Land Use of Selected Cities in Indiana

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Introduction

This is a paper which is based upon some land use data gathered from field research in six Indiana cities. The first part of this paper is a brief description of the technique and classification system used to map urban land uses. The second part is a brief examination of some land use data of six Indiana cities which is then compared with the functional classifications of these cities.

Mapping Technique and Classification System

All land included in this study was classified as developed or vacant or water areas in accordance with the Bartholomew method of classifying urban land uses (1). The developed land includes all areas used for urban functions whether open use such as parks or intensive uses, such as downtown department stores. Land not used for urban functions, such as cropland or undeveloped land for subdivisions, was classified as vacant.

The field mapping was conducted by a team of two, mapping from inside an automobile and plotting the symbols on an acetate overlay above an existing Sandborn Atlas base map of that city. This "windshield mapping procedure" was carried out by undergraduate students who were majoring or minoring in geography at Indiana State College. At the end of each work day in the field, the data from the overlays were plotted on a large-scale base map in the office. The base map, normally drawn from the city engineers base map, showed all streets and lot lines for all developed areas of the city. The existing land use for each lot was plotted on the large line map according to Bartholomew's land use classification system (1). Letters were used as symbols of land use in the field, but the final maps were reproduced in multicolors.

The statistical summaries are prepared in terms of acreage consumed in each category of use employed in the survey (Table I). Percentage summaries are then used to compare the city with the Bartholomew percentages of cities of comparable size which is termed the "Percentage of Standard Land Usage" (Table II).

The actual measuring of land use acreages was done by a planimeter or an areagraph. The accuracy of areagraphs used vary from 90 per cent to 97 per cent. The choice of the areagraph or the planimeter was determined by the dissemination and areal extent of a common land use.

With this simple, standardized system and technique employed in the six cities, and with the same persons mapping and measuring the land use of these cities, selected characteristics, comparisons and contrasts will be made.

TABLE I

COMPARATIVE LAND USES

Percentage of Total Developed Land

City	1960 Population	Residential	Commercial	Transportation, Utilities, and Communication	Industrial	Community Facilities
Jeffersonville	19,522	43.6	5.4	27.6	13.3	10.1
Logansport	21,106	40.8	4.5	30.0	6.4	18.3
LaPorte	21,157	39.9	3.9	34.1	11.2	10.9
Bloomington	31,357	35.9	2.9	16.6	14.8	29.8
Mishawaka	33,361	46.1	4.0	35.5	7.7	6.7
Marion	37,854	32.0	4.5	41.7	9.2	12.6
Bartholomew Standard*	—50,000	39.6	3.1	33.3	5.7	18.3

* Based upon 28 United States cities of less than 50,000 persons by Harland Bartholomew, *Land Uses in American Cities.* Harvard University Press, 1955. pp. 21-73.

TABLE II

PERCENTAGE OF STANDARD LAND USAGE

City	Residential	Commercial	Transportation, Utilities, and Communication	Industrial	Community Facilities	Functional Classification**
Jeffersonville	110	174	83	233	55	Industrial
Logansport	103	145	90	112	100	Industrial and Transportation
LaPorte	101	126	102	196	60	Industrial
Bloomington	91	94	50	260	163	Professional
Mishawaka	116	129	107	135	37	Industrial
Marion	81	145	125	161	69	Diversified
Bartholomew Standard	100	100	100	100	100	

** Based upon Howard J. Nelson's criteria included in "A Service Classification of American Cities." *Economic Geography,* July, 1955. pp. 189-210. Employment Data based upon 1960 Indiana Employment Security Division Reports.

Land Use Characteristics

From Table I comparative land uses of the six cities and the Bartholomew standard can be analyzed. Table II reveals a comparison of the percentages of standard land usage, and provides data for a comparison of the existing land use and their functional classifications based on 1960 employment data and the use of Nelson's criteria.

The six cities are distributed in a random fashion within Indiana and no attempt is made here to analyze their many local geographical differences. The cities are third and fourth class cities which range in population from 19,522 persons in Jeffersonville to 37,854 persons in Marion. The 28 cities of less than 50,000 persons, which were selected by Harland Bartholomew and Associates, were used to quantitatively compare the land use characteristics of the six Indiana cities.

Jeffersonville, with 5.4 per cent of the total developed land in commercial uses, has relatively more developed commercial land than any of the six selected cities (Table I). Jeffersonville has 174 per cent of standard commercial land usage, and the areas consumed for industry in Jeffersonville is 233 per cent of the average of the 28 selected cities. This unusually large area is due largely to the extensive area in the Quartermaster Depot. In contrast, only 83 per cent as much land is consumed for transportation, utilities, and communication and only 55 per cent of the land in community facilities as in the Bartholomew Standard (Table II). As can be also read (Table II), the residential areas consume 110 per cent of the Bartholomew average.

The land use in Logansport is more closely related to standard land usage than for the other five cities (Tables I and II). Unusually close comparisons occur in such land uses as residential; transportation, utilities, and communication; industrial; and community facilities which range from 90 per cent to 112 per cent of Standard Land Usage. On the other hand, 145 per cent of average standard land usage does exist in commercial land uses. Logansport has exactly the same proportion of its developed land set aside for community facilities as the Bartholomew standard, the only such instance noted in Table II.

LaPorte has about an average percentage of its developed land consumed for residential areas. It has almost twice the area in industrial space and 126 per cent of standard land usage set aside for commercial land. But, the proportion of land consumed for community facilities in LaPorte is only 60 per cent of standard usage of the comparison cities.

On a percentage basis, Bloomington falls below the average of the 28 cities in areas used for residential; commercial; transportation, utilities, and communication. In contrast to the other three land uses, Bloomington has 260 per cent of the average usage of land in industry. The extensive limestone quarries, which are scattered through several planning districts and were classified as industrial, is the primary reason for this abnormally large percentage. Since the general category of community facilities includes Indiana University, Bloomington has 163 per cent standard land usage consumed for community facilities. The streets and roads which serve the university campus were also

classified as community facilities. Therefore, only 50 per cent of standard land usage occurs in transportation, utilities, and communication.

Mishawaka has above the average land areas used for residential; commercial; industrial; and transportation, utilities, and communication uses. Mishawaka's land in community facilities is only 37 per cent of the Bartholomew standard, a fact that may influence local thinking about the availability of state and federal recreational facilities in northern Indiana.

Marion uses only 81 per cent as much land for residential purposes but uses 145 per cent as much land for commercial purposes, 125 per cent as much for transportation, utilities, and communication, and 161 per cent as much of its total developed land for industrial land uses as the Bartholomew Standard (Table II). In common with most other third class cities in Indiana, Marion also has less than average land in community facilities with only 69 per cent of standard land usage.

The 1960 employment figures for Jeffersonville indicate that 54 per cent of the labor force was employed in industries (2). This was the only employment classification that ranked considerable above the average of the Nelson standard percentage of employment. The functional classification of Jeffersonville is industrial as Nelson determined an average of 27 per cent employed by industries (2).

By using Nelson's criteria, and the 1960 employment figures, Logansport is both an industrial and transportation city. In 1960, Logansport had 60 per cent of its total labor force employed in industries. In addition, about 26 per cent of its labor forces was employed in transportation, utilities, and communication in comparison to Nelson's average of 7.1 per cent (2).

LaPorte, which has 11.2 per cent of its developed land used by industries, has 69 per cent of the total labor force employed by industries. Its functional classification is also industrial.

Bloomington is classified as a professional city. Employment figures for 1960 show that 6,184 persons are employed in educational services which even exceeds the total number of persons employed by industry. Nelson found the average is 11.1 per cent employed in professional services.

The functional classification of Mishawaka is industrial since about 75 per cent of all of Mishawaka's employment, or about three times as many as Nelson shows to be average for the United States, are employed by industries (2).

According to Nelson's criteria, Marion is classified as a diversified city since none of the classifications exceed the average by a standard deviation.

The six cities range from 65.5 per cent (in Bloomington) to 81.6 per cent (in Mishawaka) of their developed areas confined to residential areas and to transportation, utilities, and communications (Table I). The most significant differences in how cities use their land really occur in only about the one-fourth of the developed area which is used for commercial, industrial, and community facilities.

Conclusions

In an attempt to characterize the land use of six smaller cities of Indiana, the lack of data and of understanding have been apparent at many points. The resulting conclusions are of course, incomplete and tentative.

The general problem of the mapping technique and classification needs to be carried out more widely in the United States. But Bartholomew's method lends itself to a uniform and comprehensive system of collecting urban land use data. If a more generally recognized standard system of urban land use classification were more widely used, geographers no longer have to rely primarily upon employment data as a basis for the functional classification of American cities. Rather, cities could be classified on the basis of how much land is used for what purpose. No such classification system is widely used now, but such a classification scheme would be of great value to geographers and city planners.

As more attention is given to the establishment of optimum standards of urban land use, more details about the existing land uses in smaller cities could aid in finding better ways of arriving at numerical estimates of how much space a city will need in the future. Undoubtedly, geographers can do much better than they have been doing at equating myriads of urban ecological data with land use characteristics of American cities.

Literature Cited

1. BARTHOLOMEW, HARLAND. 1955. Land Uses in American Cities. Harvard University Press, pp. 147-157.
2. NELSON, HOWARD J. 1955. A Service Classification of American Cities. Economic Geography XXXI (July) : 189-210.