A STUDY OF THE RURBANIZATION PROCESS IN BRANTFORD TOWNSHIP

A STUDY OF SELECTED ASPECTS OF THE "RURBANIZATION" PROCESS IN BRANTFORD TOWNSHIP

by

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ABSTRACT:

This study examines the problem of "rurbanization," which is a term that has been applied to the process by which rural areas are being changed by urban influences. This implies more than the traditional geographic concept of land-use change at the rural-urban fringe, but is concerned with basic changes in the agricultural industry relating to appearance, land use, density and social structure.

In rural Southern Ontario, there are two main phenomena occurring to effect these changes: the increase in part-time farming and in low-density residences. This study is concerned more specifically with an examination of these two phenomena. Its two main objectives are to see how these two are interrelated and how they have affected agriculture and rural society.

The study achieves these objectives through the use of a questionnaire administered to residents of Brantford

township, a rural area with a thriving agricultural industry, but at the same time under considerable stress from urban pressures. Three types of residents were surveyed: full-time farmers, part-time farmers and non-farmers. The data collected was subjected to discriminant and cross-tabulation analyses in order to observe similarities and differences among the three groups. These similarities and differences allowed inferences concerning the acceptance or rejection of six postulated hypotheses.

The following general conclusions result from the analysis:

Part-time farmers and rural non-farmers are predominantly former urbanites who have migrated to rural areas. Both groups share similar occupations and have lived at the rural location for a similar length of time, but non-farmers tend to be older and to have been born and raised on a farm. However, there does exist a significant minority of part-time farmers who were former full-time farmers. Both phenomena appear to be fairly permanent arrangements as the overwhelming majority of both groups wished to maintain their present status.

Full-time farmers tend to have a larger size of holding than part-time farmers. Part-time farmers place less emphasis on livestock and tobacco as the predominant crop than do full-time farmers, and tend to place a greater emphasis upon

corn and mixed grains as cash crops. The type and quality of land that is occupied and the attitude toward the preservation of agricultural land do not vary significantly by group. All three groups were strongly in favour of preservation of land for farming. The participation rates of part-time and non-farmers in the rural organizations of the township and in the urban organizations of nearby towns are not significantly different from those of full-time farmers.

The study has confirmed some of the findings of other researchers and has in turn shed some new light on the "rurbanization" problem. Urban out-migration has been found to be the most important cause of the problem. Thus the problem appears to be the result of a social phenomenon rather than a physical one, and the phenomena causing the problem appear to be persistent and permanent. It may also be noted that the choice of alternative, either part-time farming or non-farming residency, is somehow related to the age and location of birth and childhood of the urban out-migrant. Significantly, more part-time farmers were born in the city and more non-farmers were born on a farm. It may be argued that this is precisely opposite to the situation that might be expected.

ACKNOWLEDGEMENTS

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I. INTRODUCTION

Since the Second World War, the phenomenon of suburbanization has been rampant in Canada and indeed throughout the Western World. A mass exodus of city dwellers to fringe areas of the city has occurred, completely altering the traditional nature of the western city and creating a continuum of urban-suburban-rural intensities of dwelling rather than the traditional urban-rural dichotomy.

For the first period of time in which this phenomenon was occurring, rural areas other than those directly bordering the built-up fringes of urban areas were not significantly affected by it. However, within the past fifteen years, the traditional contrasts between the urban and rural landscapes and functions have been gradually disappearing. The agricultural areas of Canada are undergoing a great change as a result of this process, which has been termed the process of "rurbanization." *

This process is the result of two phenomena of change occurring within the agricultural areas: (1) the rapid rise

* This word was first coined by C.J. Galpin, the former head of the Division of Farm Population and Rural Life in the U.S. Dept. of Agriculture, and was subsequently adopted by Baker (1939) to describe the process by which rural areas are being changed by urban influences. This term is an all-encompassing one: it refers to more than just the traditional geographical concerns relating to land use change, but also to other social and functional changes such as changes in density, general visual appearance, attitudes, occupations and social activities of rural residents.

of part-time farming as a significant activity among rural dwellers, and (2) the rapid spread of rural low-density non-farm residences as a result of urban-rural migration. Consequently, the traditional concept of rural areas and of agriculture has been altered with respect to both their appearance and function.

Both of these processes have been well-documented as being quite significant. A.R.D.A. reports concerning planning for agriculture in Southern Ontario make the following statements:

"The relative numbers of part-time farmers has increased from 27% of all farms in 1951 to 41% in 1966. The phenomenon is well-entrenched in the agricultural economy of Southern Ontario and...it further appears as though part-time farming has become and probably will remain a permanent feature of Ontario agriculture...Part-time farmers now embrace nearly one-third of Ontario's farmland." (A.R.D.A., 1972, p. 164.)

"Indications are that the rapid spread of rural low-density residences will prove to be a movement of major importance to rural areas in Ontario in the 1970's." (Ibid., p. 116.) Other writings make similar observations.

At any rate, the agricultural areas of Canada today seem to be undergoing a significant upheaval. Yet these changes have occurred so rapidly and recently that they are

not fully understood and their implications have not yet been carefully assessed. A.R.D.A. again states:

"The spreading phenomenon of rural low-density residential occupancy of the countryside must be closely watched ...At present, the significance of this phenomenon to agriculture has still to be properly assessed...Research must be immediately begun on this problem." (Ibid., p. 107-116.)

Although part-time farming has been studied to a greater extent, Bertrand (1967) notes:

"The concept of part-time farming continues to be the subject of some controversy and varies somewhat according to the whims of the researcher and possibly the data at hand." (p. 296.)

The ignorance and uncertainty about these changes gives rise to alarm. This becomes more evident when one reads that "...the effect (of the phenomena) to agriculture would not appear to be positive and its implications must be rapidly assessed before rural planning is overwhelmed by it." A.R.D.A., 1972, p. 107.) This is even more disquieting in the light of the present raging controversy in Southern Ontario and in all of Canada concerning the rapid loss of prime agricultural land to non-agricultural uses. Certainly, these problems need to be investigated since they affect the future welfare of agriculture and are of vital importance to the Canadian economy as a whole.

This study seeks to shed some light on this area of concern through research performed in a Southern Ontario agricultural township close to, and affected by, urban influences. It is a study of the township of Brantford, in Brant County. The study has two main general objectives, which are as follows:

(1) It seeks to examine the relationship between the two components of the process of "rurbanization," by examining the linkage between the two growing forces of part-time farming and the spread of rural low-density residences. Are they the result of, or the response to, the same force occurring within our society? Can they both be viewed in the light of a common paradigm?

(2) It also asks the question: What are the effects of these two components upon the rural-agricultural nature of the township in question? Specifically, it seeks to identify how the part-time farmers and rural low-density residents of the study area differ in their characteristics and activities from the full-time farmers of the township. By tracing any differences among the three groups, one may be able to speculate about the future implications of the process of "rurbanization" for agriculture and for rural Ontario.

These questions are answered in this study by postulating hypotheses and testing them with the use of questionnaire data. Through this procedure, the hypotheses may be accepted or rejected.

II. THE BACKGROUND TO THE STUDY

In order to proceed with the examination of the phenomena discussed in Part I, it is necessary to study more closely these areas of concern in terms of the theories and studies relating to them. This discussion has three main objectives and sections:

A. To review the evidence regarding the increase in part-time farming and rural low-density residential development.

B. To further establish that these two phenomena are significant and worthy of study, by commenting on the possible harmful effects that may ensue from them.

C. To summarize what has been learned about these two phenomena in studies which have been completed.

The concept of part-time farming suffers from the fact that it is not easy to define, and there are no generally agreed specific criteria to separate what is to be considered part-time or full-time farming. However, "the majority of studies concerning part-time farming define the phenomenon in terms of a time variable attributed to the farm operator and in fact implying dual employment on the part of the head of the household." (Mage, 1974, p. 3.) Two variables have usually been employed to classify part-time farming: time spent off the farm in performing the non-farm job, and the

amount of income earned in the off-farm job. (Fuller, 1974.) It is apparent, therefore, that due to the nature of these variables, a continuum of part-time farmers may exist, ranging from the "moonlighting" case where a farmer only possesses a light, casual job for supplementary income, to "hobby farming", in which agriculture is only practised as a sideline and any remunerations received are incidental. However, if we accept for the purposes of this examination, the definition of "part-time" farmers as all farm operators reporting off-farm work during the census year, we may observe the result on Table 1. Part-time farm operators compose almost 43% of all farm operators in Ontario. Thirty-eight percent of the total farm area operated is by part-time farmers, 36% of the total improved land and 36% of the cropland. Twenty-five percent of the value of agricultural products sold in 1971 were sold by part-time farm operators. (Mage, 1975.) In addition, Table 2 shows that the percentage of farms with off-farm work by the operator has increased dramatically since 1951. Those part-time farmers classified as "persistent" (part-time farming for twelve years or more) furthermore represent a significant proportion of farm operators reporting off-farm work in many areas. (Galloway, 1975; Mage, 1974.) It has been found that as many as 81% of multiple job-holders in some areas planned to continue a similar part-time situation in the future. (Mage, 1974.) Clearly this

TABLE ONE

GENERAL CHARACTERISTICS OF FULL-TIME AND PART-TIME FARM OPERATIONS, ONTARIO, 1971

	Absolute Totals	Part-Time as % of Ontario Total
No. of Part-Time Operators	40,499	42.8
No. of Full-Time Operators	54,223	
Total Operators	94,722	
Farm Area Operated by Part-Time Operators (acres)	6,027,038	37.8
Total Farm Area (acres)	15,963,056	
Acres Improved Land Operated by Part-Time Operators	3,890,106	35.8
Total Improved Land (acres)	10,864,601	
Acres of Cropland Reported by Part-Time Operators	2,872,729	35.9
Total Acres of Cropland	7,855,890	
Value of Agricultural Products Sold by Part-Time Operators	$342,373,860	24.8
Total Value of Agricultural Products Sold	$1,376,567,090	

The term "part-time" here reflects all farm operators reporting off-farm work during the census year.

Source: Mage, 1975.

TABLE TWO

NUMBER OF CENSUS FARMS AND NUMBER OF FARM OPERATORS REPORTING OFF-FARM WORK, ONTARIO 1951-1971

	1951	1961	1971
Total Census Farms	149,920	121,333	94,722
Farms with Off-Farm Work by Operator	39,772	42,584	40,499
Percentage With Off-Farm Work	26.5	35.0	42.8

Source: Mage, 1975.

observation by A.R.D.A. is well-founded:

"This phenomenon is well-entrenched in the agricultural economy of Southern Ontario...It further appears as though part-time farming has become and probably will remain a permanent feature of Ontario agriculture." (A.R.D.A., 1972, p. 164.)

The importance of part-time farming in the agriculture of southern Ontario raises some disturbing possibilities. It may be that commitment to agriculture is lower among part-time farmers and that their farm output levels may be decreased. Indeed, Clout (1972) has found this to be the case in Europe, and Hoover & Crecink (1961) have also found this to hold in the Southern United States. It was seen earlier that 43% of farm operators in Ontario produce only 25% of the total value of products sold. Part-time farming may also cause a shift in farm products to those requiring less labour and commitment. Land may be used more inefficiently and this could contribute to the process of the loss of farms and productive farmland to urban uses. Again, Clout (1972) has found that in Europe "sections of farmland may fall out of agricultural use since insufficient time and labour can be devoted to their cultivation..." (p. 57.) A lesser degree of commitment may also result in an increased willingness to sell a farm for non-agricultural purposes, further adding to farmland loss. Finally, part-time farmers may be more urban-

oriented in their outlook and values, and this may weaken rural traditions and ways of life, which are intangible assets.

The spread of low-density residences into rural areas of Ontario will now be examined. To understand what is occurring, the results of a study by the Ontario Hydro-Electric Power Commission will be referred to. (A.R.D.A., 1972, p. 99-107.) The H.E.P.C. made available lists of rural hydro customers over Southern Ontario by township for the years 1960 to 1970. It then examined the changes in density of various classes of customers in these years in order to estimate the extent of competition between agriculture and non-farming residential uses. It studied three major groups: farm operators (farmers holding 30 acres or more and on which crops are grown); high-density rural (year-round customers living at a density of more than six customers per quarter mile road section--this includes those living in hamlets or unincorporated villages); and low-density rural (year-round customers living at a maximum density of six per quarter mile road section but not meeting the criteria of farm operator.)

The results showed little change in density of customers per 100 acres of land among the farm group, and a small decrease for the high-density group, (perhaps reflecting the economic decline of many small rural service centres in Ontario.) However, in the low-density group, the density increased rapidly from 1960 to 1970 in nearly every township in Ontario,

TABLE THREE

TRANSITION MATRIX FOR DENSITY OF LOW-DENSITY RURAL HYDRO CUSTOMERS, 1960-1970

		DENSITY PER 100 ACRES 1970				
		<0.1	0.1-0.3	0.3-0.5	0.5-0.7	>0.7
DENSITY PER 100 ACRES 1960	<0.1	0.17	0.53	0.24	0.05	0.02
	0.1-0.3	0.03	0.05	0.22	0.25	0.45
	0.3-0.5	0.19	0.0	0.0	0.13	0.69
	0.5-0.7	0.0	0.0	0.0	0.0	1.00
	>0.7	0.0	0.0	0.0	0.0	0.0

Note: The possibility of a township not changing from one density group to another is given in the diagonal running from the top left to the bottom right of the matrix.

Source: A.R.D.A., 1972.

as shown in Table 3. In fact, 401 out of the 465 townships surveyed increased in density to such an extent that they moved from a lower to a higher category in the ten-year period. This pattern was also found to be accelerating. Table 4 shows the transition matrices for 1960-65 and 1965-70. In the latter case, the probability of a township not changing from one density group to another was found to be much lower than in the former period.

A.R.D.A. states that this change has been so rapid as to give cause for alarm. (1972, p. 103.) Indeed, it makes the assertion that now an urban phenomenon has become a feature of the whole landscape, urban and rural. The implications of this may be the following: The spread of rural low-density dwellers in a "strip" fashion along country concession roads incurs a very high servicing cost. This imposes additional tax burdens on other rural dwellers nearby. This is particularly true in a case in which a farmer may be charged for the cost of a sewer line fronting his property when in actual fact he neither needs nor has asked for it. The cost of rural living may rise, leading to a further cost/price squeeze upon farmers and an increase in economic if not physical marginality. (Ibid.) This may result in farming becoming even more tenuous an occupation. In addition, the aesthetic qualities of the countryside may suffer, with a fenced, subdivided, almost suburban appearance replacing broad

TABLE FOUR

TRANSITION MATRICES FOR DENSITY OF LOW DENSITY RURAL HYDRO CUSTOMERS 1960-1965 AND 1965-1970.

		DENSITY PER 100 ACRES 1965				
		<0.1	0.1-0.3	0.3-0.5	0.5-0.7	>0.7
DENSITY PER 100 ACRES 1960	<0.1	0.81	0.19	0.0	0.0	0.0
	0.1-0.3	0.02	0.84	0.13	0.0	0.01
	0.3-0.5	0.06	0.0	0.75	0.19	0.0
	0.5-0.7	0.0	0.0	0.0	1.00	0.0
	>0.7	0.0	0.0	0.0	0.0	0.0

		DENSITY PER 100 ACRES 1970				
		<0.1	0.1-0.3	0.3-0.5	0.5-0.7	>0.7
DENSITY PER 100 ACRES 1965	<0.1	0.23	0.59	0.16	0.02	0.0
	0.1-0.3	0.0	0.11	0.33	0.25	0.31
	0.3-0.5	0.06	0.0	0.03	0.11	0.81
	0.5-0.7	0.0	0.0	0.0	0.0	1.00
	>0.7	0.0	0.0	0.50	0.0	0.50

Note: The possibility of a township not changing from one density group to another is given in the diagonal running from the top left to the bottom right of the matrices.

Source: A.R.D.A., 1972.

vistas of open landscape.

In any discussion of implications for agriculture, the problem of the loss of prime agricultural land in Ontario must be brought to the fore. The "save our farmland" cry has become hackneyed by now, but this makes it no less urgent. The 1971 census indicates that Southern Ontario lost 9% of its farmland between 1966 and 1971, compared with only 12% over the 15-year period from 1951 to 1966. (The Toronto Star, August 28, 1976.) Clearly the rate of loss of farmland is increasing significantly. In 1961, Ontario needed to import only three products--wheat, fruit and potatoes. Now Ontario imports, as well as these three, beef, pork, poultry and dairy products, being self-sufficient only in eggs and vegetables. (Ibid.) Probably every Ontarian is aware of the figures cited by Stephen Lewis of the New Democratic Party in the 1975 provincial general election when he stated that Ontario lost about 26 acres of farmland per hour in the period from 1966 to 1971. Even if one looks beyond the political rhetoric, it can be appreciated that this problem will perhaps be one of Ontario's most serious within the next few years. Therefore the examination of the revolution in the rural areas of Ontario today as a result of the two phenomena under scrutiny is both crucial and urgent.

The findings about these two phenomena which relate to Southern Ontario will now be reviewed. Although the fact

must be noted that part-time farming is complex, and that findings depend to some extent on the criteria used to define it, certain findings remain notable in the literature.

In the past, it was usually believed that part-time farming appeared as a logical solution for low-income farmers in marginal areas for agriculture in Ontario, and that it was a transitional process for farmers to enter the urban work force full-time. (A.R.D.A., 1972.) While this transitional process undoubtedly continues to be the case at time, especially in the Shield areas of Southern Ontario and very close to major urban centres, it has also been discovered that there is another major dimension to the phenomenon. This is the process by which urbanites are entering agriculture. These former urbanites either remain as "persistent" or eventually become full-time. This is a significant dimension which is not yet fully understood. Some of the most important work in this area has been done by Mage (1974a) who, in a study of Waterloo County, found an actual absence of a well-defined "exit from farming" part-time farming type. In yet another study by Mage in Huron County (1974b) he found the following:

"Contrary to the popular assumption that part-time farming represents a transition phase from full-time farming to a full-time non-farming occupation, the findings here suggest that for many farmers the dual occupation role is a

permanent arrangement. Indeed, over 4/5 of the part-time group indicated they would continue to combine farming with some other line of work in the future...36% wished to expand their operations...some multiple jobholders are using the part-time farming route to enter full-time farming." (p. 51.) Hillman (1956) and Salter (1934) have found similar results in studies done in Ohio and Connecticut.

In addition, one must also note the growing importance of the "hobby farm" as a component of part-time farming. Troughton (1975) shows that the "hobby farm" has become an integral element of the rural-urban fringe of many North American cities and beyond:

" 'Hobby farms' have been acquired to provide 'rural living', which includes freedom from the city and its 'problems', private recreation space, or as an investment, which may be pure speculation or a hedge against inflation." (p. 7.)

Therefore it is important to bear in mind the "push" effect <u>away</u> from the cities as significant as well as the "pull" effect <u>to</u> the cities, in creating the phenomenon of part-time farming in Southern Ontario. This is further reinforced by Mage's previously-mentioned Waterloo County Study in which he identified five main part-time farming situations. These are illustrated in Figure 1. These are:

(1) Small-Scale Hobby (31.9% of cases.) These were people whose main interests are rural living, with farm sales

only a result of activities practised in their spare time. They do not think of themselves as farmers and never intend to pursue it as a serious business. Mage called them "pseudo-farmers" and believed that for census purposes they should be classified in the rural non-farm category.

(2) Aspiring Type (25.5% of cases.) Most of these people were born on farms and are now working in city occupations. Their ambition is to terminate their off-farm work and become full-time farmers. (Most often, they never fulfill this desire but become "persistent.")

(3) Persistent Part-Time (21.3% of cases.) This is described by Mage as "genuine" part-time farming, in that this group consists of people from the city who obtain a profit from their farms and have set their farm output levels carefully to achieve this end. This group obtains satisfaction from working with the land and from rural living, and it desires to continue this satisfactory arrangement.

(4) Sporadic Part-Time (12.8% of cases.) These are full-time farmers taking occasional off-farm jobs for extra money or variety.

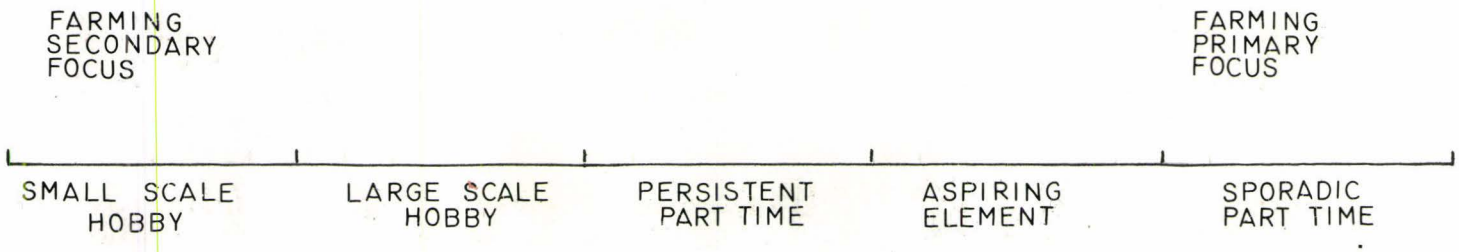
(5) Prosperous Large-Scale Hobby (6.4% of cases.) These are mainly professional people who wish to escape from the city and enjoy country living. They intend to expand but also to continue the full-time job off the farm.

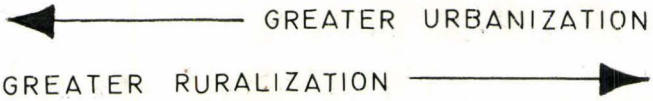
Note that only group (4), comprising only 13% of all

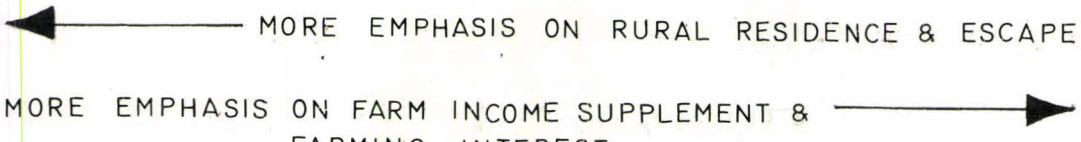
FIGURE I

Continuum of Part-Time Farming

(AS IDENTIFIED BY MAGE IN WATERLOO COUNTY)







cases, fits the classical view of the part-time farmer, and that all of the others are city-originated.

Other characteristics of part-time farms and farmers have also been studied. The size of their holding is often smaller than that of full-time farmers. (Stock, 1975; Duvick, 1966; Mage, 1974; Clout, 1972.) It is often concentrated in areas where physical and/or economic opportunity for farming is low, (A.R.D.A., 1972; Stock, 1975) but this has also been found to have little relationship. (Mage, 1974_b) Part-time farmers tend to place proportionately less emphasis upon livestock than do full-time farmers, and mixed grains are a proportionately more important crop. (Mage, 1974b, Duvick, 1966.)

The rural low-density residence phenomenon has not been nearly so widely studied. Reeds (1969) is one of the few who have examined this area in his study of the Niagara Fruit Belt. He found that 77.3% of the non-farm sample were blue-collar workers and commuted to jobs in nearby cities. Ninety-one percent indicated a city background. The majority had between two and five school-aged or pre-school children, and many were post-World War II immigrants from Europe who had previously lived in the city and had moved into rural areas only within the past few years. Their motivation for moving was usually vague or indefinite, often summarized in responses such as "like to live in the country." Only 13%

admitted that cost was a factor in their decision, yet since the majority interviewed were from the lowest income group, it was suggested that lower prices for homes or building lots was a major reason for the move. Most of this group was indifferent to the future of farming around them, indicating that they would "welcome further development in their area because they feel this would increase the number and quality of services available." (p. 31.) Reeds further states:

"Few people seem to have a very clear understanding of the nature of problems pertaining to the area in which they live...although he lives in the country, the typical non-farm resident is not part of the rural community. If he came from the city his strongest ties are still urban-oriented." (p. 31.)

Clout (1972) has found similar results in a study of former urbanites living in the rural East Anglia area of England. He concludes that "many residents of localities way beyond the built-up edge are <u>of</u> the city if not <u>in</u> the city...a sizeable number (of rural non-farmers) were keen to retain their urban anonymity and keep themselves to themselves." (p. 46-49.)

Having now obtained the general conceptual framework for the analysis and an understanding of the work done in the area, the present nature of the study area and the processes occurring there will now be examined.

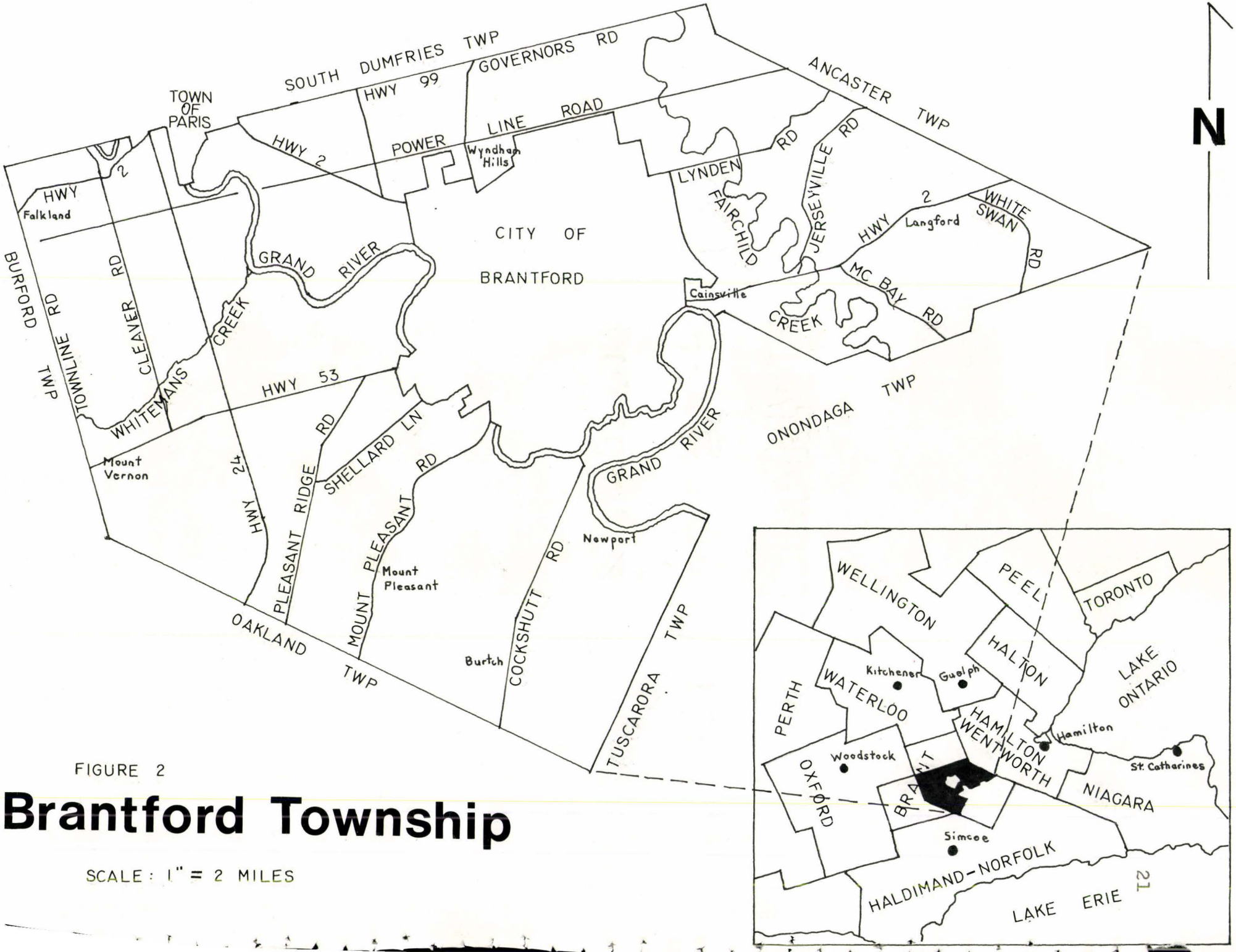


FIGURE 2

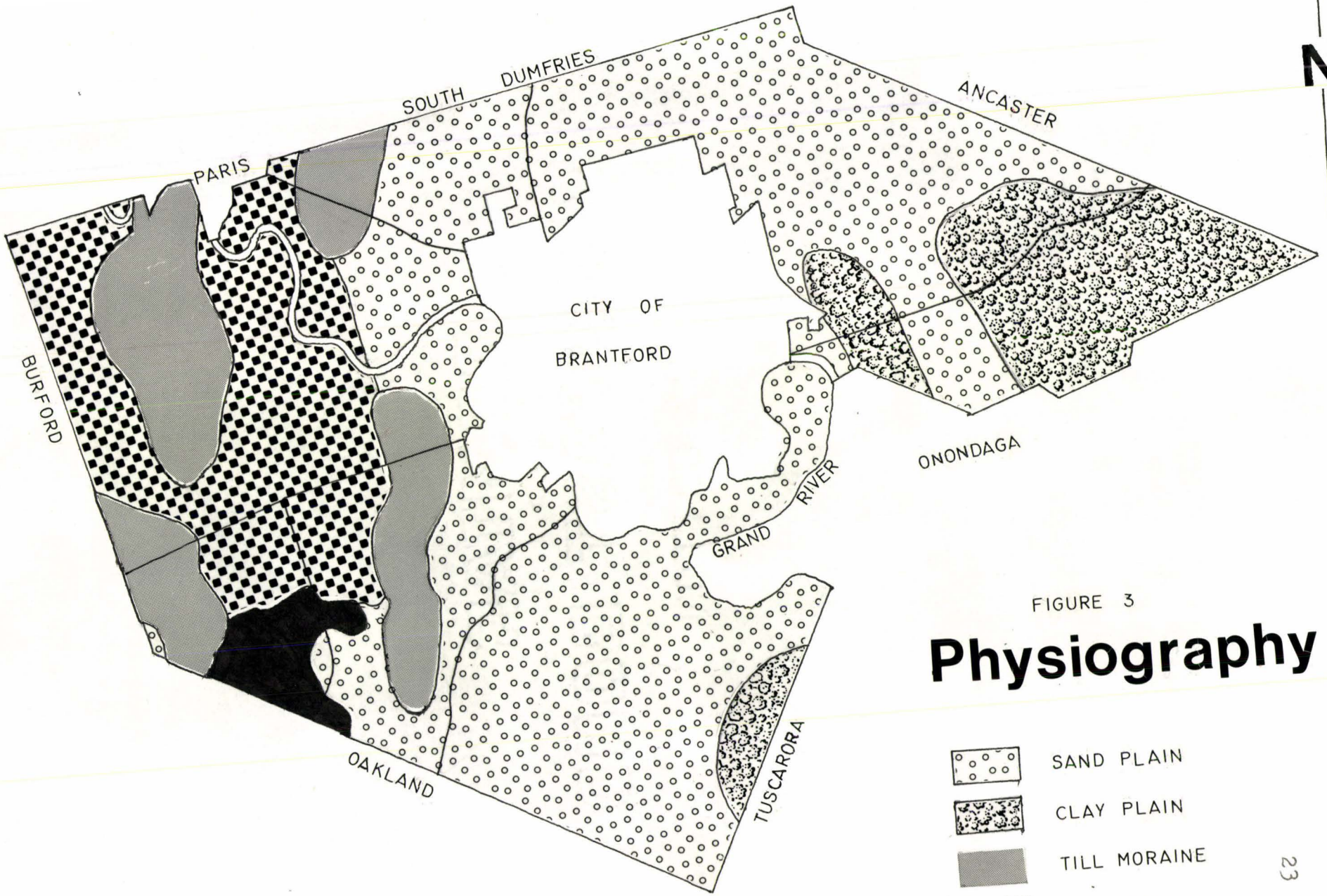
Brantford Township

SCALE: 1" = 2 MILES

III. THE STUDY AREA

Brantford township occupies a total area of 79,440 acres in the heart of Brant County in southwestern Ontario. (Figure 2.) It completely surrounds the city of Brantford and is a short distance away from the large and growing centres of the Golden Horseshoe and adjoining centres, such as Toronto, Hamilton and Kitchener.

The region contains three main physiographic features. (Figure 3.) These are the Norfolk Sand Plain, the Haldimand Clay Plain, and the Horseshoe Moraine and its associated spillway. The Norfolk Sand Plain is composed of sands and silts deposited as a delta in glacial lakes Whittlesey and Warren. A great discharge of meltwater from the Grand River area entered the lakes between the ice front and the moraines to the northwest, building the delta from west to east as the glacier withdrew. The Haldimand Clay Plain occupies an area of built-up stratified clays which was submerged by Lake Warren. These clays are invariably heavy in texture and have poor and uneven drainage. The moraines found in the western part of the township are part of a large horseshoe-shaped moraine beginning east of Sarnia and curving around the south shore of Georgian Bay before coming to an end in Brant County. This chain of moraines tends to flatten



SCALE : 1 INCH = TWO MILES

FIGURE 3

Physiography

out south of Paris and then finally disappears under the Norfolk Sand Plain. The moraines are composed of a coarse, open, stony till consisting mainly of dolomite with traces of red shale. They take the form of irregular, stony knobs and ridges which are composed of till and kamey deposits. Associated with these moraines is a system of old spillways with broad gravel and sand terraces which are more or less horizontally bedded. (Chapman & Putnam, 1966.)

The soils of the township reflect its physiography. (Figure 4.) They vary from clays to sands, with the Brantford and Burford series predominating in the clays, and the Fox series in the sands. These are all Class I and II soils for general agriculture, with only slight topographic and stoniness limitations. The only markedly deficient areas of the township for agriculture are the organic areas and the till moraines of the Dumfries soil series. (Figure 5.) It can be seen that the great majority of the township is prime agricultural land. In fact, about 80% of the area of the township is in Class I, II, or III. (Table 5.) Indeed, agriculture is dominant since the land ranks only moderately high for forests and wildlife, and low for recreational uses. (Figure 6.)

The climate of the township is also favourable to agriculture. The area is located on the border of the two Southern Ontario climactic areas known as the South Slopes

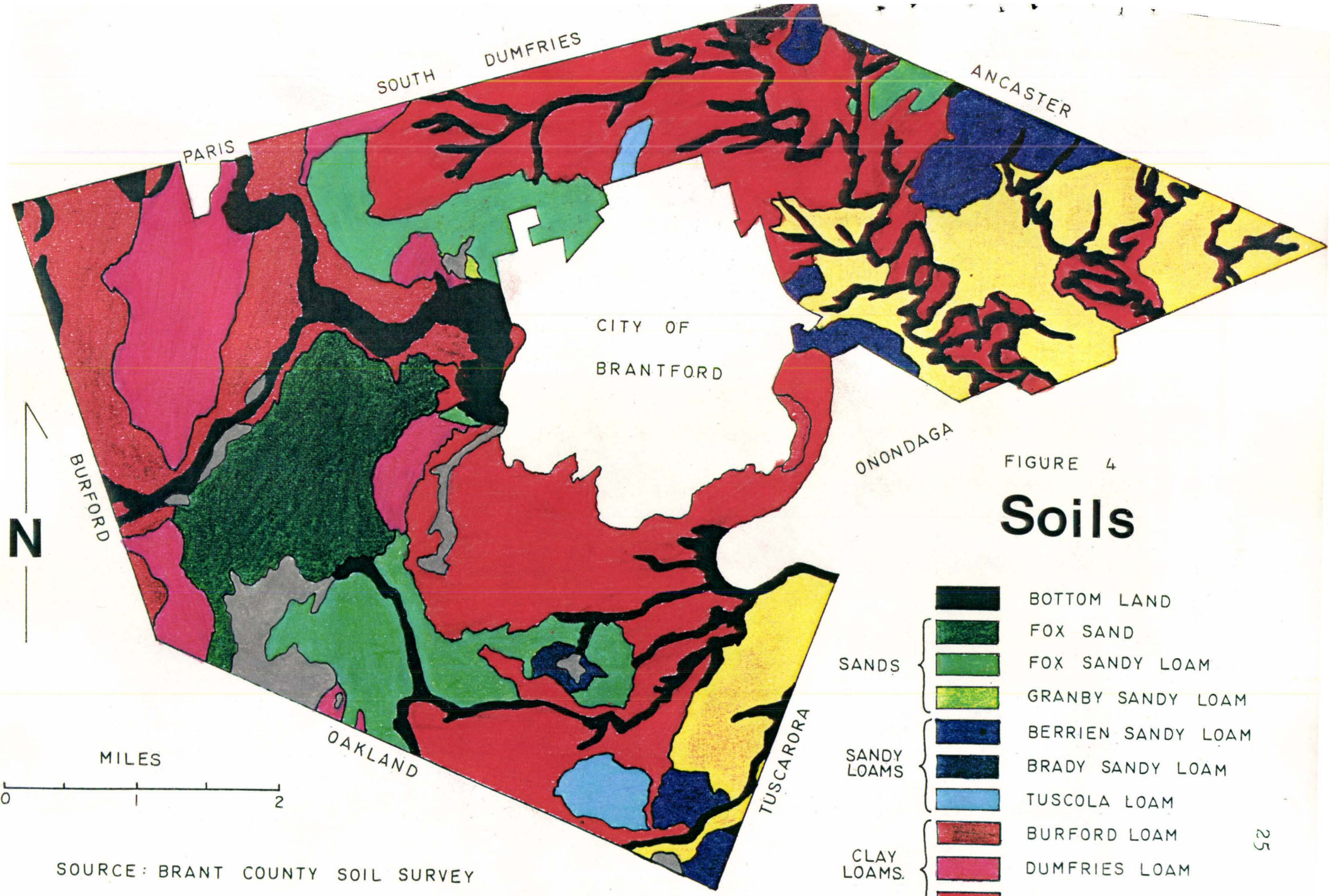
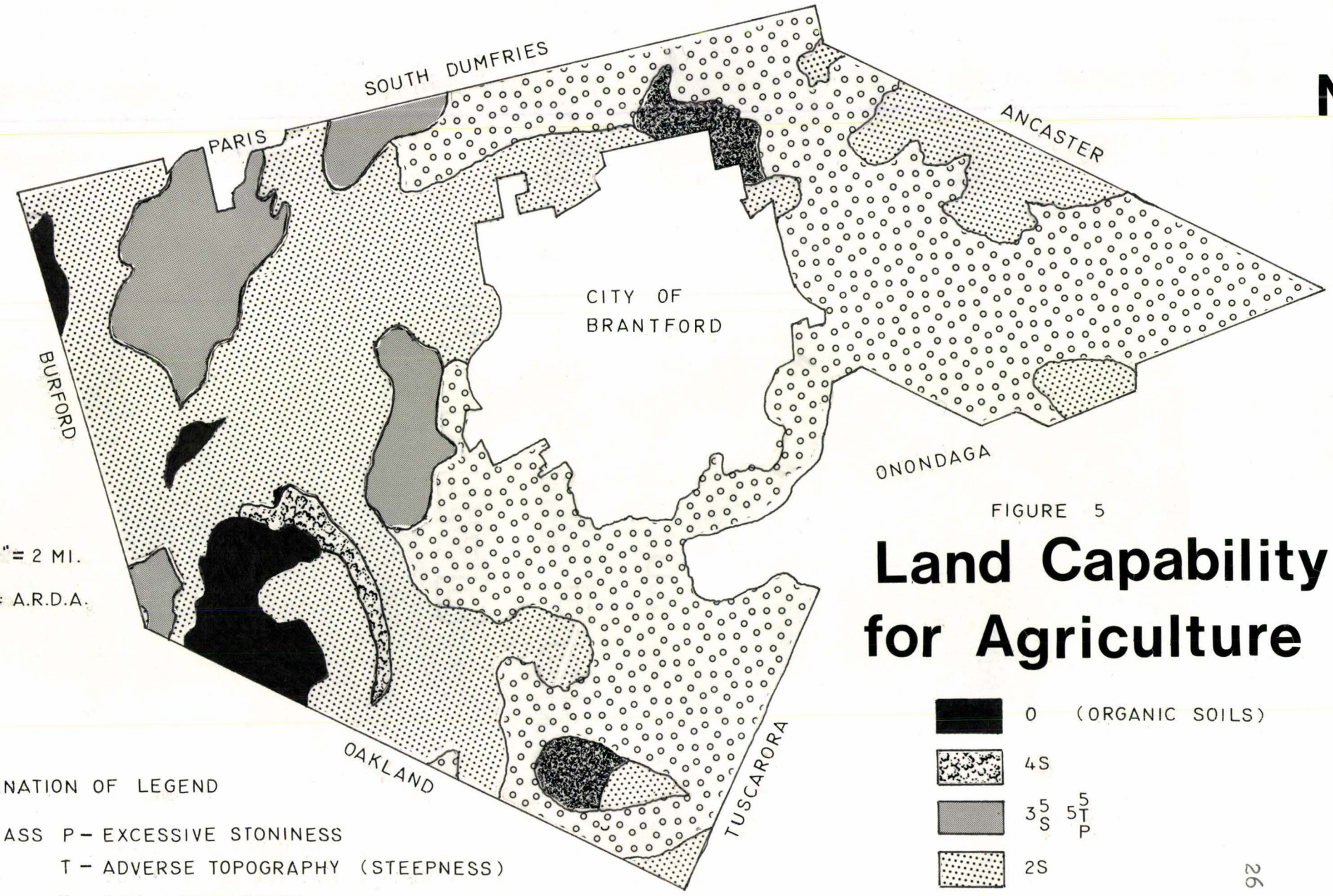


FIGURE 4

Soils

- SANDS
  - FOX SAND
  - FOX SANDY LOAM
  - GRANBY SANDY LOAM
- SANDY LOAMS
  - BERRIEN SANDY LOAM
  - BRADY SANDY LOAM
  - TUSCOLA LOAM
- CLAY LOAMS
  - BURFORD LOAM
  - DUMFRIES LOAM
  - BRANTFORD LOAM
- CLAY
  - BRANTFORD CLAY LOAM
- BOTTOM LAND
- MUCK

SOURCE: BRANT COUNTY SOIL SURVEY



N

FIGURE 5

Land Capability for Agriculture

SCALE: 1" = 2 MI.

SOURCE: A.R.D.A.

0 (ORGANIC SOILS)

4S

3^{5}_{S} $5^{5}_{T_P}$

2S

$1^{6}3^{4}_{T}$

1

EXPLANATION OF LEGEND

SUBCLASS P – EXCESSIVE STONINESS

T – ADVERSE TOPOGRAPHY (STEEPNESS)

S – SOIL LIMITATIONS
(EG. LOW FERTILITY, LOW PERMEABILITY)

EXAMPLE: $1^{6}3^{4}_{T}$ AREA OF CLASS 1 LAND & CLASS 3 LAND WITH TOPOGRAPHIC LIMITATION, IN THE PROPORTION 6:4

TABLE FIVE

ACREAGE OF SOIL CAPABILITY FOR AGRICULTURE, BRANTFORD TOWNSHIP

Class 1	21,815	(27.4%)	(80.1%)
Class 2	25,920	(32.7%)	
Class 3	15,825	(20.0%)	
Class 4	5,390		
Class 5	8,625		
Class 6	-		
Class 7	-		
Class 0 (organic)	1,865		
TOTAL	79,440		

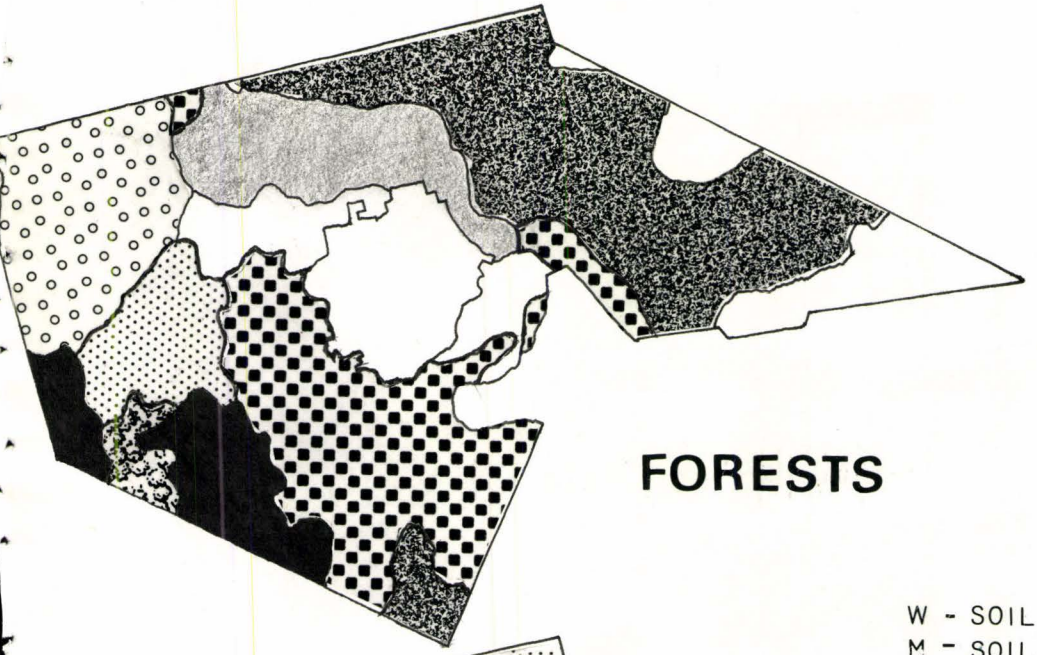
Subclasses:	W (excess water)	5,805
	T (adverse topography)	2,695
	P (stoniness)	620
	S (soil limitations)	40,885

Source: Agricultural Statistics for Ontario, 1971.

FIGURE 6

Land Capabilities

SOURCE: CANADA LAND INVENTORY



FORESTS

CLASS

$1^{7}2^{3}_{D}$

$1^{5}2^{4}_{M}2^{1}_{W\,D}$

$1^{4}2^{4}_{M}3^{2}_{M}$

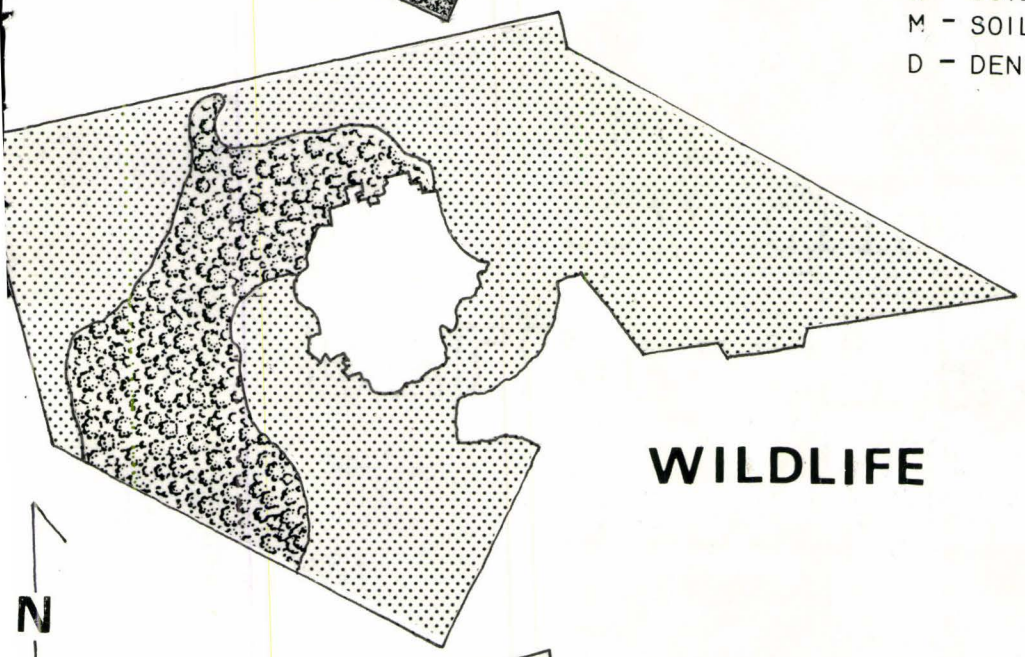
$2^{5}_{M}1^{4}2^{1}_{W}$

$2^{7}_{M}3^{3}_{M}$

$2^{6}_{D}3^{4}_{W\,D}$

$4^{9}_{W}2^{1}_{W}$

W - SOIL MOISTURE EXCESS
M - SOIL MOISTURE DEFICIENCY
D - DENSE OR CONSOLIDATED ROCK LAYERS



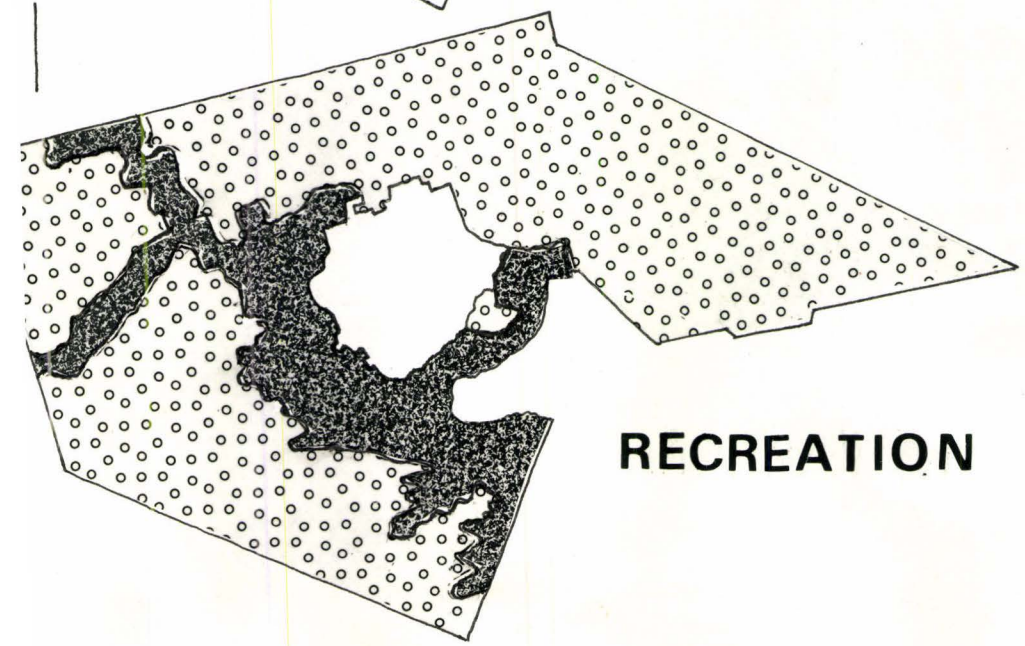
WILDLIFE

CLASS

3 - SLIGHT LIMITATIONS

2 - VERY SLIGHT LIMITATIONS

N



RECREATION

CLASS

5 - MODERATELY LOW CAPABILITY

6 - LOW CAPABILITY

and the Lake Erie counties, and it enjoys a comparatively high mean annual temperature of 46° F. or 6° C., a long growing season of 205 to 210 days, and a frost-free period of about 145 to 150 days. It also enjoys a considerable amount of heat in the form of growing-degree days, (about 3500 to 4000.) It also receives an ample amount of precipitation, about 32" or 80 cm. annually. (Brown et al., 1974.) Although its climate is not as favourable as the fruit-growing areas of the Niagara Peninsula or the region of Essex County, it is excellent for almost all types of general farming.

The township area was first occupied by the Five (later Six) Nations Iroquois Confederacy. The first traces of settlement occurred after 1785 with the arrival of United Empire Loyalists. The entire area of Brantford township was part of a Crown land grant to the Six Nations as a reserve. This original grant, given by Governor Haldimand to Joseph Brant as a reward for the latter's loyalty in the Revolutionary War, covered all of the Grand River valley from Kitchener to Lake Erie. Gradually pieces of the grant were surrendered to the Crown and used for settlement, until by 1841 the reserve covered only the area now known as Tuscarora Township or the Oshweken Indian Reserve. The township started to be settled in earnest after 1810 when a road was built from London to Hamilton (now Highway 2) and Governor's Road was built joining London to York (Toronto), (now Highway 99.)

The surveying of the township, however, was not completed until 1843. It was originally attached to Wentworth County but in 1852 it was made part of the newly-formed Brant County. Almost immediately it fell under the shadow of the settlement of Brantford. This community's development was spurred by its location on the London-Hamilton road, and its continued predominance was assured when the main line of the Grand Trunk Railway was constructed through it in 1905. (Brant Historical Society, 1966.)

General farming was practised in the township from the beginning. However, in the sandy soils of the Norfolk Sand Plain, it was found that the soil was too light-textured for regular cropping practices. The land productivity declined until by the time of the First World War, wind erosion had increased to such an extent that farm abandonment was common. Then the discovery was made that this soil was ideal for tobacco. In the 1920's came the tobacco revolution, in which the whole agricultural make-up of the area was changed. The land use changed rapidly until about 1/2 to 2/3 of the farms in the sand plain were tobacco farms. The ethnic composition of the township then also changed, with large numbers of Hungarians, Poles, Dutch, Belgians and Ukranians arriving to work the farms. (Ibid.) Today, tobacco is a major crop of the township both in terms of land use and cash receipts. Rye has also become an important field

crop, used in rotation with tobacco. However, in the clay plains general farming has continued, with emphasis on livestock and the growth of hay, oats, wheat and corn. The moraine-spillway areas also have an emphasis on livestock production.

Farming has been and continues to be the major economic activity of the township. Table 6 gives agricultural statistics for the area. One can see that Brantford township's agricultural pattern is generally following the pattern of Ontario agriculture as a whole: the number of farms has decreased up to 1971, the size of farms has increased, and the total acreage under production has dropped for most crops. Exceptions to this are grain corn and tobacco, which have increased. Numbers of livestock have also dropped except for hogs which has shown an upturn. Agriculture in the township has also become more intensely capitalized and the gross incomes of the farms remaining have also increased.

These statistics mirror provincial patterns. However, the increase in the size of farms in Brant County showed the third-highest increase of any county of Ontario in the period 1951-1966, about 30.5%. Brantford township also ranks near the top in terms of the increase of intensity of land use in farming during 1951-1966, showing a greater than 50% increase. (A.R.D.A., 1972.)

Table 7 shows the population statistics and changes

TABLE SIX

AGRICULTURAL STATISTICS 1971, BRANTFORD TOWNSHIP

(1961 Values in Brackets)

FARM SIZE	Number of Farms
under 3 acres	11
3-9 acres	87
10-69 acres	118
70-129 acres	116
130-179 acres	56
180-239 acres	37
240-399 acres	37
over 400 acres	16

Total Number of Farms: 428 (497 in 1966)

FIELD CROPS		
TOTAL	39,168 acres	
wheat	2,091	(3,604)
oats	2,619	(9,728)
barley	1,732	(256)
mixed grains	2,360	
rye	1,539	
graincorn	3,444	(2,563)
tobacco	3,500	(2,563)

hay	7,374	(11,100)
corn	3,444	
vegetables & small fruits	4,159	
greenhouses	100,000 square feet.	

LIVESTOCK

cattle	8,748	(11,339)
milk	3,164	(4,902)
hogs	11,171	(6,728)
sheep	702	(1,280)
poultry	123,136	(189,461)

CAPITALIZATION

Total	$44,513,000	(27,870,000)
Land & Buildings	$36,553,000	(21,162,000)
Machinery & Equipment	$ 5,381,000	(4,136,800)

for the area. Brantford township in 1971 had a population of 9,380, an increase of about 3,000 since 1956. However, this does not give a true picture of the rate of population growth pressures since the city of Brantford made three large annexations of township land since 1956. If the average annual growth rate percentages of all of the municipalities of Brant County from 1956 to 1971 are examined, one may see that Brantford township had the highest growth rate of any municipality in the county. This is significantly higher than even the city of Brantford itself. Clearly this is the effect of pressures resulting from its close proximity to the city. In fact, a recurring pattern has occurred in the city's growth in the past twenty years. There has been a spill-over of residential development beyond the city's boundaries into the township; then the city has annexed the built-up area. At present, there are three major continuously urbanized areas in the township contiguous to the city's boundaries. (Figure 7.) The city is presently beginning to make noises about annexations of these areas as well, much to the chagrin of the township officials, who fear the loss of more and more of township land to the city. Table 8 shows the projected statistics for the growth of Brantford and the resulting loss of Class I and Class II soils as a result of this growth. It can be seen that this direct growth is not greatly significant in terms of the amount of

TABLE SEVEN

POPULATION STATISTICS, BRANT COUNTY

	POPULATION			
	1956	1961	1966	1971
Brantford (city)	51,869T	55,201T	59,854T	64,421
Brantford (township)	6,381F	7,764F	9,062F	9,380

T = annexations to

F = annexations from

Population Change	56-66	66-71	61-71	56-71
Brantford (city)	7985	4567	9220	12552
Brantford (township)	2681	318	1616	2999

Average Annual Growth Rate (percent)

	56-66	66-71	61-71	56-71
Brantford (city)	1.44	1.48	1.56	1.46
Brantford (township)	3.57	0.69	1.91	2.60 *
Burford twp.				0.83
South Dumfries twp.				1.27
Oakland twp.				0.81
Onondaga twp.				0.62

Source: Ontario Population Statistics, 1972.

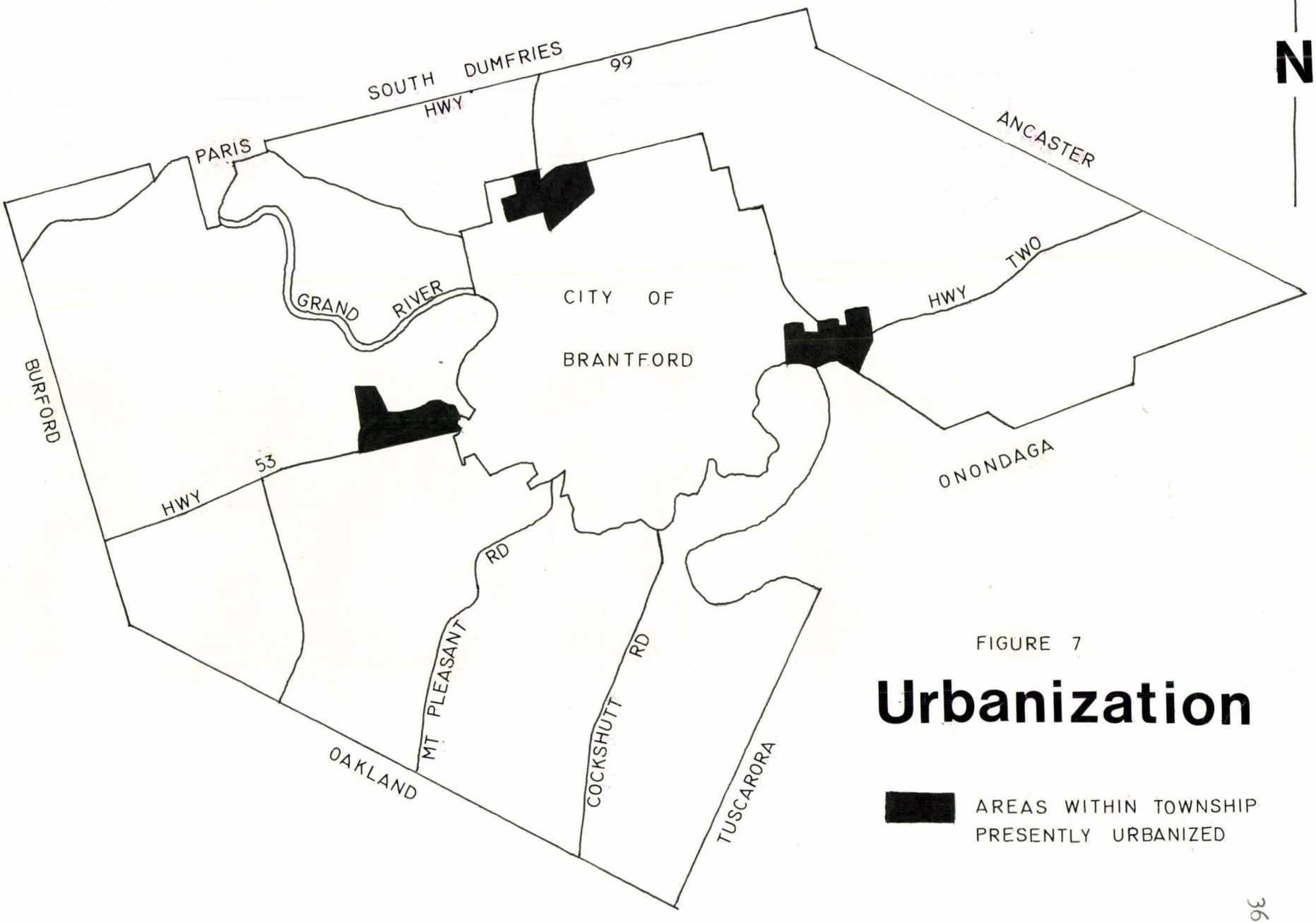


FIGURE 7

Urbanization

AREAS WITHIN TOWNSHIP PRESENTLY URBANIZED

1 INCH = TWO MILES

agricultural lands lost in the township. More important here, as is also the case throughout Southern Ontario, is the urban shadow effect. In the case of Brantford township, most of the land from one-half to one mile outside of the city limits is presently being held by speculators or non-resident landlords renting the land in anticipation of further urban growth. (Interview with Don Graham, Ministry of Agriculture & Food.) The effect of this has usually been found to be detrimental to the future of agriculture in the province.

TABLE EIGHT

BRANTFORD GROWTH PROJECTIONS

Developed Urban Areas of Brantford, in thousands of acres, (excluding vacant and agricultural land)

1971	6.08
1976	6.47
1981	6.88
1986	7.35
1991	7.78

Estimated Loss of Class 1 and 2 Soils, = 1.8

Source: A.R.D.A., 1972.

IV, THE HYPOTHESES

In the introduction to the study, two general aims of the analysis were put forward. Having now obtained an understanding of the background to the study and to the study area, the two general aims of the study will now be broken down into six more specific hypotheses in order to operationalize them for data collection purposes. Each hypothesis will be stated in turn, together with a brief discussion of its genesis and foundation.

> HYPOTHESIS ONE.
> The majority of part-time farmers in Brantford township are not former full-time farmers. Rather, they are former urbanites farming for the attractions of rural living, for a hobby, or for a desire to enter agriculture full-time. In other words, part-time farming in this area is largely a result of a "push" force away from the city rather than a "pull" towards the city.

It may be remembered that the first aim of this study was to attempt to examine any linkage between the phenomena of part-time farming and the spread of rural low-density residences. This first hypothesis is an attempt to view these two phenomena as simply two manifestations of the same social force; therefore part-time farming may be regarded as merely the stronger manifestation of this desire, and rural low-density residency as the weaker.

The impetus for the formation of this hypothesis was

provided by a study by Mage (1974), who performed a factor analysis of part-time farming in Southern Ontario using several hypothesized variables. In this study, he found that former full-time farmers were not, by and large, responding to urban pressures and opportunities by de-escalating their farming operations. Rather, urban pressures have in fact caused urban folk to become part-time farmers. Nearby city jobs have created opportunities for starting young farmers to supplement initial low farm incomes and have offered a position of long-term stability for those combining farming and off-farm work. Hence, part-time farming is the result of a "push" outward from cities rather than a "pull" towards them. One may speculate then that low-density rural residence is another result of this same "push."

The location of the study area adds strength to the hypothesis. Mage classified the counties of Ontario into six groups on the basis of the factors obtained. He found that in a wide band of counties surrounding the heavily-urbanized Golden Horseshoe, (for example, Waterloo, Wentworth, and Peel), part-time farming was generally of a small farm type very close to an intensely urbanized area. Here the farms were generally not money-making, and there was a high "hobby" element in agriculture. In nearby counties to the west, (for example, Brant and Middlesex), he found a viable farm situation close to an urbanized area, where little

off-farm work by full-time farmers existed. Thus any part-time farmers located here would tend to be of a different type than "the exit from farming" type. Brantford township's location in close proximity to both of these factor areas tends to lend weight to the belief in the idea of "flight" from the city being at work here.

Hypotheses Two to Six relate to the second aim of the study: to observe any differences between full-time, part-time and non-farmers in order to predict the implications of the phenomena for the township in the future.

HYPOTHESIS TWO.
Part-time farmers possess a significantly smaller farm size than their full-time counterparts.

HYPOTHESIS THREE.
The type of farming practised varies significantly between the two groups in the following manner: Full-time farmers place a proportionately greater emphasis on livestock while part-time farmers place a proportionately greater emphasis on mixed grains.

HYPOTHESIS FOUR.
There is a significant difference between the quality of land upon which the three groups are located: the land quality of full-time farmers tends to be higher than that of part-time and non-farmers.

These hypotheses result from differences observed between full-time farmers and part-time farmers in past studies which were mentioned earlier. They relate to differences in agricultural phenomena and the results may allow inferences concerning the agricultural future of the study area.

HYPOTHESIS FIVE.
The attitudes of part-time farmers are generally less favourable to the necessity of preserving Ontario farmland than are those of full-time farmers, while rural non-farm residents' attitudes are less favourable than both other groups.

This hypothesis is the result of work by Reeds (1969) in the Niagara Peninsula, in which he found that a greater proportion of full-time fruit-growers were in favour of preservation of the Niagara Peninsula Fruit Belt than were part-time growers. This idea is intuitively appealing: Full-time farmers possess a greater economic and psychological commitment to the land than do the two other groups, and thus the latter two groups may be expected to possess a greater degree of indifference and/or ignorance concerning the land preservation question.

HYPOTHESIS SIX.
Part-time farmers are significantly more urban-oriented in their social, cultural and economic activities and do not participate in as many aspects of the rural community as do full-time farmers. This tendency is even stronger among rural non-farm residents.

This hypothesis is again based on Reeds' work in the Niagara Peninsula and on Clout's study in England,(1972) in which they found that non-farming residents were not participants in the rural community and were urban-oriented in their activities. Again, this concept is also intuitively appealing; especially if Hypothesis One is accepted. Assuming that part-time farmers are largely former urbanites and that

non-farmers almost wholly so, it may be expected that their activities would continue to be oriented towards the manner of their former lifestyle. Although their residential milieu has changed, their psychological milieu may have not. Even if one finds that part-time farmers are former full-time farmers finding jobs in urban areas, it is logical to expect that their interests are becoming more urban-oriented than those who have remained on the farm in a full-time capacity.

V. METHODOLOGY

In order to carry out the study, it was necessary to first visit the township study area, to verify the suitability of the study with someone familiar with the area and its characteristics. This was done in June 1976 in a discussion with Mr. Biggar, the Clerk of Brantford township. He indicated that he had no objections to such a study and gave advice relating to the best method of carrying it out.

Following this, the study resumed in early August. The Township of Brantford Municipal Office in Brantford was visited and an attempt to choose the respondents was made. A list of names was obtained from the township assessment roll book by choosing the middle name from every second page of the book as a possible respondent for the study. It was felt that this method was random and that it would include names from all three study groups.*

Having then obtained this list of potential names, a questionnaire was designed. An attempt was made to set questions specifically designed to answer each hypothesis, as follows:

HYPOTHESIS ONE.
It was not possible to design a specific question to answer this statement, but it was felt that the acceptance

* The occupation of landowners was not listed, due to a recent change in provincial law.

or rejection of this hypothesis depended upon inferences made from several questions and then combining the inferences from each question to produce an overall view. The variables of interest here would be: the age of the operator or owner, the length of his residence at his present rural location, the location of his previous residence, the location of his birth and place of residence as a youth, his degree of attachment to his present location, and his future intentions.

HYPOTHESES TWO, THREE AND FOUR.

The questions designed to apply to these hypotheses were more direct. These involved: (a) the size of holding, (b) the main crop emphasis and the numbers of livestock and acres of each field crop, and (c) the type and class of land the respondent possessed.

HYPOTHESIS FIVE.

This was the most general hypothesis of the latter five and thus the question designed for it was also general, consisting of a general framework designed to informally elicit the respondent's feelings about the preservation of farmland.

HYPOTHESIS SIX.

This area was more direct, entailing only a question dealing with which organizations the respondent was active in, and in what capacity. It was felt that membership in either rural or urban organizations was a good indicator of the respondents' community orientation.

The result was the questionnaire shown in Appendix A. In this questionnaire each hypothesis related to the following questions: *

Hypothesis	1-	Questions	5, 6, 7, 8, 11, 13.
"	2-	"	1.
"	3-	"	2, 3.
"	4-	"	9, 10.
"	5-	"	12.
"	6-	"	14.

With the questionnaire now formulated, another visit to the study area was made. This visit consisted of a second to the Township Office and then to Mr. Don Graham, the local agricultural representative of the Ontario Ministry of Agriculture and Food. These visits served two purposes: First, it was necessary to determine which names on the tentative respondent list belonged to the full-time, part-time, and non-farm groups. Mary Gregory, an assistant clerk at the Township Office, and a 32-year resident of the township, and Mr. Graham, the agricultural representative in the area for 26 years, together were able to classify most of the names on the list into each of the three classes.

* Question 4, which asked the total income derived from agriculture, was designed to obtain an inference about the commitment to agriculture of a respondent. However, very few respondents chose to answer this question, and thus rendered it useless.

Second, the two received the opportunity to examine the questionnaire and to volunteer criticisms based upon their knowledge of the area and respondents. This criticism resulted in minor changes in wording and order of the questions and served as a pre-test for the questionnaire.

Then, from August 16 to 21, 1976, the questionnaire was administered through door-to-door canvassing by automobile. It was hoped that 100 responses could be collected. This target was desired, since, firstly, anything under 30 responses for each group was regarded as too small to achieve the desired randomness; and secondly, it was hoped that the proportion of each group in the sample would somehow mirror the proportion in the population as a whole. Thus 40 full-time farmers were desired compared to 30 part-time, since about 60% of farmers in the township are full-time, and 40% part-time. *

Although more than 100 names were on the tentative respondent list, some were unknown to Graham or Gregory, some were unable to be located, some were not at home, and a few were unwilling to give any information. Therefore the final list which composed the survey was very close to the desired 100, as were the final proportions of groups surveyed to the desired proportions.

* According to Don Graham's estimate. "Part-time farmer" was defined for the purposes of this analysis as any person possessing a full-time off-farm job and in addition obtaining income from agricultural pursuits.

This produced an even spatial distribution of respondents of all three groups across the township. (Figure 8.)

Following the collection of the data, an analysis was performed. The most appropriate analysis to employ was a discriminant analysis. This analysis takes a given set of variables and determines a linear combination of these variables which maximizes the differences in group means between each group. Since in this study the objective was to obtain a maximum differentiation between these three groups in order to assess differences between them, this direct method of discriminant analysis was most useful. Direct discriminant analysis was performed upon all three groups, and then between full-time and part-time, and part-time and non-farmers separately.

A step-wise discriminant analysis was also performed. Rather than using all of the given variables to form the discriminant functions, this analysis selects only those variables which it deems to be significant according to their statistical F-criterion, and forms a discriminant function from these. Since all insignificant variables are removed, this analysis tells us which variables are significant discriminators. Therefore discriminant analysis gives us indications of the quality of variables as well as whether the original set of variables taken together as a group discriminates well.

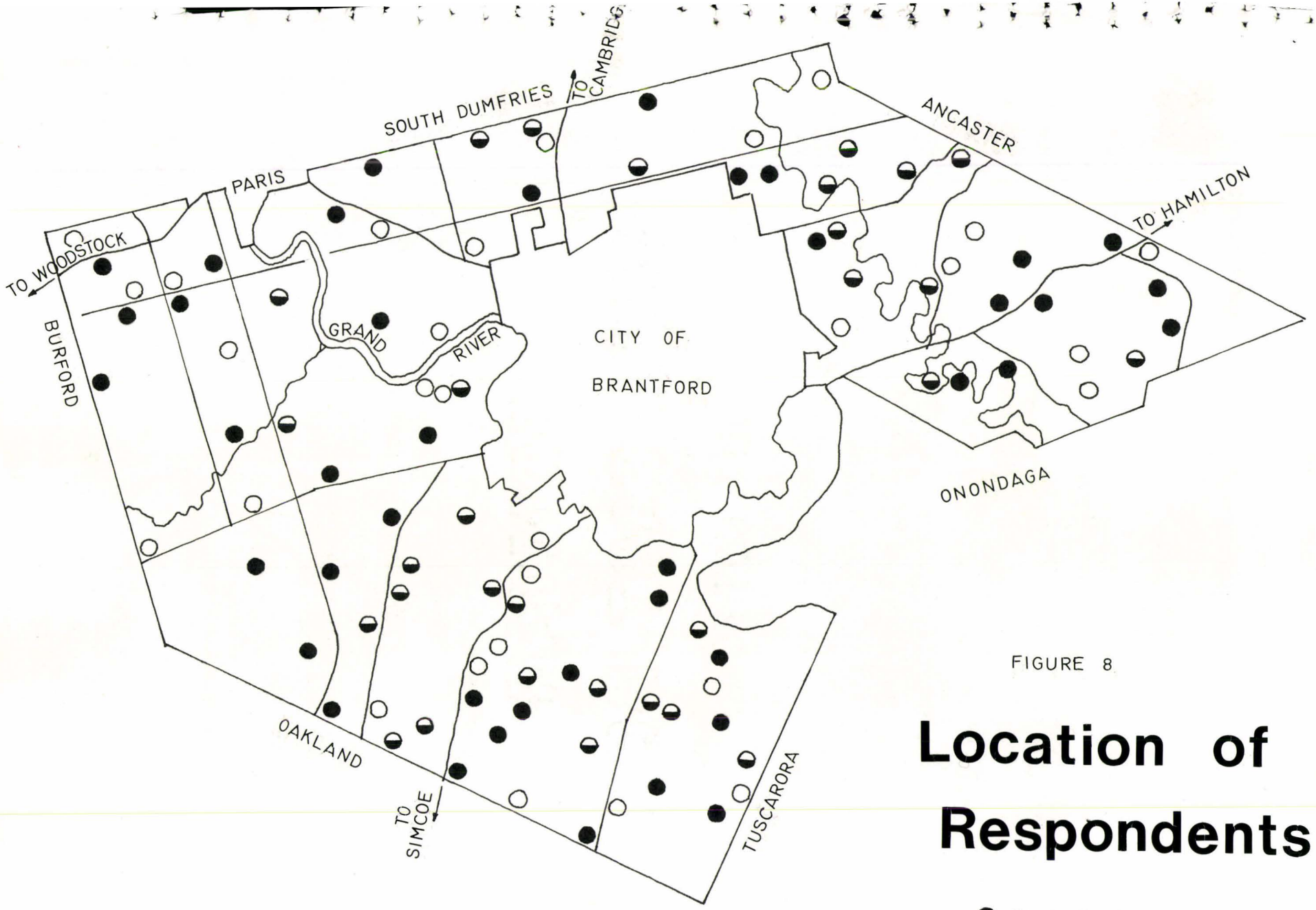


FIGURE 8

Location of Respondents

- ● FULL-TIME FARMERS
- ◒ PART-TIME FARMERS
- ○ NON-FARMERS

1 INCH = TWO MILES

Unfortunately, only quantifiable variables may be used in discriminant analysis. The data collected which was of a qualitative nature was therefore subjected to a cross-tabulation analysis, which is the most appropriate analysis for nominal variables.

A summary of the analyses performed, with the groups studied and the variables employed in them, is summarized in Table 9.

TABLE NINE

A SUMMARY OF THE ANALYSES PERFORMED

A. DIRECT DISCRIMINANT ANALYSIS

ANALYSIS 1: Discrimination of all 3 groups.

VARIABLES: (1) Farm Size

(2) Age of Operator

(3) Length of Residence at the Present Location

(4) Land Class

(5) Number of Urban Organizations belonged to

(6) Number of Rural Organizations belonged to

ANALYSIS 2: Discrimination of Full-Time Group vs. Part-Time Group

VARIABLES: same as above

ANALYSIS 3: Discrimination of Part-Time Group vs. Non-Farm Group

VARIABLES: same as above

B. STEP-WISE DISCRIMINANT ANALYSIS

ANALYSIS: Discrimination of all 3 groups.

VARIABLES: same as above

C. CROSS-TABULATION ANALYSIS

ANALYSIS 1: Cross-Tabulation of all 3 groups.

VARIABLES:
(1) Location of Previous Residence
(2) Location of Birth and/or Childhood
(3) Land Type
(4) Degree of Attachment to Residence (Inclination to Sell)
(5) Attitude Toward Land Preservation
(6) Future Intentions

ANALYSIS 2: Cross-Tabulation of Full-Time Group vs. Part-Time Group

VARIABLES: Crop Emphasis

ANALYSIS 3: Cross-Tabulation of Part-Time Group vs. Non-Farm Group

VARIABLES: Off-Farm Occupation

VI. THE ANALYSIS

The results of each analysis that was performed will now be summarized briefly. A more detailed report of the results obtained may be found in Appendix B, (Direct Discriminant Analysis), Appendix C, (Step-Wise Discriminant Analysis), and Appendix D, (Cross-Tabulation Analysis.) Following this, the validity of each hypothesis will be discussed in the light of the analysis results obtained.

(a) Direct Discriminant Analysis

In the direct analysis, a one-way analysis of variance is first performed with each variable separately. This is to test the significance of each variable entered, and serves as a guide to give clues to the observer about which variables are most important. The results of this process are found in Table 10. One sees that at the a=.01 level of significance, farm size, age, residential length and land class are significantly different between the three groups and between full-time and part-time farmers. Only farm size and age are significantly different between part-time and non-farmers. In all three cases, the association with urban and rural organizations is not significantly different.

In the analysis of the three groups taken together, two discriminant functions were found.(Table 11.) The first,

TABLE TEN

RESULTS OF THE ONE-WAY ANALYSIS OF VARIANCE

VARIABLE	SIGNIFICANT AT a=.01 Level?		
	All 3 Groups	Full-Time -Part-Time	Part-Time -Non-Farm
Farm Size	YES	YES	YES
Age of Operator	YES	YES	YES
Length of Residence	YES	YES	
Number of Rural Organizations			
Number of Urban Organizations			
Land Class	YES	YES	

having a very high eigenvalue of 1.13465, is by far the most important of the two, accounting for 90.9% of the total trace. The second, having an eigenvalue of .11425, contributes 9.1% of the trace. Although the second function is considerably less important than the first, significance testing reveals that both are significant.

In examining the discriminant function coefficients, one sees that farm size loads very heavily upon the first function, while residence length, land class, rural organizations and urban organizations load moderately. Age loads heavily upon the second function while the other variables load very weakly.

A plot is then obtained of all the observations according to their discriminant scores. (Figure 9.) In this plot, 72% of known cases are correctly classified according to their scores. The plot shows a good visual separation of group observations according to the functions obtained. Full-time farmers, clustered to the bottom of the plot, tend to have larger farm sizes, longer residence length, lower land class, and belong to fewer urban and rural organizations. Part-time farmers, located at the centre and to the left of the plot, tend to be younger than both other groups, while scoring medium in the other five variables. Finally, non-farmers, located at the top of the plot, tend to have small farm sizes, short residence lengths, high land class, and

TABLE 11

RESULTS OF DIRECT DISCRIMINANT ANALYSIS, THREE GROUPS

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS' LAMBDA
0	1.13465	.72907	90.9	.42043
1	.11425	.32021	9.1	.89747

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	1	2
Farm Size	1.16446	-.23503
Age of Operator	.11858	.98589
Residence Length	.36000	.07050
Land Class	-.28737	-.11026
# Rural Organizations	-.33800	-.00164
# Urban Organizations	-.36470	.04741

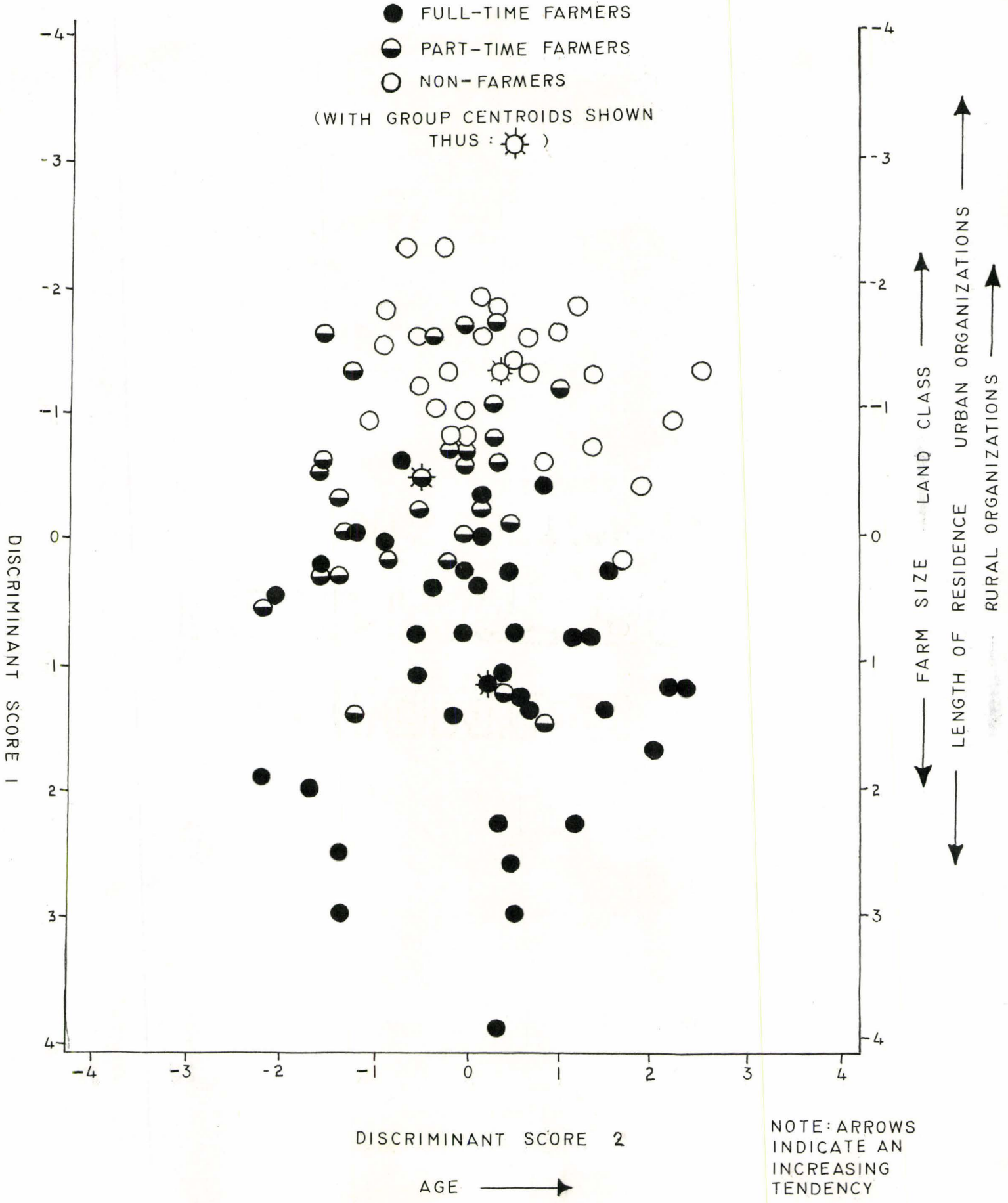
	Predicted Group Membership (%)		
Actual Group	Full-Time	Part-Time	Non-Farm
Full-Time	29.0	10.0	2.0
Part-Time	3.0	20.0	7.0
Non-Farm	1.0	5.0	23.0

72.0% of known cases correctly classified.

FIGURE 9

Visual Plot of Observations

ACCORDING TO THEIR SCORES UPON THE DIRECT DISCRIMINANT FCTS.



high affiliation with both urban and rural organizations.

Following this, a discriminant analysis was performed between only the full-time and part-time groups. (Table 12.) One discriminant function was obtained, with an eigenvalue of .63189. Farm size and age load heavily upon the function, while land class, and rural and urban organizations load moderately. The plot of the observations according to their discriminant scores is shown in Figure 10. In this plot, where 77.5% of cases are correctly classified, another good visual separation is achieved. It shows that full-time farmers tend to possess greater farm size and lower land class and to be older than part-time farmers. Part-time farmers tend to participate to a greater extent in both urban and rural organizations.

Finally, a discriminant analysis between part-time and non-farmers was performed, with the results displayed in Table 13. Again one discriminant function was obtained, with an eigenvalue of .92326. Again, farm size loads heavily on this function, while age and the number of rural organizations load moderately. In the plot obtained, (Figure 11), an excellent 84.7% of cases are correctly classified and a very good visual separation is obtained. Again it may be noted that part-time farmers tend to be younger and to possess a greater farm size.

TABLE 12

RESULTS OF DIRECT DISCRIMINANT ANALYSIS,

FULL-TIME VS. PART-TIME FARMERS.

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS LAMBDA
0	.63189	.62226	100.0	.61279

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	1
Farm Size	.79426
Age of Operator	.63162
Residence Length	.23404
Land Class	-.47072
# Rural Organizations	-.37467
# Urban Organizations	-.40424

Actual Group	Predicted Group Membership (%)	
	Full-Time	Part-Time
Full-Time	40.8	16.9
Part-Time	5.6	36.6

77.5% of known cases correctly classified.

FIGURE 10

Visual Plot of Observations

ACCORDING TO THEIR SCORE ON THE TWO-GROUP DIRECT DISCRIMINANT

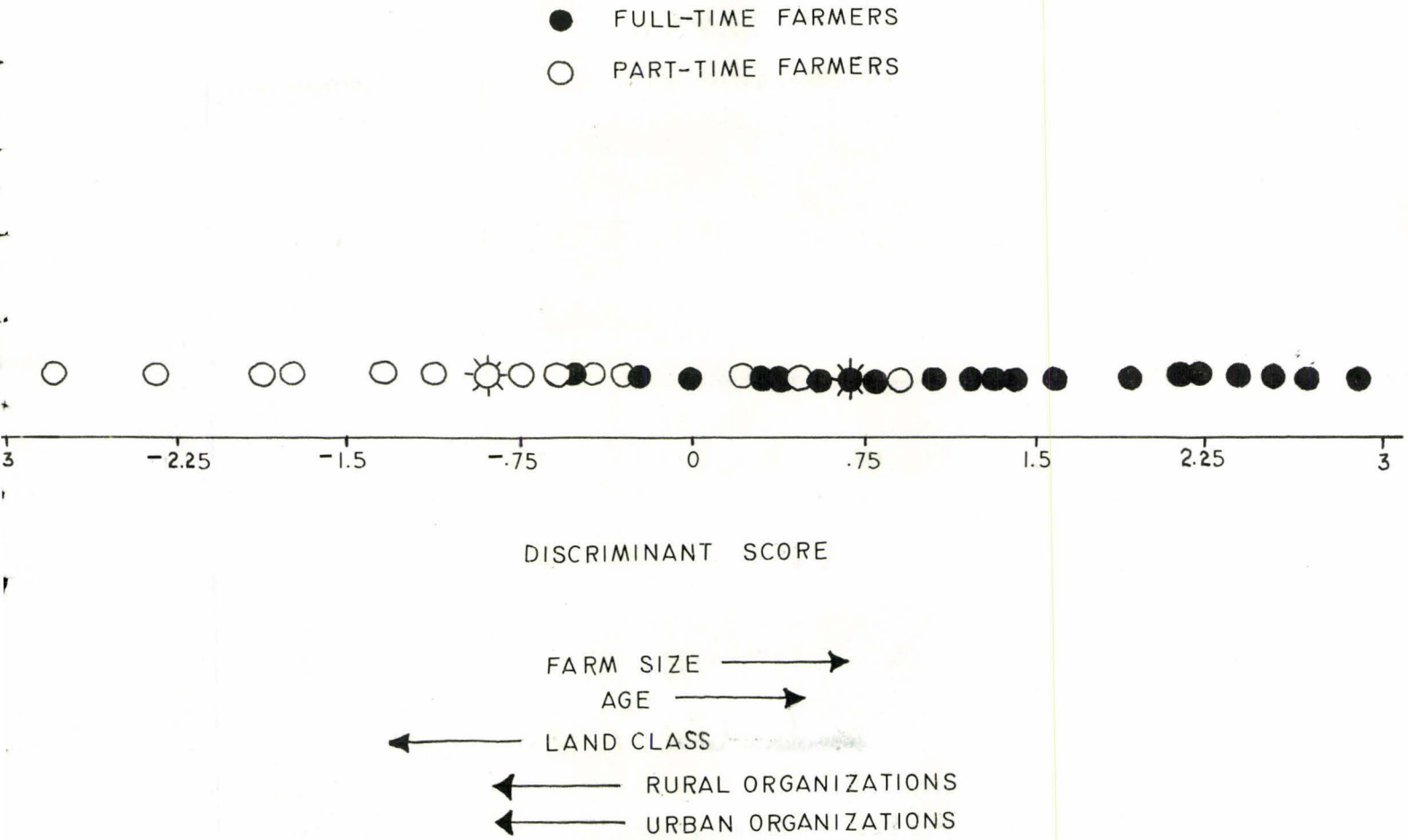


TABLE 13

RESULTS OF DIRECT DISCRIMINANT ANALYSIS,

PART-TIME VS. NON-FARMERS

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS LAMBDA
0	.92326	.69286	100.0	.51995

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	1
Farm Size	1.19581
Age of Operator	-.46836
Residence Length	..17550
Land Class	-.01635
# Rural Organizations	-.22100
# Urban Organizations	-.12731

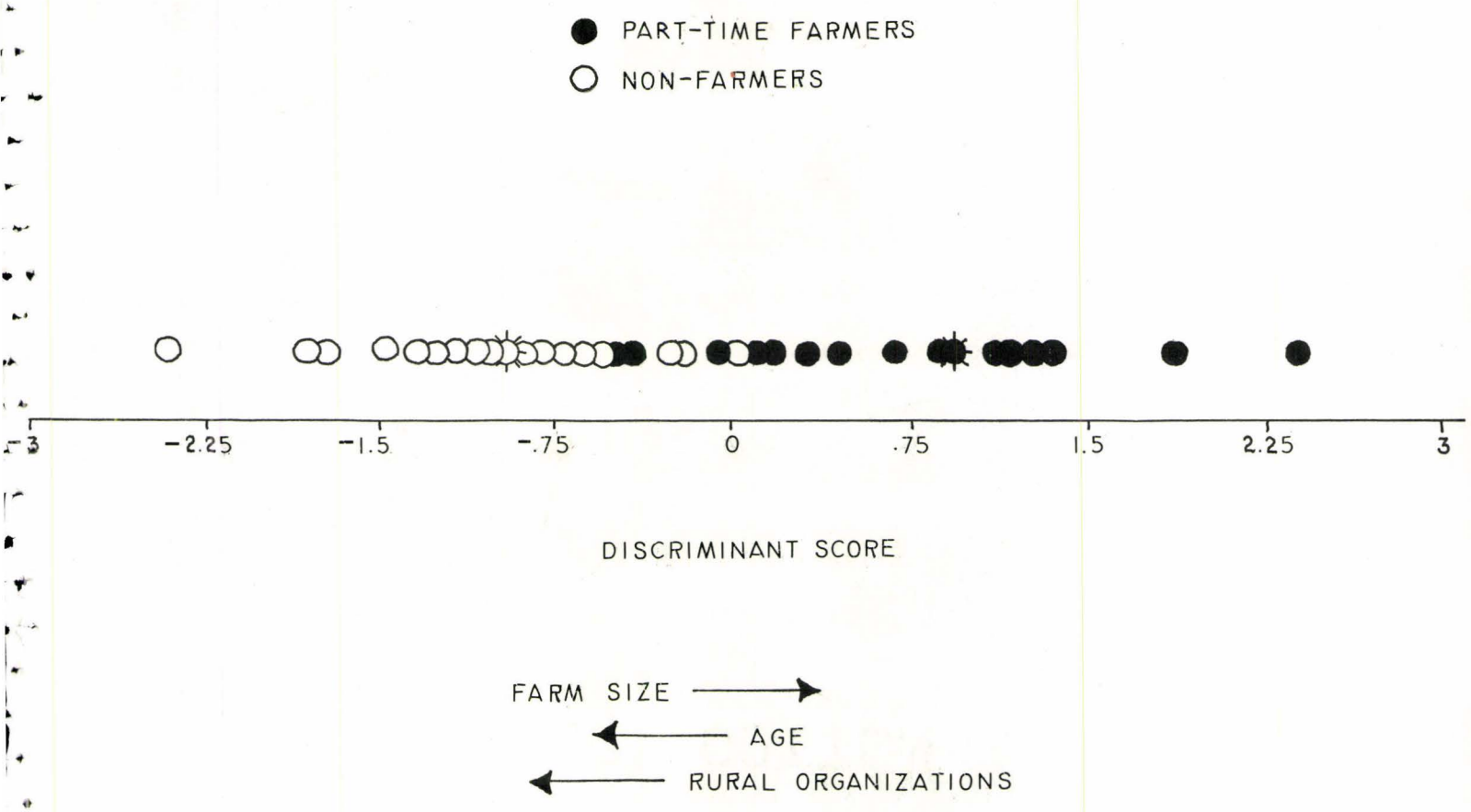
Actual Group	Predicted Group Membership (%)	
	Part-Time	Non-Farmers
Part-Time	37.3	13.6
Non-Farmers	1.7	47.5

84.7% of known cases correctly classified.

FIGURE II

Visual Plot of Observations

ACCORDING TO THEIR SCORES ON THE TWO-GROUP DIRECT DISCRIMINANT



(b) Step-Wise Discriminant Analysis

In summary, therefore, it can be seen that all three direct discriminant analyses performed showed good discrimination between the groups under consideration. However, it had already been suspected that some variables in the analysis were insignificant discriminators. It was thus necessary to perform a step-wise discriminant analysis to verify which variables may be retained and which may be discarded. This analysis determines each variable's F-statistic and compares it to a specific F-level to enter which is specified by the analyst. All variables with a higher F-level are entered into the analysis while all those with a lower F-level are discarded as being insignificant.

In this analysis, an F-to-enter and F-to-remove level was set at 3.00. This value was selected since it is the approximate critical level of F at a level of a = .01 with (2,97) degrees of freedom relevant to the data in the analysis. The results, which are displayed in Table 14, show that the variables farm size, age and residence length were proved to be significant, while land class, rural organizations and urban organizations were discarded. This confirms to a great extent the results of the one-way analysis of variance discussed earlier.

With only three variables remaining, two new discriminant functions were formed. The first and more important, with an eigenvalue of .93521, and accounting for

TABLE 14

RESULTS OF THE STEP-WISE DISCRIMINANT ANALYSIS

F-LEVEL FOR INCLUSION/DELETION = 3.000.

VARIABLES IN THE ANALYSIS			VARIABLES NOT IN THE ANALYSIS	
VARIABLE	ENTRY CRITERION	F TO REMOVE	VARIABLE	F TO ENTER
Farm Size	38.37966	23.24230	Land Class	.85951
Age	6.08117	3.72232	# Rural Organizations	.70946
Residence Length	3.17520	3.17520	# Urban Organizations	1.49149

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS LAMBDA
0	.93521	.69517	89.3	.46443
1	.11264	.31818	10.7	.89876

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	1	2
Farm Size	-1.11937	.22816
Age of Operator	-.01011	-.98230
Residence Length	-.45587	-.10213

Actual Group	Predicted Group Membership (%)		
	Full-Time	Part-Time	Non-Farm
Full-Time	27.0	9.0	5.0
Part-Time	4.0	17.0	9.0
Non-Farm	0.0	6.0	23.0

67.0% of known cases correctly classified.

89.3% of the trace, is essentially a farm size-residential length measure; while the second, with an eigenvalue of .11264 and accounting for 10.7% of the trace, is essentially an age measure. The plot of the observations, in which 67% of cases are correctly classified according to these two new functions, is shown in Figure 12. Again a satisfactory visual separation is obtained--indeed, the discrimination of three variables is only slightly worse than that obtained by the original six variables. Final inferences may be made concerning the variables involved in the discriminant analyses. They may be summarized as follows:

1. The variables farm size, age and residential length vary significantly among the three groups under consideration.

2. Full-time farmers have a significantly larger farm size than part-time farmers, while the part-time group has a significantly greater farm size than the non-farm group.

3. Part-time farmers tend to be significantly younger than full-time farmers and non-farmers.

4. Full-time farmers tend to have a significantly greater length of residence at their present location than do both other groups.

FIGURE 12

Visual Plot of Observations

ACCORDING TO THEIR SCORES UPON THE STEP-WISE DISCRIMINANT FCTS.

● FULL-TIME

◒ PART-TIME

○ NON-FARM

(GROUP CENTROIDS SHOWN)

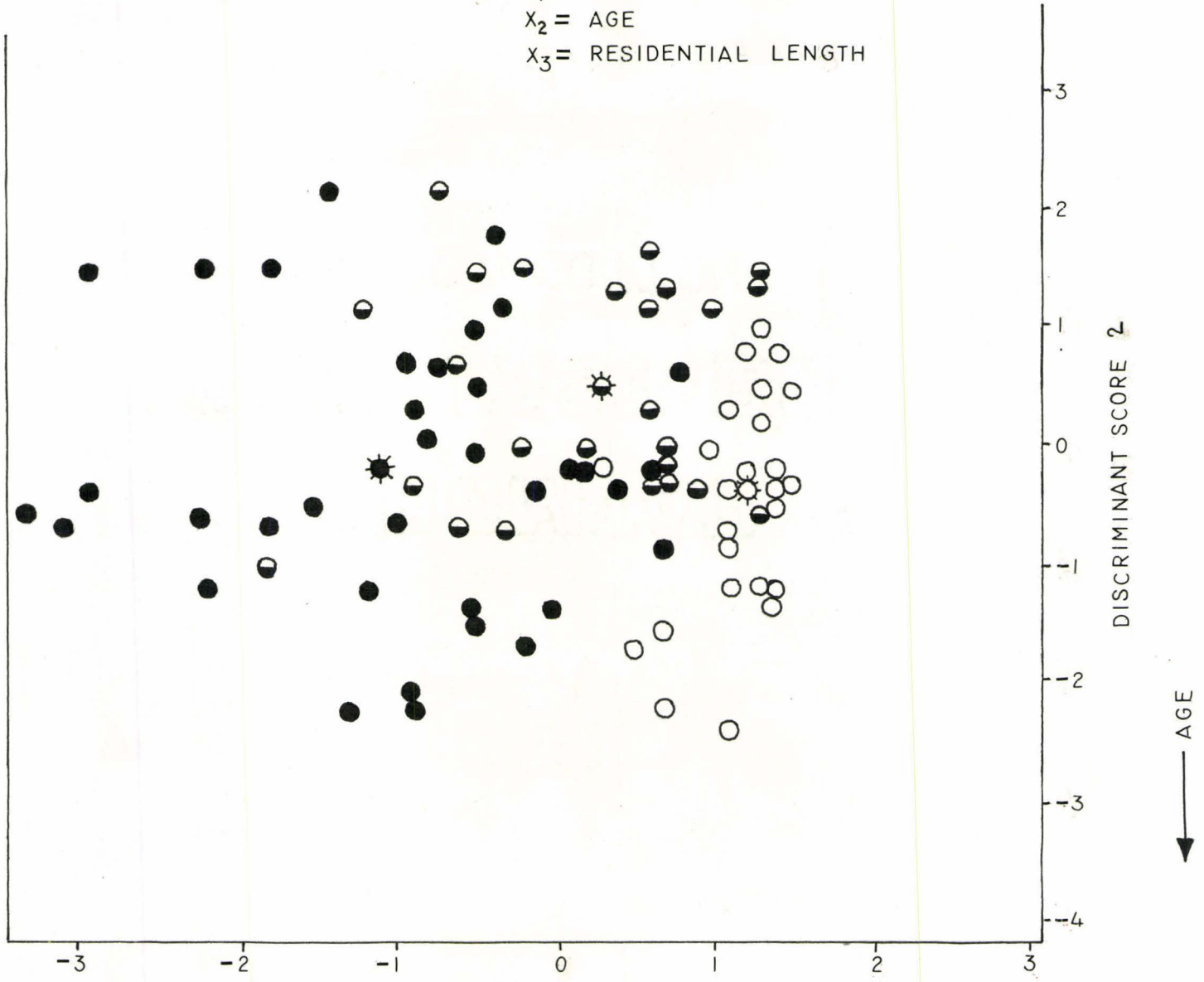
$$Y_1 = -1.11937X_1 - .01011X_2 - .45587X_3$$

$$Y_2 = .22816X_1 - .98230X_2 - .10213X_3$$

WHERE X_1 = FARM SIZE

X_2 = AGE

X_3 = RESIDENTIAL LENGTH



(c) Cross-Tabulation Analysis

The results of the cross-tabulation analysis may now be examined. These results are summarized concisely in Table 15. Here are listed the various cross-tabulations that were performed and the statistics obtained from them. By comparing the critical Chi-Square value at a level of a=.01 with the relevant degrees of freedom to the Chi-Square obtained, it is comparatively easy to see in which cross-tabulations the difference between groups is significant.

It is found that only three of the eight cross-tabulations performed yield significant results. These are: group by crop emphasis, group by location of previous residence, and group by location of birth or childhood. The variables which were found not to vary significantly between the groups were land type, inclination to sell, attitude toward land preservation, future intentions and off-farm occupation. The significant findings may be summarized as follows:

1. Part-time farmers place proportionately less emphasis on dairy, beef, hogs and tobacco than do full-time farmers, and place proportionately greater emphasis on cash crops. (corn or mixed grains.)

2. A greater proportion of full-time farmers lived on a farm before they moved to their present location. A significantly greater proportion of part-time farmers lived in a

TABLE 15

RESULTS OF CROSS-TABULATION ANALYSIS

ANALYSIS PERFORMED (a = .01)	(1) CHI-SQUARE VALUE OBTAINED (2) CRITICAL VALUE OF CHI-SQUARE	CRAMER'S V (0 V 1)	ASSYMETRIC UNCERTAINTY COEFFICIENT (0 u 1)
Group by Crop Emphasis (Groups Full-Time vs. Part-Time Only)	(1) 26.49446 (2) 18.475 (SIGNIFICANT)	.61087	.12744
Group by Location of Previous Residence	(1) 30.68191 (2) 20.090 (SIGNIFICANT)	.39168	.14314
Group by Location of Birth and/or Childhood	(1) 19.37683 (2) 20.090 (VERY NEARLY SIGNIFICANT, SIGNIFICANT AT LEVEL OF a = .025)	.31126	.11341
Group by Land Type	(1) .53067 (2) 13.277 (NOT SIGNIFICANT)	.05151	.00250
Group by Inclination to Sell (Attachment)	(1) 1.39854 (2) 9.210 (NOT SIGNIFICANT)	.11826	.01102

Group by Attitude to Land Preservation	(1) 1.27452 (2) 13.277 (NOT SIGNIFICANT)	.07983	.00649
Group by Future Intentions	(1) 6.03761 (2) 13.277 (NOT SIGNIFICANT)	.17375	.04181
Group by Occupation (Groups Part-Time vs. Non-Farmers only)	(1) 7.12045 (2) 16.812 (NOT SIGNIFICANT)	.34740	.04509

town or a city before their present location than did full-time farmers. Among the non-farm group, the tendency to live in an urban area before the present location was stronger than both other groups.

3. Almost all full-time farmers were born and raised on a farm. A significantly smaller proportion of both other groups were born on a farm. It is interesting, however, to note that a greater proportion of non-farmers were born and raised on a farm than were part-time farmers.

The significant relationships obtained from all of the analyses performed are shown diagrammatically in Figure 13. Each hypothesis will now be discussed in the light of these findings.

> HYPOTHESIS ONE.
> The majority of part-time farmers in Brantford township are not former full-time farmers. Rather, they are former urbanites farming for the attractions of rural living, for a hobby, or for a desire to enter agriculture full-time. In other words, part-time farming in this area is largely a result of a "push" force away from the city rather than a "pull" towards the city.

This hypothesis is the most difficult to discuss with certainty since its acceptance or rejection rests upon the examination of several variables. However, it is concluded that the hypothesis as stated may be accepted in the light of the variable findings, for the following reasons.

The variables relevant to this hypothesis which were found to be significant through discriminant analysis or

FIGURE 13

Summary of Significant Findings

FARM SIZE

SMALL	MEDIUM	LARGE
NON-FARMERS	PART-TIME FARMERS	FULL-TIME FARMERS

AGE

YOUNGER	OLDER
PART-TIME FARMERS	FULL-TIME FARMERS NON-FARMERS

LENGTH OF RESIDENCE

SHORTER TIME	LONGER TIME
PART-TIME FARMERS NON-FARMERS	FULL-TIME FARMERS

CROP EMPHASIS

GRAINS/CASH CROPS	LIVESTOCK/TOBACCO
PART-TIME FARMERS	FULL-TIME FARMERS

LOCATION OF PREVIOUS RESIDENCE

URBAN LOCATION		RURAL LOCATION
NON-FARMERS	PART-TIME FARMERS	FULL-TIME FARMERS

LOCATION OF BIRTH AND/OR CHILDHOOD

URBAN LOCATION		RURAL LOCATION
PART-TIME FARMERS	NON-FARMERS	FULL-TIME FARMERS

cross-tabulations, were: age, residence length, location of previous residence and location of birth and/or childhood. If each group in turn is examined in terms of these variables, as shown in Table 16, a better understanding may be obtained of the findings relating to this hypothesis.

The examination may begin with the full-time farmer group. The members of this group are generally middle-aged and have been living in their present location for a long time. If the mean number of years resident at the present location, (30), is subtracted from the mean present age, (51), 21 years is found as the mean age at which the members of this group moved to their present residence. Knowing that for the overwhelming majority of this group, the previous residence and location of birth was a farm, it may be concluded that it is likely that until the mean age of 21 most members of this group lived on their parents' farm. Around this age, then, they moved to occupy a new farm. Thus most members of this group grew up on a farm and have been farming all of their lives.

The non-farm group's mean age is almost equal to that of the full-time farm group, but this group's mean length of residence at the present location is considerably less, (only 11 years.) It may be noted that a majority of this group's members were born and raised on a farm (62%) but also that a majority (65%) lived in an urban area before

TABLE 16

SUMMARY OF SIGNIFICANT VARIABLES

	GROUP		
	FULL-TIME	PART-TIME	NON-FARM
Mean Farm Size (acres)	155.9	72.9	3.2
Mean Age of Operator	50.7	42.2	49.8
Mean Length of Residence at present Rural Location (years)	29.9	13.4	11.4
Main Crop Emphases	livestock 36%	livestock 0%	
	tobacco 22%	tobacco 3%	
	grains/corn 32%	grains/corn 80%	
Location of Previous Residence *	farm 85%	farm 37%	farm 28%
	city or town 7%	city or town 50%	city or town 65%
Location of Birth and/or Childhood *	farm 88%	farm 47%	farm 62%
	city or town 10%	city or town 40%	city or town 27%

* Column Totals may not add to 100%, since the small proportion from villages or rural non-farm areas are not listed.

occupying their present rural residences. Hence it is probable that the members of this group were farm children who moved to urban areas either through choice or necessity. Apparently there was dissatisfaction with this move, since the group then moved back to a rural environment. This move was done relatively late in life, at a mean age of (50 - 11) = 39 years. Perhaps this would indicate that the economic means were not possessed earlier to achieve this move or that perhaps the presence of children was a factor in the move. It may also be suggested that the minority of this group who did not live in urban areas previous to their move were probably retired farmers.

The part-time farming group is the main focus of attention here. This group was considerably younger than both other groups, showing a mean age of only 42 years. Also, the members of this group occupied their present residences for a comparatively short time, (13 years.) However, in examining the results further, some interesting patterns occur. Half of all group members lived in urban areas previous to their present location. It may be concluded, then, that these members fit the hypothesized conception of a part-time farmer as a former urbanite, who moved to the country at a comparatively early age (29) to begin the part-time situation. The young age at which the move was made indicates a strong possibility of an aspiring element or desire for persistence of

part-time farming within this group.

However, it must also be noted that 37% of all members of this group were located on a farm before their present location. This could indicate a significant "exit from farming" component within this part-time group. The early age of the exit from the previous full-time situation could indicate one of the following:

(1) A young farmer attempts full-time farming for a few years and then finds that, either through dislike of the occupation or economic hardship, he quits farming as a full-time occupation and takes on a full-time urban job. The fact that farming is continued on a part-time basis suggests that economic hardship is the more likely reason.

(2) A young farmer's previous residence was that of the family farm upon which he was born and raised. After marrying or having children he decides to leave his parents' farm but again due to economic constraints he is unable to enter agriculture full-time himself.

A clearer picture of the processes occurring could be obtained by determining the place of birth of the group members. However, here again one sees a split, for 47% are farm-born while 40% are urban-born. Since it is not known which members of this farm-born group belong to the farm-as previous-residence group and vice versa, it is difficult to speculate further about the origins and motivations of the

part-time group.

In summary, Hypothesis One as it has been stated may be accepted on the basis of the variables examined, since a majority of members seem to be within this part-time group as a result of an "entry" process into farming from urban areas. However, this hypothesis may be only tentatively accepted, since it is apparent that there does exist a quite significant "exit from farming" component as well. Further research is necessary into this area to make more definite statements.

HYPOTHESIS TWO.
Part-time farmers possess a significantly smaller farm size than their full-time counterparts.

This hypothesis is perhaps the easiest to make a judgment upon. Farm size showed consistently the greatest loading upon each major discriminant function of every analysis and was chosen as the first variable to enter into the Step-wise analysis, with an overwhelmingly greater F-statistic than any other variable. The hypothesis that full-time farmers possess a significantly larger farm size than part-time farmers may be accepted conclusively.

HYPOTHESIS THREE.
The type of farming practised varies significantly between the two groups in the following manner: Full-time farmers place a proportionately greater emphasis on livestock while part-time farmers place a proportionately greater emphasis on mixed grains.

The results relating to this hypothesis were also quite clear-cut. The calculated Chi-Square value was found

to be significantly greater than the critical value at a very high level of significance. Thus the differences in crop emphases between full-time and part-time farmers were significant and could not be attributed to chance. Full-time farmers tend to place a greater emphasis on livestock, while part-time farmers place a greater emphasis on mixed grains and corn as cash crops.

HYPOTHESIS FOUR.
There is a significant difference between the quality of land upon which the groups are located: the land quality of full-time farmers tends to be higher than that of part-time and non-farmers.

Land class was found to be generally a poor discriminator between the groups in direct discriminant analysis and was eliminated completely in Step-Wise analysis. Land type was also found to vary to an extremely small extent between the groups. Apparently there is no relationship between the type of farming or non-farming practised and the quality or the type of land, and this hypothesis must be rejected.

It must be remembered, however, that the data of land class and type were obtained directly from the residents themselves. The assumption was thus made that the respondents were correct in their land assessments in all cases. This assumption may not be valid: it may be possible that many respondents were in error in their land judgments. A more precise method of testing this hypothesis would be to consult a soil map and locate the holding of each respondent to obtain

a precise assessment of their land type and quality. By performing this, it is possible that different results would be obtained.

> HYPOTHESIS FIVE.
> The attitudes of part-time farmers are generally less favourable to the necessity of preserving Ontario farmland than are those of full-time farmers, while rural non-farm residents' attitudes are less favourable than both other groups.

Within the sample surveyed in this study, there again was little relationship found in Chi-Square testing between attitudes toward land preservation and group membership. Again, the hypothesis that attitudes vary significantly toward this question according to group membership must be rejected.

> HYPOTHESIS SIX.
> Part-time farmers are significantly more urban-oriented in their social, cultural and economic activities and do not participate in as many aspects of the rural community as do full-time farmers. This tendency is even stronger among rural non-farm residents.

The number of urban and rural organizations which a respondent belonged to were found to be weak discriminators and were discarded in the Step-wise analysis. It must be concluded that the degree of commitment to, and participation in, urban and rural organizations, does not vary significantly between groups and thus the participation activities within the rural community do not vary significantly. This hypothesis must be rejected.

Again it must be noted that the assumption was made

that the level of participation in organizations is a significant measure of an individual's commitment to the community. If some other measure is deemed to be more appropriate, and is utilized, it is again possible that the results may differ.

VII. SUMMARY AND CONCLUSIONS

This study has examined the problem of "rurbanization." This is a process which has gained momentum in Southern Ontario during the last two decades. Both the appearance of the rural landscape and the traditional rural community with its institutions and cohesive society have gradually been changing because of urban influences.

This change is the result of two major processes: an increase in part-time farming, and an increase in the spread of low-density residences. This study has pointed out the rapid increase in these two phenomena in Southern Ontario within the past few years, and the implications that these developments may have for rural Ontario.

These two phenomena effect both a physical and a psychological change in the nature of rural areas. The physical change in density and appearance of the countryside is the simpler one to visualize; however, "rurbanization" involves more than this. A psychological change among rural inhabitants has resulted, bringing about a situation in which "...many people who live in the open country...are dependent upon the city for their employment, and (are) urban in every important aspect of their lifestyles." (Clawson, 1972, p. 102.)

The objectives of this study, were, firstly, to shed

light upon the relationship of these two phenomena by studying any similarities and differences between part-time farmers and rural low-density resident non-farmers; and secondly, to study the changes which rural areas may have undergone because of these two developments. This involved the examination of selected aspects of change, both physical, such as farm size or type of crop grown; and psychological, such as attitudes toward land preservation or participation in the rural community.

The investigation was carried out by the selection as a study area of a Southern Ontario township, which is an area of thriving and progressive agriculture and yet which is also being subjected to urban pressures. Six hypotheses, relating to the general objectives of the study, were selected and these were operationalized by the development of a questionnaire. Three groups of respondents were surveyed: Full-time farmers, who were used essentially as a control group of people not participating in the changes; part-time farmers, respresenting the part-time farming phenomenon; and non-farmers, representing the low-density rural residence phenomenon. The analysis of the questionnaire data permitted the testing of the hypotheses and their significance to the objectives of the study.

One can conclude from this investigation that the two phenomena are both general manifestations of the same process:

a general out-migration from urban areas to rural areas of Southern Ontario appears to have been occurring at a significant scale. The reason for this out-migration is unclear; it may be due to a desire for country-living and a dissatisfaction with the urban environment, or it may be partly due to economic factors. At any rate, a rural residential location seems to be perceived as a distinctly more desirable location than an urban one by a sizeable segment of urban populations. However, it must also be noted that although a great majority of part-time farmers lived at an urban place before moving to their present location in a rural area, a significant component of this group is also composed of former full-time farmers, who are phasing out of full-time farming or perhaps out of farming altogether.

Both groups share several similarities. The average length of residence at the present location ranges from eleven to thirteen years, a period much shorter than that of the full-time farmers, indicating that these phenomena are comparatively recent. Both groups also have similar occupations: there is generally a mix of white-collar, blue-collar and skilled trade workers.

It appears that the locational situation of both groups will persist in the future, since both groups have similar future intentions of maintaining their present situation. This lends support to Mage's finding that part-time

farming is a persistent phenomenon rather than a transitional one, as is commonly believed.

Two major differences were found between the two groups. Firstly, part-time farmers are significantly younger than non-farmers. This could indicate an aspiring element in part-time farming, although the results of the future intentions of the groups do not bear this out. Secondly, non-farmers have a significantly greater tendency to be born on a farm than part-time farmers. This could indicate that urbanites born on a farm desire a return to a country environment but wish to avoid farming due to their appreciation of the financial and personal sacrifices involved. Part-time farmers, who in most instances were born and raised in a city, may view farming as a new and attractive alternate lifestyle.

One may also make the following conclusions concerning the effects of "rurbanization." Firstly, part-time farmers have a significantly smaller size of holding than full-time farmers. Secondly, part-time farmers place greater emphasis on grains and cash crops and less emphasis on livestock or tobacco. Thirdly, the type or capability of land that is occupied does not vary in any way by group. Fourthly, no significant differences exist among the attitudes of the three groups concerning the preservation of valuable Ontario farmland: the opinions of all three groups were extremely

positive. Finally, attitudes to and participation in the rural community does not vary significantly by group. All three groups show similar rates of participation in rural organizations in the township and in urban organizations of nearby communities. It was also pointed out earlier that the findings relating to land type and quality, and community involvement, could be challenged. It may in fact be argued that in any search for attitudinal or behavioural differences, one would expect a trend towards lack of differentiation between groups, since it would be the persons with rural values and attitudes who would be most attracted to out-migration from urban areas in the first place. This argument has validity, but the influence of an urban environment in influencing attitudes must not be discounted.

It may be suggested that the results obtained in Brantford township might be applied to much of southwestern Ontario, which is quite similar to the study area. It appears that the "rurbanization" of much of rural southwestern Ontario is largely attributable to urban out-migration, with the out-migrants pursuing one of two alternatives: part-time farming or non-farming residency. After an alternative is selected, it becomes a fairly permanent arrangement. It also appears that the alternative chosen may be partly influenced either by the age of the out-migrant or whether he was born and raised on a farm, not by the occupation of the out-migrant

nor by the length of his rural residency. At the same time, one must also be aware of a noteworthy "exit from full-time farming" component of the part-time situation.

As a result of these phenomena, farm size is decreasing. Although undoubtedly the average size of farm will continue to rise, the overall size of farm in southwestern Ontario may not increase as quickly as it might if this phenomenon were not occurring.

A shift of crop emphasis is occurring, from more intensive operations, such as livestock or tobacco, to a more extensive type of operation, such as grains, requiring less of a time commitment. This may have long-term influences on the type of agriculture practised in southwestern Ontario.

This process also seems to be occurring independently of land type and capability. No significant shift in attitudes of rural residents toward the issue of the loss of farmland in the province to non-agricultural uses seems to have resulted, nor has "rurbanization" significantly affected rural community as it has been defined in this study.

This study has confirmed some of the findings of other researchers and has in turn shed some new light on the "rurbanization" problem. Urban out-migration has been viewed as the most important cause of the problem. Thus the problem appears to be the result of a social phenomenon rather

than a physical one, since land type and capability were found to be unrelated to it, and the differences in crops grown were due more to lifestyle constraints than to physical ones. The phenomena causing the problem appear to be persistent and permanent, rather than transitional. It is also interesting to note that the choice of alternative, either part-time farming or non-farming residency, is somehow related to the age and location of birth and childhood of the out-migrant. Significantly, more part-time farmers were born in the city and more non-farmers were born on a farm. It may be argued that this is precisely the opposite to the situation that might be expected.

Further research in this entire area is necessary, for these processes are not yet well understood. It would be interesting to pursue a similar type of investigation in another quite different area which has marginal land, such as at the edge of the Canadian Shield, to see to what extent the findings of this study are applicable. The investigation might also be pursued in an area fairly distant from direct urban pressures, such as the Lake Huron area, to see whether the findings apply there. The study might also be made into a dynamic one; that is, an area can be examined over a period of several years to see whether or not these relationships are changing over time.

Finally, since only selected impacts and aspects of

the process of "rurbanization" were examined, it would be interesting to study others. For example, one could analyze the reasons for urban out-migration, which may include family considerations such as concern for children; the income level, the effect of rural land prices, taxes or servicing costs. One might also examine any differences in attitudes toward other questions affecting rural areas or agriculture, or one might study the issue of rural community more fully using an examination of the various social interactions of the rural residents. Questions relating more directly to part-time farming could also be studied, such as comparative incomes derived, farming methods employed, or the efficiency of farm operations. Lastly, the "exit from full-time farming" subgroup could be examined more thoroughly by noting its characteristics which distinguish it as a group separate from the others.

It is quite important that the problem of "rurbanization" be studied further; it is a recent and little-understood process and the understanding of its nature and consequences is significant for the future of rural Ontario and for agriculture.

APPENDIX A

THE QUESTIONNAIRE THAT WAS ADMINISTERED

BRANTFORD TOWNSHIP QUESTIONNAIRE

GROUP _____
(FT, PT or NF)

FARM LOCATION & DESCRIPTION

1. FARM SIZE (acres) _____

2. WHAT IS YOUR MAIN CROP EMPHASIS? _____

3. NUMBERS OF: DAIRY _____ ACRES OF: TOBACCO _____

   BEEF _____ MARKET GARDENING _____

   HOGS _____ CASH CROP _____

   POULTRY _____ MIXED GRAINS _____

4. WHAT WAS YOUR ROUGH GROSS INCOME LAST YEAR FROM AGRICULTURE: _____

5. AGE OF OPERATOR _____

6. HOW LONG HAVE YOU LIVED HERE? _____

7. WHERE DID YOU LIVE BEFORE THAT? _____

8. WHERE WERE YOU BORN AND RAISED? _____
   (farm, rural non-farm, village, town, city)

9. WHAT KIND OF LAND DO YOU HAVE?

   heavy clay _____ loamy _____ sandy _____

10. HERE IS A SYSTEM FOR CLASSIFYING LAND ON THE BASIS OF ITS USEFULNESS FOR FARMING. ROUGHLY WHAT FRACTION OF YOUR LAND FALLS INTO EACH OF THESE CATEGORIES?
    (category descriptions read to respondent)

    Class 1 _____ Class 2 _____ Class 3 _____ Class 4 _____

11. IF SOMEONE OFFERED TO BUY YOUR FARM, WOULD YOU SELL? _____
    HOW HIGH WOULD THE PRICE PER ACRE HAVE TO BE BEFORE YOU WOULD DECIDE TO SELL? _____
    REASON? _____

12. THERE HAS BEEN MUCH DISCUSSION LATELY ABOUT PRESERVING ONTARIO FARMLAND FOR THE FUTURE. HOW DO YOU FEEL ABOUT THAT? _____

    _____

Land must be preserved at any cost _____

Land must be preserved only if it is economically viable to do so _____

Indifferent about the question _____

13. WHAT ARE YOUR FUTURE INTENTIONS RIGHT NOW?

a. Expand _____ b. Maintain present state _____ c. Cut Back _____ d. or Sell _____

14. COULD YOU PLEASE INDICATE IN WHICH ORGANIZATIONS OR CLUBS YOU OR YOUR WIFE TAKE PART IN AND IN WHICH CAPACITY: *

NAME OF ORGANIZATION	HUSBAND	WIFE
1.		
2.		
3.		
4.		
5.		

OCCUPATION; (Groups 2 and 3 only) _____

* Note: Number of Rural or Urban Organizations was derived by adding up the number of organizations the husband belonged to, plus the number of organizations the wife belonged to. Two points were assigned if the husband or wife was an office holder in the particular organization. Organizations were then assigned into either an urban or a rural category depending on the nature of the organization.
Eg. Women's Institute - rural
Lions Club in Brantford- urban

APPENDIX B

RESULTS OF THE DIRECT DISCRIMINANT ANALYSIS

ANALYSIS 1: THREE GROUPS

NUMBER		
Group 1	41	(Full-Time)
Group 2	30	(Part-Time)
Group 3	29	(Non-Farm)
Total	100	

MEANS	Group 1	Group 2	Group 3
Farm Size	155.902	72.966	86.750
Age of Operator	50.731	42.166	47.900
Residence Length	29.951	13.400	11.448
Land Class	1.439	1.766	1.896
# Rural Organizations	1.731	1.166	.965
# Urban Organizations	.585	1.000	1.444

STANDARD DEVIATIONS	Group 1	Group 2	Group 3
Farm Size	101.267	58.725	3.345
Age of Operator	11.753	9.805	10.993
Residence Length	19.649	12.832	11.450
Land Class	.593	.678	.817
# Rural Organizations	1.761	1.315	1.179
# Urban Organizations	.893	1.911	1.020

WILKS LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO WITH 2 AND 97 DEGREES OF FREEDOM

VARIABLE	WILKS LAMBDA	F
Farm Size	.5582	38.3797
Age of Operator	.8916	5.8981
Residence Length	.7617	15.1716
Land Class	.9211	4.1572
# Rural Organizations	.9498	2.5615
# Urban Organizations	.9293	3.6903

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS LAMBDA
0	1.13465	.72907	90.9	.42043
1	.11425	.32021	9.1	.89747

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

VARIABLE	1	2
Farm Size	1.16446	-.23503
Age of Operator	.11858	.98589
Residence Length	.36000	.07050
Land Class	-.28737	-.11026
# Rural Organizations	-.33800	-.00164
# Urban Organizations	-.36470	.04741

CENTROIDS OF GROUPS IN REDUCED SPACE

Group 1	1.18268	.13651
Group 2	-.36281	-.49530
Group 3	-1.29674	.31938

PREDICTION RESULTS

Actual Group	Predicted Group Membership		
	Group 1	Group 2	Group 3
Group 1	29.0 %	10.0 %	2.0 %
Group 2	3.0 %	20.0 %	7.0 %
Group 3	1.0 %	5.0 %	23.0 %

72.0 percent of known cases correctly classified.

Chi-Square = 67.280 Significance = .000

ANALYSIS 2: FULL-TIME VS. PART-TIME GROUPS

WILKS LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO WITH 1 AND 69 DEGREES OF FREEDOM

VARIABLE	WILKS LAMBDA	F
Farm Size	.8107	16.1147
Age of Operator	.8674	10.5471
Residence Length	.8099	16.1955
Land Class	.9366	4.6723
# Rural Organizations	.9692	2.1906
# Urban Organizations	.9789	1.4897

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS LAMBDA
0	.63189	.62226	100.0	.61279

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

VARIABLE	1
Farm Size	.79426
Age of Operator	.63162
Residence Length	.23404
Land Class	-.47072
# Rural Organizations	-.37467
# Urban Organizations	-.40424

CENTROIDS OF GROUPS IN REDUCED SPACE

Group 1	.67032
Group 2	-.91611

PREDICTION RESULTS

Actual Group	Predicted Group Membership	
	Group 1	Group 2
Group 1	40.8 %	16.9 %
Group 2	5.6 %	36.6 %
Ungrouped (Group 3)	7.0 %	33.8 %

77.5 percent of known cases correctly classified.

Chi-Square = 21.423 Significance = .000

ANALYSIS 3: PART-TIME VS. NON-FARMERS

WILKS LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO WITH 1 and 57 DEGREES OF FREEDOM

VARIABLE	WILKS LAMBDA	F
Farm Size	.5832	40.7302
Age of Operator	.8770	7.9920
Residence Length	.9934	.3791
Land Class	.9923	.4423
# Rural Organizations	.9934	.3815
# Urban Organizations	.9785	1.2495

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS LAMBDA
0	.92326	.69286	100.0	.51995

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

VARIABLE	1
Farm Size	1.19581
Age of Operator	-.46836
Residence Length	.17550
Land Class	-.01635
# Rural Organizations	-.22100
# Urban Organizations	-.12731

CENTROIDS OF GROUPS IN REDUCED SPACE

Group 2	.92856
Group 3	-.96058

PREDICTION RESULTS

Actual Group	Predicted Group Membership	
	Group 2	Group 3
Group 2	37.3 %	13.6 %
Group 3	1.7 %	47.5 %
Ungrouped (Group 1)	69.5 %	0.0 %

84.7 percent of known cases correctly classified.

Chi-Square = 28.492 Significance = .000

APPENDIX C

RESULTS OF THE STEP-WISE DISCRIMINANT ANALYSIS

STEP-WISE DISCRIMINANT ANALYSIS

Tolerance Level .00010 Maximum Steps 12

F for Inclusion 3.0000 F for Deletion 3.0000

Solution Method: Select Variable which will minimize Wilks Lambda.

VARIABLE ENTERED ON STEP NUMBER 1: FARM SIZE

Wilks Lambda .55824 Approximate F 38.37966
Raos V 76.75933 Change in V 76.75933

VARIABLES IN THE ANALYSIS			VARIABLES NOT IN THE ANALYSIS		
VARIABLE	ENTRY CRITERION	F TO REMOVE	VARIABLE	F TO ENTER	ENTRY CRITERION
Farm Size	38.37966	38.37966	Age	6.08117	5.89813
			Resid-ence Length	5.50352	15.17163
			Land Class	1.86437	4.15722
			Rural Organiz.	.22267	2.56150
			Urban Organiz.	2.06248	3.69034

VARIABLE ENTERED ON STEP NUMBER 2: AGE OF OPERATOR

Wilks Lambda .49547 Approximate F 20.19176
Raos V 89.93173 Change in V 13.17241

VARIABLES IN THE ANALYSIS			VARIABLES NOT IN THE ANALYSIS		
VARIABLE	ENTRY CRITERION	F TO REMOVE	VARIABLE	F TO ENTER	ENTRY CRITERION
Farm Size	38.37966	38.37346	Resid-ence Length	3.17520	5.50352
Age of Operator	6.08117	6.08117	Land Class	1.90473	1.86437

Rural Organiz.	.19037	.22267
Urban Organiz.	2.18316	2.06248

VARIABLE ENTERED ON STEP NUMBER 3: RESIDENCE LENGTH

Wilks Lambda	.46443	Approximate F	14.80026
Raos V	101.64157	Change in V	11.70984

VARIABLES IN THE ANALYSIS

VARIABLE	ENTRY CRITERION	F TO REMOVE
Farm Size	38.37966	23.24230
Age of Operator	6.08117	3.72232
Residence Length	3.17520	3.17520

VARIABLES NOT IN THE ANALYSIS

VARIABLE	F TO ENTER	ENTRY CRITERION
Land Class	.85951	1.90473
Rural Organizations	.70946	.19037
Urban Organizations	1.49149	2.18316

ALL ELIGIBLE VARIABLES INCLUDED

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	% OF TRACE	WILKS LAMBDA
0	.93521	.69517	89.3	.46443
1	.11264	.31818	10.7	.89876

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	1	2
Farm Size	-1.11937	.22816
Age of Operator	-.01011	-.98230
Residence Length	-.45587	-.10213

CENTROIDS OF GROUPS IN REDUCED SPACE

	1	2
Group 1	-1.07247	-.13674
Group 2	.32487	.49217
Group 3	1.18018	-.31582

PREDICTION RESULTS

Actual Group	Predicted Group Membership		
	Group 1	Group 2	Group 3
Group 1	27.0%	9.0%	5.0%
Group 2	4.0%	17.0%	9.0%
Group 3	0.0	6.0%	23.0%

67.0 percent of known cases correctly classified.

Chi-Square = 51.005 Significance = .000

APPENDIX D

RESULTS OF THE CROSS-TABULATIONS

CROSS-TABULATION: GROUP BY CROP EMPHASIS

CROP EMPHASIS	GROUP		ROW PCT.
	FULL-TIME FARMERS	PART-TIME FARMERS	
Dairy	24.4	0.0	14.1
Beef	7.3	0.0	4.2
Hogs	4.9	0.0	2.8
Poultry	7.3	6.7	7.0
Tobacco	22.0	3.3	14.1
Market Gardening	2.4	10.0	5.6
Cash Crop-Corn	7.3	36.7	19.7
Mixed Grains	24.4	43.3	32.4
Column Total	57.7	42.3	100.0

Raw Chi-Square = 26.49446 with 7 degrees of freedom.
Cramer's V = .61087
Contingency Coefficient = .52130
Lambda (Asymmetric) = .43333 with Group dependent.
= 0 with Crop Emphasis dependent.
Lambda (Symmetric) = .16667
Uncertainty Coefficient (Asymmetric) = .34063 with Group dependent, = .21744 with Crop Emphasis dependent.
Uncertainty Coefficient (Symmetric) = .18548

CROSS-TABULATION: GROUP BY LOCATION OF PREVIOUS RESIDENCE

LOCATION OF PREVIOUS RESIDENCE	GROUP			ROW PCT.
	FULL-TIME FARMERS	PART-TIME FARMERS	NON-FARMERS	
Farm	85.4	36.7	27.6	54.0
Rural Non-Farm	2.4	3.3	3.4	3.0
Village	2.4	10.0	3.4	5.0
Town	2.4	10.0	13.8	8.0
City	7.3	40.0	51.7	30.0
Column Total	41.0	30.0	29.0	100.0

Raw Chi-Square = 30.68191 with 8 degrees of freedom.
Cramer's V = .39168
Contingency Coefficient = .48454
Lambda (Asymmetric) = .28814 with group dependent.
= .17391 with location of previous residence dependent.
Lambda (Symmetric) = .23810
Uncertainty Coefficient (Asymmetric) = .15174 with Group dependent, = .14314 with location of previous residence dependent.
Uncertainty Coefficient (Symmetric) = .14732

CROSS-TABULATION: GROUP BY LOCATION OF BIRTH AND/OR CHILDHOOD

LOCATION OF BIRTH AND/OR CHILDHOOD	GROUP			ROW PCT.
	FULL-TIME FARMERS	PART-TIME FARMERS	NON-FARMERS	
Farm	87.8	46.7	62.1	68.0
Rural Non-Farm	0.0	3.3	6.9	3.0
Village	4.9	10.0	3.4	6.0
Town	0.0	0.0	3.4	1.0
City	7.3	40.0	24.1	22.0
Column Total	41.0	30.0	29.0	100.0

Raw Chi-Square = 19.37683 with 8 degrees of freedom.
Cramer's V = .31126
Contingency Coefficient = .40289
Lambda (Asymmetric) = .22034 with Group dependent.
= 0 with Location of Birth and/or Childhood dependent.
Lambda (Symmetric) = .14286
Uncertainty Coefficient (Asymmetric) = .09562 with Group dependent.
= .11341 with Location of Birth and/or Childhood dependent.
Uncertainty Coefficient (Symmetric) = .10376

CROSS-TABULATION: GROUP BY LAND TYPE

LAND TYPE	GROUP			ROW PCT.
	FULL-TIME FARMERS	PART-TIME FARMERS	NON-FARMERS	
Clay	41.5	43.3	44.8	43.0
Loam	31.7	30.0	24.1	29.0
Sand	26.8	26.7	31.0	28.0
Column Total	41.0	30.0	29.0	100.0

Raw Chi-Square = .53067 with 4 degrees of freedom.
Cramer's V = .05151
Contingency Coefficient = .07265
Lambda (Asymmetric) = 0 with Group dependent.
= 0 with Land Type dependent.
Lambda (Symmetric) = 0
Uncertainty Coefficient (Asymmetric) = .00248 with Group dependent
= .00250 with Land Type dependent.
Uncertainty Coefficient (Symmetric) = .00249

CROSS-TABULATION: GROUP BY INCLINATION TO SELL (ATTACHMENT)

INCLINATION TO SELL	GROUP			ROW PCT.
	FULL-TIME FARMERS	PART-TIME FARMERS	NON-FARMERS	
Wouldn't Sell	73.2	60.0	69.0	68.0
Would Sell	26.8	40.0	31.0	32.0
Column Total	41.0	30.0	29.0	100.0

Raw Chi-Square = 1.39854 with 2 degrees of freedom.
Cramer's V = .11826
Contingency Coefficient = .11744
Lambda (Asymmetric) = .01695 with Group dependent.
= 0 with Inclination to Sell dependent.
Lambda (Symmetric) = .01099
Uncertainty Coefficient (Asymmetric) = .00636 with Group dependent.
= .01102 with Inclination to Sell dependent.
Uncertainty Coefficient (Symmetric) = .00807

CROSS-TABULATION: GROUP BY ATTITUDE TO LAND PRESERVATION

ATTITUDE TO LAND PRESERVATION	GROUP			ROW PCT.
	FULL-TIME FARMERS	PART-TIME FARMERS	NON-FARMERS	
Land Should be preserved at any Cost	51.2	40.0	51.7	48.0
Land should be preserved only if it is economically viable to do so	36.6	43.3	37.9	39.0
Indifferent about the question	12.2	16.7	10.3	13.0
Column Total	41.0	30.0	29.0	100.0

Raw Chi-Square = 1.27452 with 4 degrees of freedom.
Cramer's V = .07983
Contingency Coefficient = .11218
Lambda (Asymmetric) = 0 with Group dependent.
= .01923 with Attitude dependent.
Lambda (Symmetric) = .00901
Uncertainty Coefficient (Asymmetric) = .00588 with Group dependent.
= .00649 with Attitude dependent.
Uncertainty Coefficient (Symmetric) = .00617

CROSS-TABULATION: GROUP BY FUTURE INTENTIONS

FUTURE INTENTIONS	GROUP			ROW PCT.
	FULL-TIME FARMERS	PART-TIME FARMERS	NON-FARMERS	
Expand	31.7	26.7	10.3	24.0
Maintain	61.0	63.3	86.2	69.0
Cut Back or Sell	7.3	10.00	3.4	7.0
Column Total	41.0	30.0	29.0	100.0

Raw Chi-Square = 6.03761 with 4 degrees of freedom.
Cramer's V = .17375
Contingency Coefficient = .23862
Lambda (Asymmetric) = 0 with Group dependent.
= 0 with Future Intentions dependent.
Lambda (Symmetric) = 0
Uncertainty Coefficient (Asymmetric) = .03022 with Group dependent.
= .04181 with Future Intentions dependent.
Uncertainty Coefficient (Symmetric) = .03508

CROSS-TABULATION: GROUP BY OCCUPATION

OCCUPATION	GROUP		ROW PCT.
	PART-TIME FARMERS	NON-FARMERS	
Agriculture	3.3	0.0	1.7
Professional-Managerial	3.3	6.9	5.1
White Collar	16.7	20.7	18.6
Blue Collar (Unskilled)	33.3	20.7	27.1
Skilled Trade	30.0	20.7	25.4
Student, Retired, Unemployed, Welfare	0.0	13.8	6.8
Self-Employed Business	13.3	17.2	15.3
Column Total	50.8	49.2	100.0

Raw Chi-Square = 7.12045 with 6 degrees of freedom.
Cramer's V = .34740
Contingency Coefficient = .32816
Lambda (Asymmetric) = .24138 with Group dependent.
= 0 with Occupation dependent.
Lambda (Symmetric) = .09722
Uncertainty Coefficient (Asymmetric) = .11093 with Group dependent.
= .04509 with Occupation dependent.
Uncertainty Coefficient (Symmetric) = .06412

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