# GEOLOGY AND GEOGRAPHY

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## Rural Population Density in Indiana

JOHN FRASER HART, Indiana University

It is my purpose here to consider the distribution of rural population in Indiana, together with sources and techniques for ascertaining how the rural population is distributed. Many of my suggestions and ideas are generic, rather than specific, in that they are applicable throughout the areas covered by the 1950 Census of Population. It seems appropriate to apply these generic concepts specifically to Indiana, however, in view of the fact that Indiana is so close to the national demographic norm (3, 4).
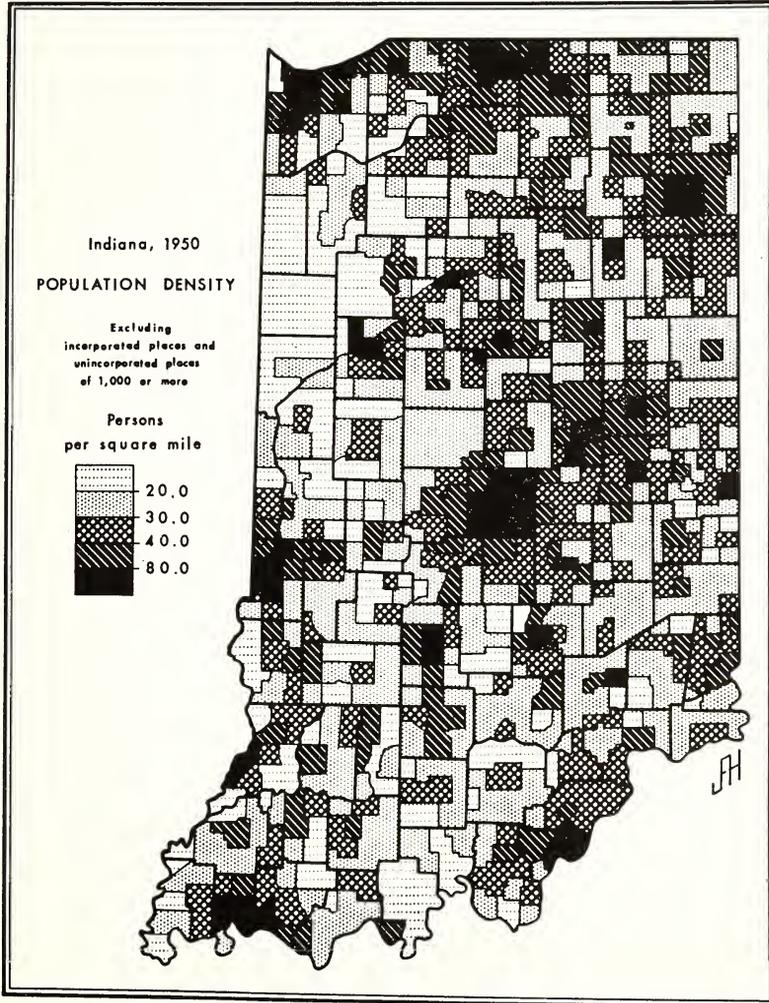
The primary statistical source of information on numbers of people in this country is the decennial Census of Population, which divides total population into three categories, urban, rural nonfarm, and rural farm. The urban population consists essentially of those people living in places of 2,500 or more, plus those on the urban fringes of cities of 50,000 or more. All other people are classified as rural.

Within the rural category, however, there are two subdivisions, rural nonfarm and rural farm. The rural farm population consists of all persons living on farms, regardless of occupation; a farm was defined, in 1950, as any place of 3 acres or more with sales of farm produce amounting to $150 or more. The rest of the population, the people who do not live in places of 2,500 or more or on farms, are classified as rural nonfarm population. It has already been shown that there is a close relationship between the distribution of the rural nonfarm population and the distribution of urban centers (1), and a large proportion of the rural nonfarm population are actually people who live in clustered settlements which happen to lie outside the Census definition of urban places.

It would seem, therefore, that any consideration of the rural population should be restricted to the rural farm population, as this is essentially the group of people who live in "open country," as opposed to "clustered settlements." Furthermore, it appears that the distribution of the rural nonfarm population is related to the distribution of urban places, whereas the distribution of the rural farm population seems to bear a closer relation to the physical environment and the associated agricultural economy. One would suspect, therefore, that the density of rural farm population would be relatively uniform over extensive areas, or regions, with gradual transitions in density from one region to

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another, whereas the rural nonfarm population tends to be nucleated on urban foci. It would seem desirable, in fact, to portray the distribution of the rural nonfarm population by point symbols, reserving area symbols for the rural farm population, which is the only one of the three major categories which is actually dispersed across the countryside.

The rural farm population density pattern is different in the two halves of Indiana. In the northern half there is a gradual decline from areas of greatest density in the east to areas of least density in the



Indiana, 1950

POPULATION DENSITY

Excluding
incorporated places and
unincorporated places
of 1,000 or more

Persons
per square mile

20.0
30.0
40.0
80.0

west (Fig. 1). The pattern in the southern half is rather more complex, with densities ranging a bit lower than the state average, and less variation from east to west. There are scattered counties of high or low density, but the only area of contiguous counties with extreme

densities is the group of counties with high densities in the south-eastern corner of the state.

Unfortunately, data on the rural farm population are not published for areal units smaller than counties. Within an area as small as Indiana, the patterns revealed by use of data by counties (average size, 393.5 square miles) are undesirably gross, and it would be preferable to use data for townships (average size, 35.8 square miles) for better comparison with the fine grained geographic patterns of other distributions within the state.
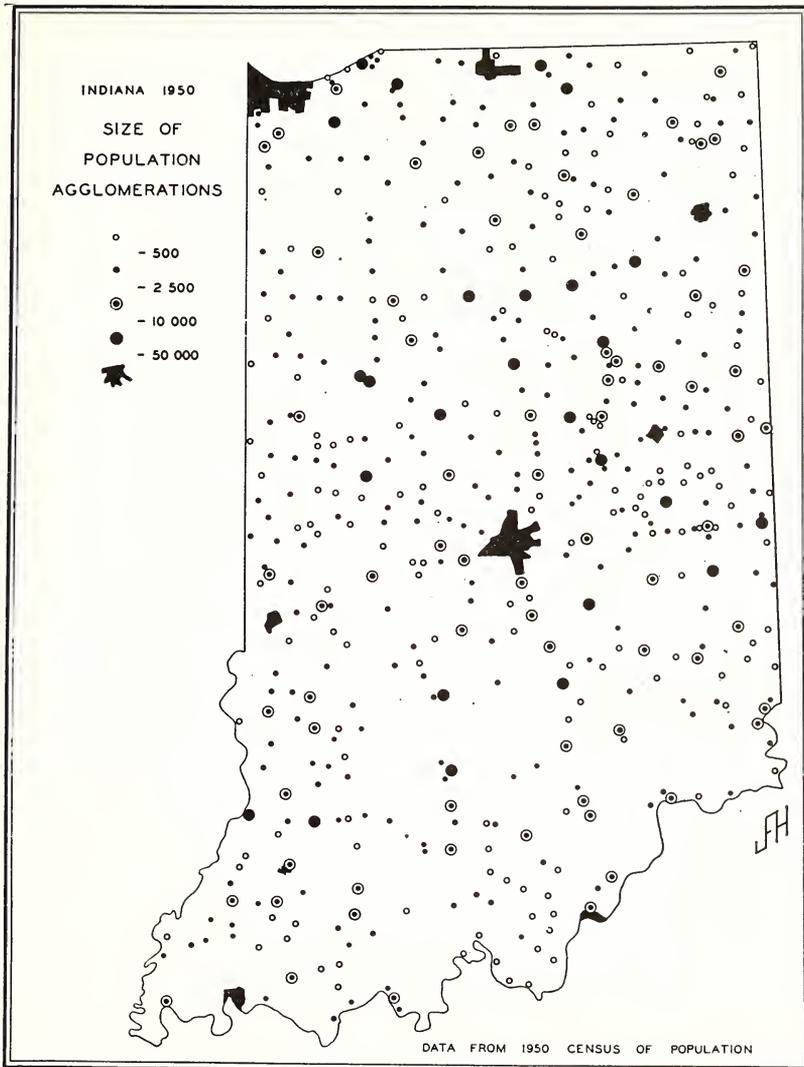
Take, for instance, the seven physiographic sub-provinces of southern Indiana; no single county lies wholly within the Mitchell Plain, the Scottsburg Lowland, or the Muscatatuck Regional Slope. Only Brown County is entirely within the Norman Upland, and only two counties, Crawford and Perry, lie wholly within the Crawford Upland. Only five counties are wholly within the Dearborn Upland, and only eight within the Wabash Lowland. Thus, of the 46 counties which lie in whole or in part within these sub-provinces, only 16 are entirely within a single province and can be considered representative thereof, whereas three of the seven provinces do not have a single representative county. Furthermore, ten counties contain parts of three different provinces, three counties contain parts of four, and Putnam County has the unique distinction of containing parts of five!

Comparable complications could be cited for the other generally accepted regional subdivisions of Indiana, and it seems apparent that attempts at geographic investigation within the state should be based on minor civil division data rather than on county data if this is at all possible. It will certainly be difficult, because appallingly little Census material is published on a township basis.

In the case of population, for instance, the 1950 Census publishes the total population of each township, the total population of all incorporated places, and the total population of the twelve unincorporated places having more than 1,000 persons. By subtracting the population of clustered settlements from the total township population it is possible to estimate the population of each township who live in the open country, although it is obvious that some significant proportion of these people live in unincorporated villages. (Parenthetically, I am happy to report that the Bureau of the Census is making strenuous efforts to obtain more complete information in 1960 for all clustered settlements, whether incorporated or not, which have at least 100 dwelling units or approximately 400 persons.)

The distribution of the clustered settlements for which data are available for 1950 has been discussed in a previous paper (Fig. 2). Here I am concerned with the density of the remaining population. Let it be emphasized at once that this is not a map of rural population, nor is it a map of open country population, but it is the closest approach we can make with the data available in the 1950 Census (Fig. 3). For lack of a better term, we might call these people the "nonurban" population.

Three singular aspects of the map warrant brief consideration. First, despite my efforts to reduce or eliminate the influence of urban centers,

INDIANA 1950

SIZE OF

POPULATION

AGGLOMERATIONS

○  − 500

·  − 2 500

◎  − 10 000
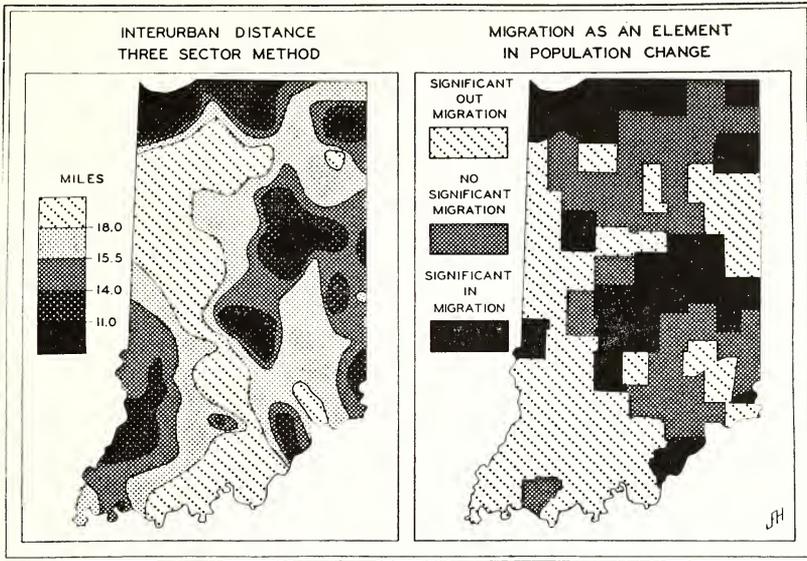
●  − 50 000

DATA FROM 1950 CENSUS OF POPULATION

it is apparent that there is quite a close relationship between the
densities here indicated and our major urban centers. The six major
clusters of townships with densest population all focus on metropolitan
areas: Indianapolis-Muncie, Chicago-Elkhart, Fort Wayne, Terre Haute,
Evansville, and that part of the Louisville fringe represented by Jeffer-
sonville and New Albany.

Six lesser clusters of townships with dense population are also
urban oriented, focussing on the towns of the middle Wabash Valley,
on the Kokomo-Marion area, on Vincennes, on the Stone Belt, on the
Columbus-Seymour area along U. S. 31, and in Dearborn County on
Cincinnati.

Indiana, 1950

RURAL FARM
PERSONS PER
SQUARE MILE

15.0
17.0
20.0
22.0
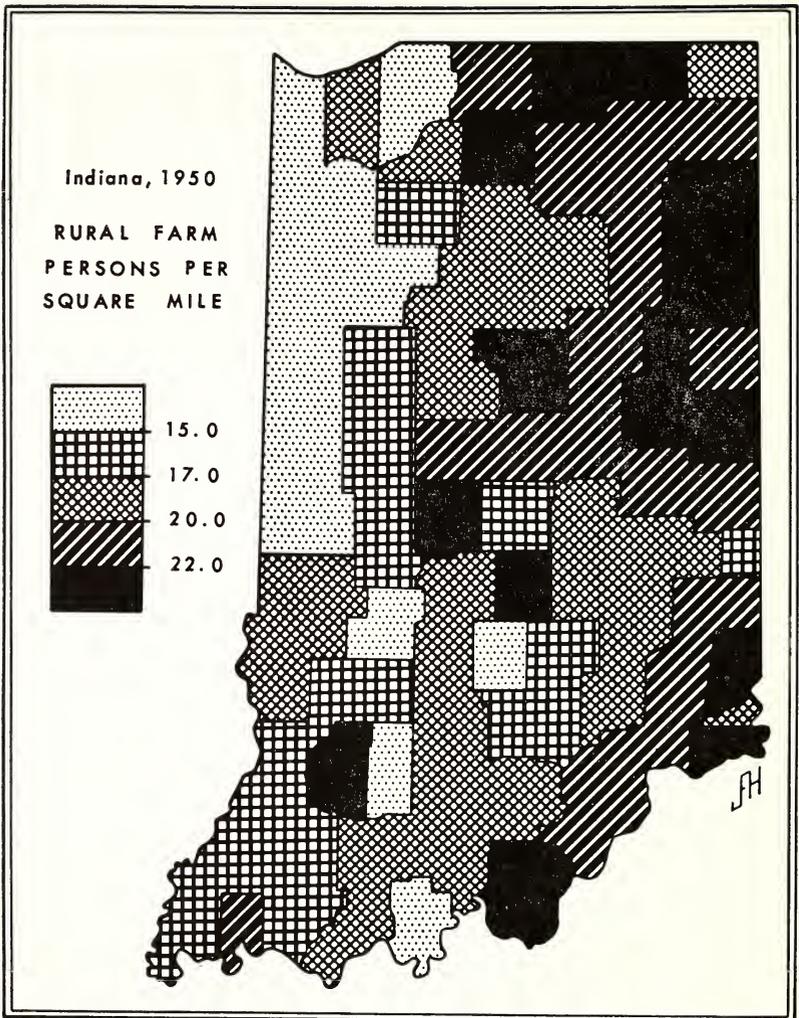
The second point to which I wish to call your attention is the fact that the areas of densest non-urban population are the very areas with the greatest numbers of urban areas, as indicated by interurban distance, and those with the greatest amounts of in-migration (Fig. 4) (2, 5).

The third point is the significance of a line from Chicago to Louisville in the population geography of Indiana (Fig. 3). This may not be evident at first glance, because the thickening of the population fabric near urban areas has created numerous islands of denser population. Closer examination, however, reveals that the vast majority of Indiana's townships with less than 20 nonurban persons per square mile are west of this line, and it is also true that the majority of town-

ships west of this line have fewer than 30 nonurban persons per square mile. Conversely, densities of more than 30 nonurban persons per square mile are characteristic of the townships east of the line, and the eastern sector also contains a disproportionate share of the densely populated townships.

Before concluding, I should like to call your attention to a few specific relationships which one can detect from this map. The largest contiguous area of sparsest population density coincides with the cash grain farming area centering on Benton County (Fig. 3). For most of their lengths, the Mitchell Plain and the Scottsburg Lowland are relatively densely populated, whereas moderate densities characterize the Muscatatuck Regional Slope, and the Norman and Crawford Uplands are quite sparsely populated. It is nonetheless interesting that the major factor controlling the density of nonurban population in Indiana seems to be neither agriculture nor physiography, but the distribution of urban centers.

I should like to conclude, therefore, as I did last year, with two questions suggesting lines of investigation which appear to hold significant potentialities. First, can we delimit "zones of urban influence" for individual cities on a demographic basis? My inablity, thus far, to develop technques for such delimitation has not yet dampened my hopes that they can be developed. Second, can we delimit population regions in precise quantitative terms? Subjective delimitation, I submit, is as unsatisfactory as it is simple, but I have high hopes that we can develop objective techniques for delimiting population regions, and that these population regions will take their rightful and useful place alongside our existing systems of physiographic, climatic, agricultural, and manufacturing regions.

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