IRm, IIR, IIRr, and IVR are the same as land classes I, Im, II, III, and IV, except that land classes IR, IRm, IIR, IIRr, and IVR have a considerable number of rural residences, recreational sites, private game preserves, and commercial and industrial plants, and the number of these probably will increase.

Due largely to the close proximity to the Wilmington retail market, more than one-third of the gross income of farmers in land classes IIR and IVR is derived from the sale of poultry products, garden products, flowers, cooked foods, and mushrooms. These enterprises have relatively little relationship to land use but they offer opportunity for increased farm incomes in these land classes.

— Representative district boundaries  
— Representative districts 1 to 5 inclusive, are in the City of Wilmington

**ROAD CLASSIFICATION**

**HARD-SURFACE ROADS**  
— Dual Highway } 536.5 Miles  
— Other hard-surface roads }

**DIRT ROADS DESIRABLE EVENTUALLY TO IMPROVE AS HARD ROADS**  
- - - - - Class A—Serves the largest number of the better farms and rural residences per mile of road, largely in land Class IV—47.2 Miles  
- - - - - Class B—Serves fewer of the better farms and rural residences per mile of road than Group A roads, largely in land Class III—88.9 Miles  
- - - - - Class C—Serves some farms and are connecting roads—3.4 Miles

**PERMANENT DIRT OR GRAVEL ROADS**  
- - - - - Class D—93.2 Miles

**DIRT ROADS NEEDED ONLY FOR FOREST OR RECREATIONAL TRAVEL IF LAND IS REFORESTED**  
- - - - - Class E—8.7 Miles

**ABANDONED ROADS**  
- - - - - Class G—29.2 Miles

