LAND USE AND TENURE RELATIONSHIPS IN EAST WAWANOSH TOWNSHIP

by

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Requirements of Geography 490

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C E R T I F I C A T E O F E X A M I N A T I O N

This report by

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ABSTRACT

Land use and tenure relationships lie at the heart of agricultural activity in the rural Township of East Wawanosh. The investigation of this agricultural system has the objectives of identifying the tenure situation and some of the key relationships between tenure and land use in the context of a set of hypothesized relationships. Data was compiled primarily from personal questionnaire-interviews of 80% of the township's landowners who owned or operated more than 10 acres of property. The information obtained from these questionnaire-interviews permitted a detailed analysis of the ownership and operation of land within East Wawanosh Township.

The study provides the following major conclusions:

1) There is a wide variation in tenure within East Wawanosh Township, consisting of a total of eight tenure types.

2) These tenure types differed in the intensity of land use for agricultural purposes ranging from the full-time farmer through to those tenure types with no agricultural activity.

3) These differences are enhanced by a marked contrast between those tenure types significantly involved in agriculture and those having minimal or no agricultural involvement.

Overall, the tenure types are differentiated in terms of the amount of land base held (for example, owned acreage, rented acreage and soil capability), by different land uses (for example, enterprise type, crop and livestock patterns) and by the intensity of land use for agricultural production, including the total agricultural output.

The patterns of tenure and operation as discussed within this report, reveal a heterogeneous and complicated system of land use relationships. The significance of these relationships would suggest that any further evaluation of the township, including rural planning, needs to explicitly recognize this situation.

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CHAPTER I

INTRODUCTION

East Wawanosh Township (Figure 1), like many rural-agricultural communities in Ontario, has undergone dramatic changes in recent years. Land prices have escalated, economic circumstances have fluctuated and farming has responded in terms of increased scale and intensity of operation; substituting labour with increased levels of mechanization and specialization, resulting in changes in land use and enterprise types.

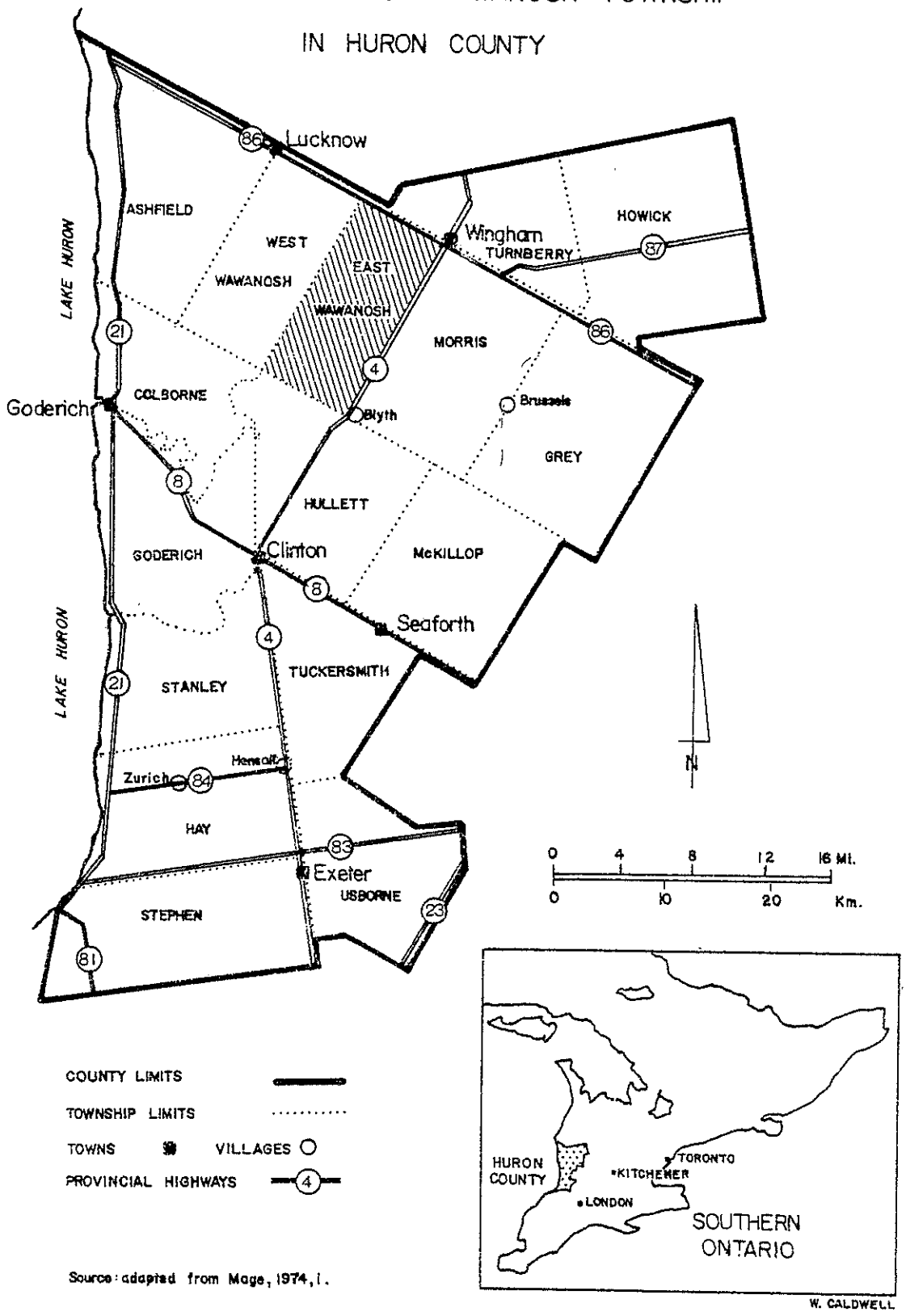
Objectives

Associated with these changes in farm operation has been a transformation in the tenure situation. Tenure, which involves both the ownership and operation of farm land, has traditionally consisted of full-time, family owned and operated farms. Evidence of widespread modification, however, involving part-time and ancillary forms of farm land ownership and operation is one of the key factors associated with change. The identification and description of the current tenure situation, within East Wawanosh, represents one of the major objectives of this report.

The second major objective of this study is to

FIGURE 1:

LOCATION OF EAST WAWANOSH TOWNSHIP IN HURON COUNTY



Source: adapted from Mage, 1974, 1.

identify and evaluate some of the relationships between tenure and land use, within the still predominantly rural-farm environment of East Wawanosh. The presence of different tenure types may be examined in the context of agricultural activity, including land use as reflected by enterprise type, cropping patterns and different capital and labour investments. Of major importance is the concept of intensity as an indicator of change associated with tenure and its detailed measurement at the individual farm level. Tenure conditions and relationships lie at the heart of land use in the still rural township of East Wawanosh and their evaluation is important in terms of assessing both change in the rural system and as the background to further rural planning and development.

Expected Relationships

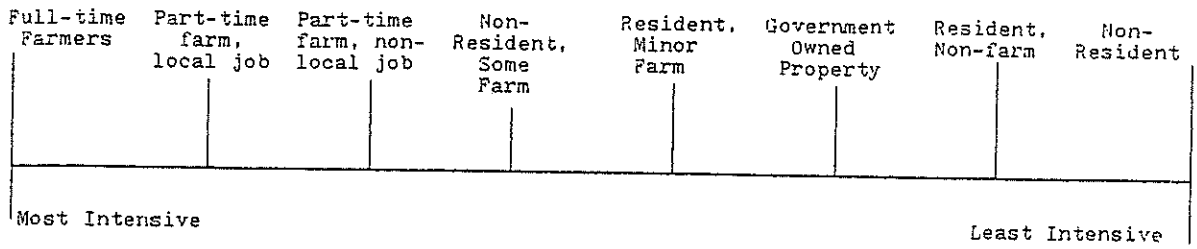
Given the changes in farming and the location of the township, the detailed examination of tenure and farm operation is placed in the following framework of expected relationships: (Figure 2)

a) That a broad range of farm and non-farm types of tenure has developed within East Wawanosh. However, given the distance of the township from large urban centers and its still predominantly farm environment, it is expected that the distribution of tenure will show no locational relationships other than to the physical features of the township.

b) That the intensity of land use will be related to the

FIGURE 2:

THE HYPOTHESIZED RELATIONSHIP BETWEEN TENURE* AND INTENSITY



level of commitment to agriculture; that is, the intensity of land use will describe a continuum, with a direct relationship between intensively managed properties and full-time farming, and with a decline in intensity through part-time to non-farm tenure situations. Furthermore, intensity as measured through differences in enterprise type, crop and livestock patterns, labour inputs and capital investments will demonstrate a similar relationship with tenure.

The Approach to the Problem

Essentially this report attempts to analyse the agricultural system of East Wawanosh from the perspective of ownership and operation (tenure), using both a detailed data base consisting largely of individual farm interviews and a more general model and operational frame of reference. The latter forms the basis for a consideration of the broad conditions stimulating and guiding change in agriculture and the related rural setting (Chapter II). This is followed by an introduction to the study area of East Wawanosh, including an

*The individual tenure types are defined in Chapter III.

historical perspective and a review of the range of methods used to obtain and analyze the detailed data in the study (Chapter III). The actual analysis of the East Wawanosh agricultural system is prescribed in Chapters IV and V. Chapter IV deals primarily with who owns the land and the variables of layout, farm size and the physical base of the individual parcel units. Chapter V examines the expected relationship between tenure and factors of operation and intensity of land use. The concluding chapter presents a summary of the findings and discusses their implications for rural planning as well as possibilities for additional research.

CHAPTER II

AGRICULTURE IN SOUTHWESTERN ONTARIO: THE PROCESS OF CHANGE

> "A general farmer is the man who carries on a system of mixed farming, working from one hundred to two hundred acres of land, raising just such crops as his soil seems best arranged for, or his convenience demands, keeping his fifteen to twenty head of stock, and a few sheep and hogs, using the milk of his cows for the cheese factory or home dairy, and fattening two or three beasts annually for the market. Such men as these form by far the larger portion of farmers in Ontario". (The Ontario Agricultural Commission Report of 1881, in Patterson, 1965, 8).

The above statement, indicative of Ontario agriculture in 1881, helps to establish, by comparison, the extent to which agriculture has changed during the last 100 years. In fact, even prior to World War II, agriculture in Ontario still consisted largely of the labour intensive mixed livestock enterprise type. However, since 1945 some major processes have been operating which have had an important impact upon the rural socio-economic structure, including the operational characteristics of the farm unit and the agricultural economy, as well as contributing to important transformations in tenure. The impact of these changes has been generally felt throughout Southwestern Ontario, including East Wawanosh Township.

Three Models of Change

The motivation for change in agriculture is the product of several interrelated circumstances. There are however, essentially three "process" models which have been advanced.

One of the most important factors inducing change in agriculture during this century, according to Patterson (1965), is the widespread adoption and use of technology, especially since World War II. In particular, Patterson notes the use of petroleum and electric power (machinery, which has replaced horses); new aids to specialization (sprays, fertilizers, drainage and irrigation) and finally changes in available markets (increases in population and improved processing technology). These new forms of technology have initiated an increasing farm size, specialization, mechanization and a significant reduction in labour requirements.

A second process at work in agriculture is the cost-price squeeze and the external economic conditions. The cost-price squeeze as discussed by Fuller (1978), among others, refers to a situation where farm input prices are increasing faster than output prices, thereby reducing the profit margin for a given level of output. While attempting to efficiently and competitively produce food, the farmer has in the face of increasingly difficult economic circumstances tended towards a greater capitalization of farming (involving increased mechanization, scale and specialization).

The industrialization of agriculture, as discussed by

Troughton (1979), considers both the technological advances and economic conditions, thereby addressing agricultural transformations in a broader context. Generally, the industrialization of agriculture has been brought about through the common processes of increased scale; intensification of capital inputs (energy, machinery, chemicals, etc); specialization in production and the integration of farm production with other parts of the total food system.

These processes, which have shaped and continue to alter the agricultural system, serve as the basis for investigating the specific elements of change. The following discussion seeks to describe and identify the nature of change, including its impact on agriculture as a socio-economic system.

Resultants of Change

Technology

The development and increasing use of new technology and mechanization is a major element of agricultural transformation in this century. Increasing levels of mechanization, stemming largely from the use of fossil fuels and electricity, has greatly reduced the human and animal labour requirements by frequently substituting labour with technology. The most immediate and visible element of this change is the tractor (Fuller, 1978, 9). The widespread use of tractors, which became popular following the scarcity of manpower during and following the Second World War, has resulted in an almost complete changeover in the equipment to go with it (Patterson,

1965, 4). One of the impacts of this machinery, which requires large acreages to be economically justifiable, is a drive towards increased scale of operation (Fuller, 1978, 14; Patterson, 1965, 4).

Other mechanized systems, such as milking parlours and automatic feeding systems, have also reduced the labour requirement per unit of produce and have therefore, fostered the movement towards increased specialization.

Furthermore, improved technology has also resulted in significant increases in crop yields. The use of fertilizers, commercial sprays and widespread drainage and irrigation have all contributed to improved conditions for growing crops (Patterson, 1965, 9). In addition, the creation of improved plant hybrids has led to significantly higher yields, as well as increasing the area over which many crops, such as corn, may be grown (Notes on Agriculture, Volume XV, No. 2, 5).

Specialization

Specialization, which involves the concentration of energies in one area of production, has according to the Centre for Resources Development, assumed increasing importance, and has resulted in improved levels of efficiency (1972, 149). A specialized enterprise as distinct from a mixed farm, usually implies a dominance of one livestock or crop type. The advantages of specialization, in addition to concentrating capital in one area of production, thereby contributing to economies of scale, is to allow the operator

to use his talents and time to the best advantage (Patterson, 1965, 18). The fact that considerable variation in income exists between different enterprise types enhances this movement towards specialization (Shaw, 1979, 104).

Capital Intensification

Increasingly intensive methods of production, including increasing scale of operation, specialization and technology, has resulted in an increasing dependence on captial. As a result, the level of indebtedness of the Canadian farm industry has increased from $1,642 million in 1964 to $5,246 million in 1976 (Fuller, 1978, 9).

In fact, the transfer of the family farm in Ontario is associated with an almost universal mortgaging of farms (Noble, 1962, 76; Noble, 1972, 11). One important aspect of this application of capital is that it has helped to offset a 25% reduction in the farm labour force between 1962 and 1976 with a 50% increase in capital inputs (Notes on Agriculture, Volume XII, No. 3, 1976, 2). In effect, the above trends represent what one author has called the industrialization of capital, in which:

> "Farming is becoming increasingly competitive, with increasing emphasis on economies of scale, increased quantity of capital stock, improved managerial skills and continual adoption of new technology as a means of dodging the ever-present cost-price squeeze" (Shaw, 1979, 121).

Changes in the Land Base

In the face of increasingly difficult economic

circumstances, some land has been pushed out of production, particularily in the more marginal areas of Ontario. Within Southwestern Ontario, while relatively small amounts of land have gone out of agricultural production, there has been a reduction in total farm numbers owing to a push towards increased farm size, including economies of scale.

With a greater demand placed upon those areas of prime agricultural capability, in light of the movement towards increasing farm size and economies of scale, land has become increasingly expensive. The rapid increases in land values, as noted within Table 1, have acted as an incentive for some individuals to sell their property, while at the same time making it increasingly difficult for many to afford the purchase of agricultural land.

TABLE 1

Percent Annual Increase in Ontario Farm Land, Values Per Acre

Base 1961-100	Yearly % Increase
1962 - 1972	9.5%
1972 - 1973	21.0%
1973 - 1974	30.0%

Source: Based on Farm Credit Corporation 1975 Annual Report (Adapted from Notes on Agriculture, Volume XII, No. 3, 17).

Tenure

In light of the overall changes affecting agriculture, farmers have faced essentially two alternatives. One, they could intensify, by adopting increasing levels of technology, specialize their operation and strive for economies of scale

(by increasing the size of their operation); or two, they could seek to add non-farm employment.

Part-time Farming

Part-time farming is often perceived as a response to increasingly difficult economic circumstances (Walker, 1979, 65; the Center for Resources Devolopment, 1972, 152; Noble, 1973, 3). Faced with a decision to either increase their scale of operation or supplement their income through off-farm employment, many farmers have chosen the latter. In the view of Richard Wietfeldt, Research Director with the Ontario Federation of Agriculture, part-time farming involves:

> "work done off the operators farm, or at least, outside of the operators farm enterprise. Off-farm work would include work on a neighbouring farm (unless this work is returned on a commercial or partnership basis), custom machinery work, and any selling or distributing or small industry the farmer carries on as well as work in factory, forest or office" (Wietfeldt, 1975, 207).

Michael Bunce (1975) has identified two groups of part-time farmers demonstrating differences in non-farm job type; regularity and duration of employment; journey to work distance and non-farm income levels. Part-time farmers holding local jobs were part of the local community's economic structure and were frequently self-employed in seasonal and part-time employment. On the other hand, part-time farmers with non-local jobs were usually full-time employees in the urban economic structure. Complimenting Bunce's findings is the recognition by Wietfeldt (1975) and Troughton (1976) of the presence of different occupational groupings among

part-time farmers.

Generally, part-time farming is associated with lower levels of productivity, efficiency and income, compared to full-time farming (Center for Resources Development, 1972, 168; Hutchison, 1975, 161; Mage, 1975, 191). Noble (1965), has also demonstrated that part-time farmers compared to full-time farmers own fewer acres, have fewer livestock and do not grow as many crops. Part-time farmers have also been attracted to those enterprise types with a reduced, often seasonal, labour requirement (Walker, 1979, 61; Troughton, 1976, 48). In general, part-time farmers form a significant portion of all farm operators; however, they are not equally represented in terms of farm acreage owned, nor the value of agricultural products produced (Table 2).

TABLE 2

General Characteristics of Part-time* Farm Operations, Ontario, 1971

Part-time as a % of Ontario's Total				
Part-time Operators	Farm Acreage	Acreage Improved Land	Acreage Cropland	Value of Agricultural Products
42.8	37.8	35.8	35.9	24.8

*Part-time indicates all farm operators reporting off-farm work during the 1971 census year.
Source: Adapted from Mage, 1975a, 172, a special Tabulation from Statistics Canada, Census of Agriculture, 1971.

Mage (1974) has found that part-time farmers in Huron County exhibit characteristics similar to those within the entire province. Part-time farmers within Huron County, a largely agricularal and rural area, have smaller farms and

fewer livestock compared to full-time farmers. Furthermore, he has found that part-time farmers demonstrate a preference for certain enterprise types such as cash cropping as opposed to those activities which are more labour dependent such as dairy and mixed livestock.

The Development of Other Tenure Types

Although farmers form the largest occupational group of rural residents, the proportion of farmers owning land has been decreasing since 1964. Wage earners, skilled tradesmen, business or commercial people, professionals and retired individuals now form a significant portion of all rural landowners. Although the majority of land owners (86%) either live on their property, or within 25 miles of it this represents a significant transformation in the ownership of rural lands (Resource Economics Branch, Ministry of Natural Resources, 1973, 1).

Partly as a result of farm abondonment and a decreasing farm population, and partly as a result of a large urban population with the financial ability and desire to purchase land in the countryside (Table 3), there has been an increasing resident non-farm population, an increasing hobby farm population, as well as an increasing incidence of non-resident land ownership (Center for Resources Development, 1972, 56; Shaw, 1979, 179). Although the land use of the non-farm rural landowner is not documented by the census (since these properties are not usually considered to be census farms) studies

have shown that this group frequently demonstrates unique patterns of land use. The non-resident land owner, for example, in many instances (50% of the time) has no form of accommodation on his property, while the incidence and size of woodlot and wasteland are liable to be more than double that of the resident (Resource Economics Branch, Ministry of Natural Resources, 1973, 33; 37).

TABLE 3

Motives for Purchasing Rural Properties in Ontario*

Motive (as a percent)	Lake Huron District	Southern Ontario
Farming	86.9	73.0
Permanent Residence	4.7	9.2
Second Home	1.7	4.7
Financial Investment	3.0	4.3
Satisfaction of Land Ownership	3.4	4.2
Satisfaction of Woodland Ownership	3.2	3.9
Commercial Timber Production	.7	2.5
Personal Recreation	3.1	5.6
Commercial Recreation	.5	1.1
Others	1.1	2.2

*Land owners with 50 acres or more
Source: Adapted from Ministry of Natural Resources, 1973, 20.

The so-called hobby farmer who is most prevalent in the fringe areas of major cities is generally perceived as being involved in farming for amenity reasons (Troughton, 1976). The hobby farmer represents a diversion from part-time farming in that he generally has much lower levels of intensity of production.

What one may deduce from the previous discussion is

that there have been several interrelated trends in acriculture. One of these has involved a movement towards increasing intensification, specialization and technology (including mechanization). A second trend has involved the development of various tenure types in addition to the full-time farmer. Among these are the resident with no agricultural activity, the non-resident landowner and the part-time farmer. In addition to the fostering of an efficient agricultural system there have been several detrimental impacts on the rural society and environment. In light of declining rural populations and employment, there is a real threat in many areas to the quality of rural life (Fuller, 1978). Furthermore, in some instances the impact of increasing technology, specialization and intensification has been to increase the incidence of pollution, erosion, a loss of natural fertility and a loss of amenity resulting from the disappearance of woodlots and fence rows.

The three models or approaches to change in agriculture discussed at the outset of this chapter reflect the transformations which have taken place in agriculture. The interaction of these transformations or changes provides the potential for considerable research at the individual township level. In this context, the advantages of selecting a study area away from major urban developments in order to isolate the economic pressures above, are generally appreciated (Ontario Department of Agriculture, Publication 68, 1). East Wawanosh Township as elaborated upon in the following chapter,

meets these requirements, being both a rural township remote from any major urban centers and being equally susceptible to many of the trends which have generally affected agriculture throughout Ontario.

CHAPTER III

EAST WAWANOSH TOWNSHIP AND THE FRAMEWORK FOR THE STUDY

The Study Area

East Wawanosh Township, located in the northern portion of Huron County is one of 16 townships in the county (Figure 1). Originally one large single township, Wawanosh was divided into the two separate townships of East and West Wawanosh in 1866. The reason given being the large size of the combined area and the rapid rate of settlement, which was creating problems of representation and administration (Graduate Planning Workship, 1979, 6). The original survey applied to Wawanosh, reflected a Nineteenth Century approach to rural survey and was based on the division of a 2,400 acre section, which was surveyed into a regular pattern of 200 acre lots of 30 by 66.67 chains (Dean, 1969, Plate 99). In East Wawanosh this produced a township of approximately 12 miles (19.3 km.) north to south and 5.8 miles (9.3 km.) east to west, with a total of 210, 200 acre lots (approximately 43,014.4 acres: Ontario Ministry of Intergovernmental Affairs, 1979, Section on Huron County). The only irregularity within the original survey pattern is caused by the

Maitland River, which runs through the township (Figure 3).

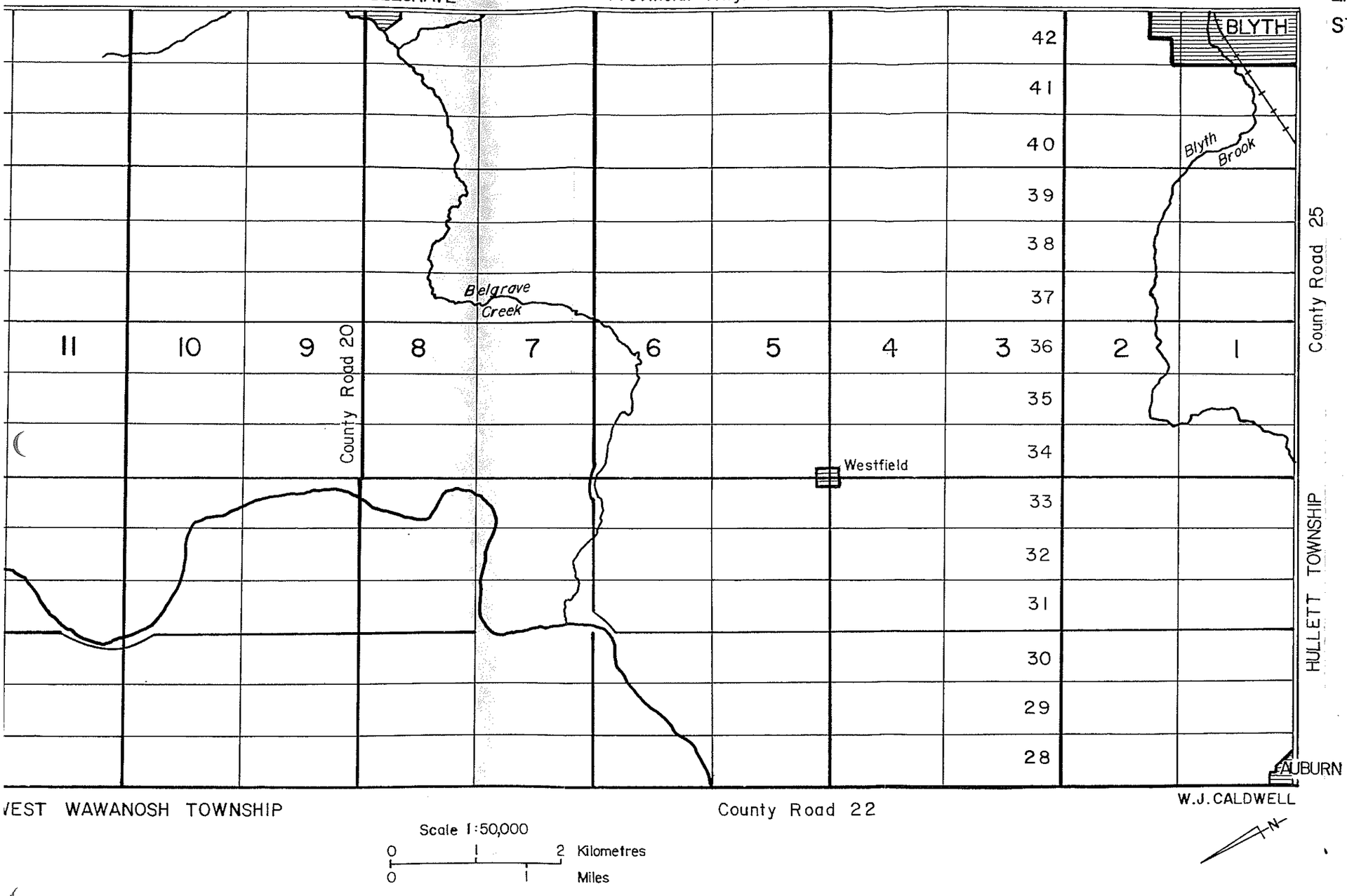
The Physical Characteristics of East Wawanosh

Despite the regular survey, a striking element of the township is its diversity of relief. Within the township, elevation ranges from less than 950 feet to over 1175 feet; terrain varies from level to gently and moderately rolling (Canada, Department of Energy, Mines and Resources, 40 P/11; 40 P/13; 40 P/14, 1972). The physiography of the township is dominated by the Wawanosh Moraine, which covers much of the south-western portion of the township. The remainder of the township lies within a drumlinized till plain, which is broken by intertwining melt water channels (Beard, 1977). The flood plain of the Maitland River, which runs in a south-westerly direction across the township, represents another major landscape feature.

There is a strong relationship between the soils in the township and their assessed Canada Land Inventory Capability. The Canada Land Inventory (CLI), which has rated the agricultural capability of soils on a scale from 1 to 7 (prior to man induced improvements), shows a strong correlation with the actual physical productivity of a soil (Troughton, 1978). Within East Wawanosh, the dominant soil type (Table 4) is the Harriston medium textured till, which is generally assessed as having a class 1 capability. The second most prevalent soil type is the Donnybrook poorly sorted gravel outwash, which is rated as class 6, reflecting severe restrictions for agricultural land use. The distribution of these soil

FIGURE 3:

EAST WAWANOSH TOWNSHIP
STUDY AREA BASE MAP



WINGHAM

MORRIS TOWNSHIP

BELGRAVE

Provincial Hwy. 4

BLYTH

TURNBERRY TOWNSHIP

Provincial Hwy. 86

Whitechurch

Belgrave Creek

Blyth Brook

MAITLAND RIVER

County Road 20

Westfield

14 13 12 11 10 9 8 7 6 5 4 3 2 1

42 41 40 39 38 37 36 35 34 33 32 31 30 29 28

WEST WAWANOSH TOWNSHIP

County Road 22

W.J. CALDWELL

Scale 1:50,000

0 1 2 Kilometres

0 1 Miles

N

TABLE 4

The Physiography, Soils and Soil Capability of East Wawanosh

Physiographic *	Approximate Percent of East Wawanosh Land Area	Major** Soil Materials and Type	Natural Drainage	Topography	Stoniness	Dominant CLI***Soil Capability
Moraine	27.0%	H1 - Harriston Medium Textured Till -loam	Good	Strongly undulating to rolling	Slightly stony	1
Till Plain	27.7%	Dos - Donnybrook Poorly Sorted Gravel Outwash -sandy loam	Good	Strongly rolling to hilly	Moderate to very stony	6
Spillways	45.4%	D1 - Dumfries Light to Medium Textured Till -loam	Good	Strongly undulating to rolling	Moderately stony	3/5
		Pal - Parkhill Medium Textured Till -loam	Poor	Level	Slightly stony	2
		M - Organic matter -muck	Poor	Depressional	Stone-free	0 (Not Assessed)
		Gil - Gilford Well Sorted Gravelly Outwash	Poor	Level to slightly depressional	Slightly stony	4

Source: * Chapman and Putnam, 1972, Map 2225
** Dominion Department of Agriculture, 1956, Soil Survey Report #13
*** ARDA Soil Capability for Agriculture, 1968, 40 P/11; 40 P/13; 40 P/14

capabilities is reflected in Figure 4 and Table 5, which shows the distribution of the dominant soil classes tabulated for each of the individual land holdings studied. The distribution of these soils is so uneven, however, that an individual farmer may have a complete range of soil capabilities on his land, with repercussions for agricultural management, field size and land use (Graduate Planning Workshop, 1979, 28-29).

TABLE 5

The Dominant CLI Capability Rating Per Land Holding

	Class 1 and 2	Class 3 and 4	Class 5 and 6	Class 0 (Not Assessed)
Percent Occurrence	61.6	10.6	25.0	2.8

Climatically, East Wawanosh falls into a region known as the Huron slopes (Table 6). In general, the growing season, precipitation levels and temperature regime allow East Wawanosh to favourably compete with most areas of the province in terms of the variety of crops which may be grown.

Socio-Economic Factors

In 1976, the population of East Wawanosh was 1,154 with a farm population of 704 or 61% of the total. Huron County, by comparison, has a farm population of 25% (Census of Canada, 1976, Volume 12, Table 23). Contributing to the rural nature of the township is the absence of any major

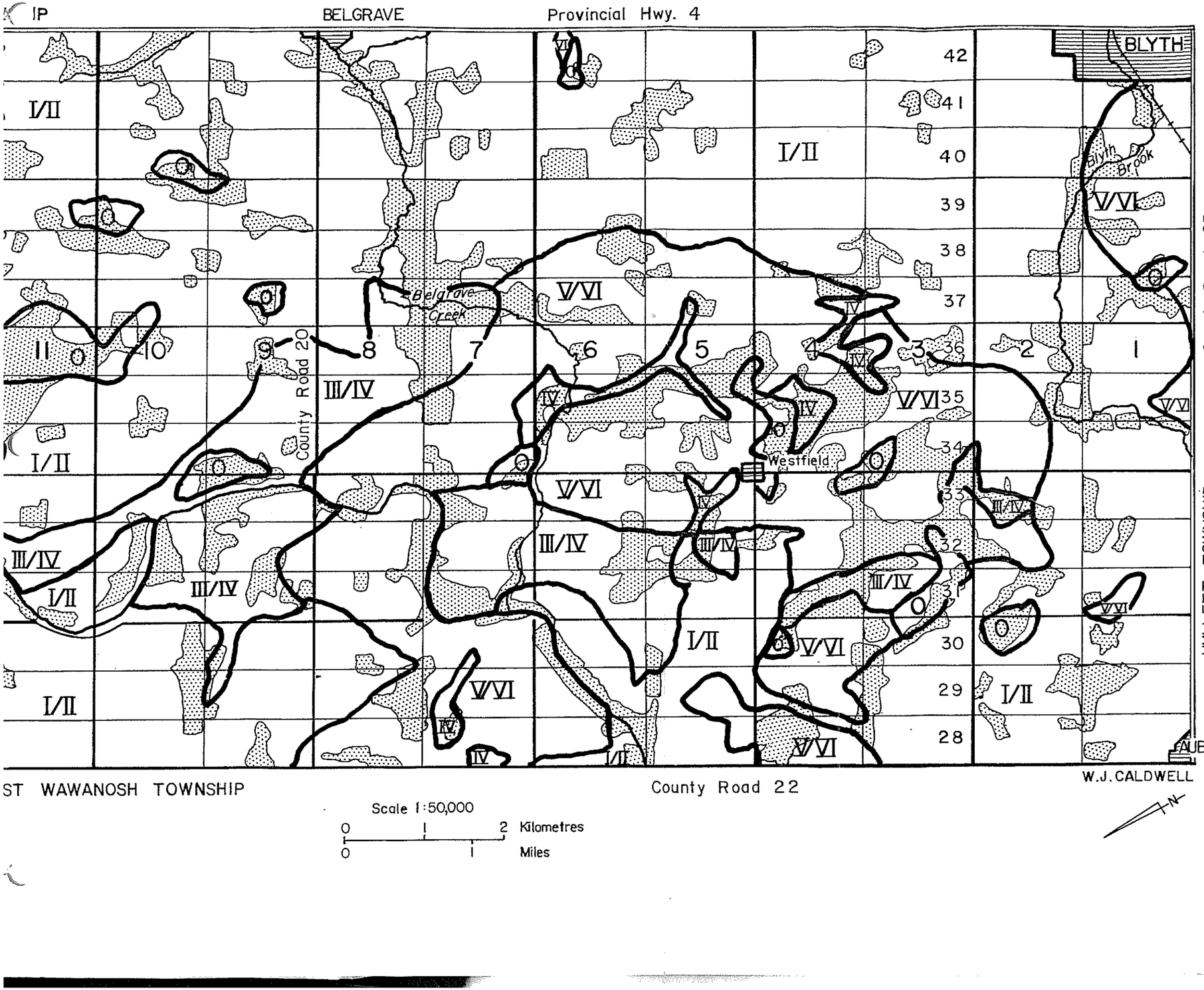
FIGURE 4:

EAST WAWANOSH TOWNSHIP:

THE LOCATION OF WOODLANDS

AND THE SOIL CAPABILITY

FOR AGRICULTURE



— LOT LINES

— GRAVEL ROADS

═ PAVED ROADS

URBAN/COMMERCIAL LAND USE

WOODLANDS

BOUNDARY OF SOIL CLASS

I/II DOMINANT SOIL CAPABILITY I OR II

III/IV DOMINANT SOIL CAPABILITY III OR IV

V/VI DOMINANT SOIL CAPABILITY V OR VI

O CAPABILITY O (NOT ASSESSED)

Source: Classification of soils and woodlands after Canada Land Inventory (ARDA, 1968).

WINGHAM

MORRIS TOWNSHIP

BELGRAVE

Provincial Hwy. 4

BLYTH

TURNBERRY TOWNSHIP

Provincial Hwy. 86

Whitechurch

Belgrave Creek

County Road 20

Blyth Brook

Westfield

MAITLAND RIVER

WEST WAWANOSH TOWNSHIP

County Road 22

AUBU

W.J. CALDWELL

Scale 1:50,000

0 2 Kilometres

0 Miles

N

TABLE 6

Selected Characteristics of Climate in East Wawanosh (Huron Slopes)*

Altitude (feet above sea level)	1100	(338.3 m.)
Mean Annual Temperature (°F)	44	(6°C)
Mean Daily Maximum Temperature (°F)-January	28	(-2°C)
-April	51	(11°C)
-July	79	(26°C)
-October	58	(14°C)
Mean Daily Minimum Temperature (°F)-January	14	(-10°C)
-April	32	(0°C)
-July	56	(13°C)
-October	39	(4°C)
Mean Date Last Spring Frost	-May 20	
Mean Date First Fall Frost	-September 30	
Mean Annual Frost Free Period (days)	135	
Mean Date of Start of Growing Season	-April 17	
Mean Date of End of Growing Season	-October 31	
Mean Annual Length of Growing Season	-195	
Mean Annual Growing Degrees Days	-3200	
Mean Annual Precipitation (inches)	32-39	(.81-.99 m.)
Mean Annual Snowfall (inches)	110	(2.79 m.)
Mean Annual Potential Evapotranspiration (inches)	23	(.58 m.)
Mean Annual Actual Evapotranspiration (inches)	22	(.56 m.)
Mean Annual Moisture Deficiency (inches)	1	(.03 m.)
Mean Annual Water Surplus (inches)	16	(.41 m.)

Source: Brown, McKay and Chapman, 1968

*See Appendix I for metric conversion factors.

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urban centers. There are, however, several small centers in close proximity. East Wawanosh* is bounded by Wingham (2,871); Blyth (866); Auburn (222); Belgrave (204) and Whitechurch (134) (Figure 3). Beyond Wingham, the next largest centers of population, located approximately 10 miles from the edge of the township, are Goderich and Clinton (populations of 7,385 and 3,151 respectively) (Figure 1). The rural nature of East Wawanosh is endorsed by M. Yeates (1975) who has categorized southern Ontario as either rural (having a population density of less than 25 people per square mile); semi-rural; semi-urban or urban. East Wawanosh, with a population density of approximately 16.6 people per square mile is classified as rural. This designation of rural is projected through to at least the year 2000.

Many of the non-farm residents living within the township are concentrated in clusters adjacent to towns or villages bordering the township (Figure 3). Data prepared by the Huron County Planning Department (August, 1978) indicates that of 76 lots, 1 acre or less in size, 45 are actually part of the unincorporated hamlets of Auburn and Belgrave or are concentrated in an area of housing development south of Wingham along provincial Highway 4.

It should also be noted that there is virtually no non-agricultural industry within East Wawanosh. Those activities which are commercial in nature are frequently agriculturally

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*All population statistics are from the 1976 Census of Canada.

oriented, such as the implement dealership/feedmill and grain and corn drying and handling facilities at Westfield. However, in 1977, there were 15 active gravel pits, within the township, of which 7 were commercial in nature (Beard, 1977).

Agriculture in East Wawanosh: A Preliminary Investigation

The 1971 and 1976 Census of Canada reflect the agricultural system in East Wawanosh as it currently exists. Because of the change in definition of a census farm between 1971 and 1976, care must be taken when comparing the two censuses. An analysis of Tables 7 and 8 indicates the general nature of agriculture in East Wawanosh and Huron County. Between 1971 and 1976 there has been a marked increase in crop acreage with corn for grain and ensilage increasing significantly, while acreages of mixed grain, barley, and pasture decreased. In addition, the total number of cattle rose while pigs decreased. There has also been a trend towards fewer but larger dairy herds. While the number of farms reporting milking machines declined by 31%, the total number of milk cows declined by less than 1%. The significant increases in the number of tractors, combines and hay balers owned is reflected in the total value of farm capital which increased by nearly 3 times, during the five year intercensal period. This increase in farm capital costs have probably contributed to the growing popularity of renting land.

The farms in East Wawanosh, on the average, have 59% of their total acreage under crops compared to 71% for Huron

TABLE 7

Crops and Livestock in East Wawanosh and Huron County:
Data from the 1971 and 1976 Census

Use of Land (Acres)

		Improved				Unimproved	
	Total Area	Under Crops	Pasture	Summer Fallow	Other	Woodland	Other
1971							
Huron County	742,965	446,672	143,798	4,320	16,518	68,589	63,068
East Wawanosh	39,853	19,007	9,940	77	779	5,384	4,661
1976							
Huron County	727,346	515,089	86,069	2,460	15,537	61,767	46,424
East Wawanosh	38,644	22,751	5,530	65	951	5,096	4,251

Selected Field Crops (Acres)

	Wheat	Oats	Barley	Mixed Grains	Total Tame Hay	Corn for Grain	Corn for Ensilage	Oats for Fodder	Other
1971									
Huron County	14,039	14,668	45,100	93,675	101,530	79,446	45,038	449	422
East Wawanosh	40	536	1,796	4,599	6,393	3,213	2,177	19	2
1976									
Huron County	31,776	10,132	40,014	72,674	94,178	129,116	64,537	668	2,009
East Wawanosh	145	356	1,470	3,636	7,172	5,799	3,678	4	1

Livestock

	Cattle				Hens & Chickens		
	Total	Milk Cows	Pigs	Sheep	Total	Hens & Pullets	Horses & Ponies
1971							
Huron County	199,291	34,324	204,847	7,808	2,574,932	789,490	2,274
East Wawanosh	11,775	2,247	8,950	311	31,697	28,554	120
1976							
Huron County	210,546	31,530	189,055	5,548	2,146,018	686,373	-
East Wawanosh	13,383	2,230	7,495	482	10,085	8,564	-

Source: Census of Canada, Volumes on Agriculture, 1971; 1976

TABLE 8

Selected Agricultural Variables for East Wawanosh and Huron County: Data from the 1971 and 1976 Census

		Value of Agricultural Products Sold ($)				Tenure			
	All Census Farms	Under 2,500	2,500-4,999	5,000 & Over	Non-Resident	Owner	Tenant	Part-Owner Part-Tenant
1971 *								
Huron County	4,213	650	459	3,104	345	3,176	127	910
East Wawanosh	203	23	16	164	15	164	4	35
1976 **		1,200-2,499		5,000 10,000				
Huron County	3,718	172	313	464 2,768	253	2,630	127	961
East Wawanosh	186	8	12	23 143	16	131	3	52

	Size of Farm: Acres							
	10	10-64	70-129	130-179	180-239	240-399	400-559	500
1971								
Huron County	149	434	1,188	718	791	694	177	62
East Wawanosh	4	15	47	32	44	50	8	3
1976								
Huron County	104	378	918	641	668	715	192	102
East Wawanosh	3	7	46	34	35	48	10	3

			Farm Capital		
	Farm Population	Total Value	Land & Buildings	Machinery & Equipment	Livestock & Poultry
1971					
Huron County	16,800	271,865,300	174,382,000	43,764,400	-
East Wawanosh	847	13,443,200	7,991,700	1,956,800	-
1976					
Huron County	14,139	792,904,897	597,877,940	104,376,395	90,650,562
East Wawanosh	704	36,386,111	26,428,950	4,838,068	5,119,093

	Number					
	Auto	Truck	Tractor	Grain Combines	Hay Balers	Farms With Milking Machines
1971						
Huron County	4,348	2,718	8,076	1,456	1,730	1,339
East Wawanosh	217	114	395	46	105	86
1976						
Huron County	4,220	3,346	8,552	1,460	1,687	942
East Wawanosh	194	151	413	54	121	59

* In 1971 a census farm was defined as a ranch or agricultural holding of 1 acre or more with sales in excess of $50

** In 1976 a census farm was defined as a ranch or agricultural holding of 1 acre or more with sales in excess of $1,200

Source: Census of Canada; Volumes on Agriculture, 1971; 1976

County. Corresponding with this, in East Wawanosh approximately 24.2% of the land area is unimproved compared to 14.9% for the entire county. Furthermore, compared to the County average, a larger proportion of East Wawanosh farms exceed 180 acres, although the total average value of farm capital is less for East Wawanosh farms than it is for Huron County. Per capita, East Wawanosh farmers own significantly more cattle (including dairy cattle) but have fewer pigs compared to the entire county. That is, within East Wawanosh, compared to Huron County, there is a greater emphasis on fodder, pasture and livestock.

Methods of Data Collection

While the information provided by the census is useful, a detailed examination of agriculture at the township level requires additional information based on the use of local sources. Essentially, the information collected was gathered in the context of two main themes: the pattern of land ownership and land use.

Initially, in order to establish the pattern of land ownership, an examination of the township's 1979 Assessment Roll with the assistance of the township clerk, allowed construction of a cadastral map. In this regard, a map accompanying the document "East Wawanosh Township: 1867-1967" which showed the property boundaries and land ownership in 1967 was of condiderable assistance. With this cadastral base, it was then possible through a personally administered questionnaire

to identify individual farms and gather detailed information at the individual farm level.

The questionnaire consisted of three sections, including personal characteristics (example age, occupations, etc.); operational information (land rental, enterprise type/ crops and livestock) and inputs and outputs (example, investments and income) (Appendix II). A complete list of the variables for which information was obtained is included in Appendix III. This information was then supplemented by various sources, including the soil capability according to the Canada Land Inventory.

Personal interviews were restricted to those people owning or operating 10 or more acres within the township. This minimum standard was based on the assumption that properties smaller than 10 acres would have minimum agricultural potential. The following table (Table 9) supports this assumption.

TABLE 9

Use of Properties 10 Acres or Less in Size

Use of Property	Number of Properties	Percent of Total
Residential Unit	71	57
Vacant Land	18	15
Local Government	5	4
Commercial	5	4
Recreational Dwelling Unit	4	3
Farm Land	4	3
Farm Residential Unit	4	3
Provincial Government	4	3
Recreational Land	3	2
Other	6	6
Total	124	100%

Source: Huron County Planning Department, 1978

In total, 216 of 270 land owners with 10 or more acres in East Wawanosh were interviewed during the summer and early fall of 1979. A small proportion of this number (approximately 5%) who were non-resident landowners were surveyed by mail. Totalled, 38,836 acres, or 90% of the township's total land area was accounted for, through these questionnaire-interviews. (A small portion of this total acreage is property actually owned by resident farmers in adjacent townships). For those land owners, not contacted, information regarding tenure and enterprise type was added with the assistance of the township clerk.

Operational Definitions

For purposes of distinguishing between the different tenure and enterprise types it was necessary to develop precise and meaningful definitions.

Tenure

In all, the following tenure types were identified, primarily on the basis of residence, gross farm income and the presence or absence of off farm employment.

1) Full-time farmers, in addition to being employed "full-time" as farmers, were required to have a gross farm income of at least $2,500 (or the equivalent in produce). Considering the seasonality of farming, however, it was determined that a farmer could work up to 20 days per year, off the farm, without affecting his full-time status.

2) Part-time farmers, with local jobs (Bunce, 1976),

required a gross farm income of at least $2,500; however, they also received income from sources other than their own farms. The part-time farmers, with a local job, by definition, held their job at distances less than 3 miles from their place of residence (for example, custom work or machinery repair). Those individuals who considered themselves to be retired, and met the income guidelines, were considered to be part-time farmers with local jobs.

3) Part-time farmers, with non-local jobs (Bunce, 1976) held their non-farm jobs at distances greater than 3 miles from their places of residence, or worked in the town of Wingham or village of Blyth. They also required at least $2,500 worth of gross farm income.

4) A fourth tenure type is identified as residents, non-farm. This group includes those individuals residing in East Wawanosh who have no agricultural income other than from the rental of their property.

5) The resident, minor-farm type, consists of those people living in the township who have a very minor engagement in agriculture. In addition to income from the rental of their property, this group may have an agriculturally derived income of up to $2,500.

6) The sixth tenure type consists of non-resident landowners, who in addition to possibly renting their property, have no agricultural income.

7) Non-residents, who have an agricultural income from their property are classified as non-resident, some farm.

This group of non-residents carries on farming on a part-time basis, usually commuting on weekends from an urban center, where they have full-time employment. Included within this category are three properties where a manager is employed by the non-resident landowner. This category does not include full-time and part-time farmers who live and farm in adjacent townships and also farm property within East Wawanosh.

8) The final tenure type includes all those properties owned and managed by a municipal or provincial government or agency.

Enterprise Type

Another variable requiring the careful establishment of an operational definition was enterprise type. The 1976 census assigned an individual farm to a given enterprise type if 51% or more of that farm's income was derived from that enterprise type. However, in this case, given the clarity of data, it was decided that 66% would be a more satisfactory delineation of enterprise type. Not only does this definition identify the more specialized agricultural operations, but it also reflects the more diverse elements of many farms as represented in the mixed enterprise categories. In all, the following enterprise types were identified: dairy; beef; hogs; poultry; sheep; cash crop; mixed general; rents land; no agricultural income and other. The first six of these enterprise types are self explanatory; however, the remaining types require further clarification. Mixed livestock indicates that 2 or more livestock types were required to account for

66% of a farmer's income. Similarily, mixed general indicates a mixture of cash crop and livestock. The rents land category implies that 66% of an individual land owner's income was acquired from the rent of his property, whereas the no agricultural income category is indicative of those land owners who had no income either from the rent of their property or from the sale of produce. The final category, other, includes all those who did not fit into any of the previous categories. Generally, it identified those individuals with no major identifiable source of agricultural income, and several individuals with horses.

Methods of Data Analysis

The interpretation of the data collected involved large scale mapping and locational analysis as well as computer based statistical analysis of the coded responses. The mapping of the available data was carried out at a scale of 1:50,000 and represents the information relating to tenure type (Figure 5), enterprise type (Figure 6), as well as the distribution of woodlots and soil capability according to the Canada Land Inventory (Figure 4).

The statistical analysis of the data was undertaken using the facilities of the Social Science Computing Laboratory and subprograms of the Statistical Package for the Social Sciences (S.P.S.S.). The statistical procedures used included the subprograms Crosstabulations; Frequencies; One Way Variance tests; Condescriptive and Discriminant Analysis.

The following two chapters consist of a detailed

analysis of the agricultural system of East Wawanosh Township. Chapter IV represents an attempt to describe the current tenure situation within the Township.

CHAPTER IV

TENURE IN EAST WAWANOSH

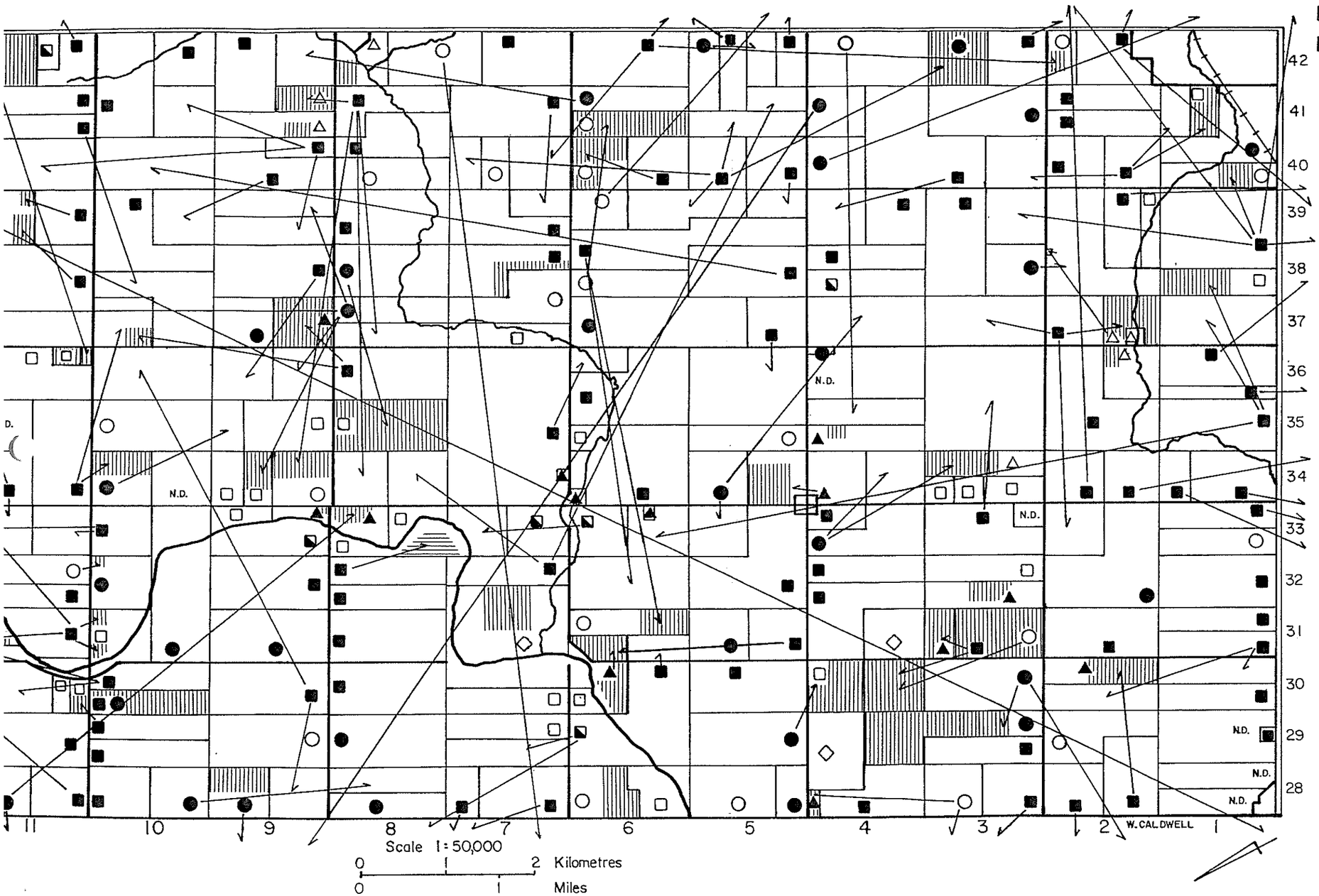
One of the major objectives of this report is to identify and describe the current tenure situation within East Wawanosh Township. With this in mind, it was hypothesized that there would be a range of farm and non-farm tenure types within the Township. The following discussion seeks to interpret tenure through factors such as land ownership, land rental, parcel layout and the distribution of tenure. Furthermore, it is expected that the various tenure types will demonstrate differences in terms of acreage owned, the number of parcels owned and the rental of land.

Number and Types of Tenure

The eight tenure types identified within East Wawanosh Township demonstrate significant differences, in terms of their numerical proportions and the total acreage which they own (Table 10; Figure 5). Full-time farmers comprise the largest single tenure type (46.8% of all land owners); however, they own a significantly larger proportion of the land within the township (60.2%). When combined, the two part-time categories comprise nearly one-third (30.1%) of all landowners, but own a somewhat smaller proportion of the total property

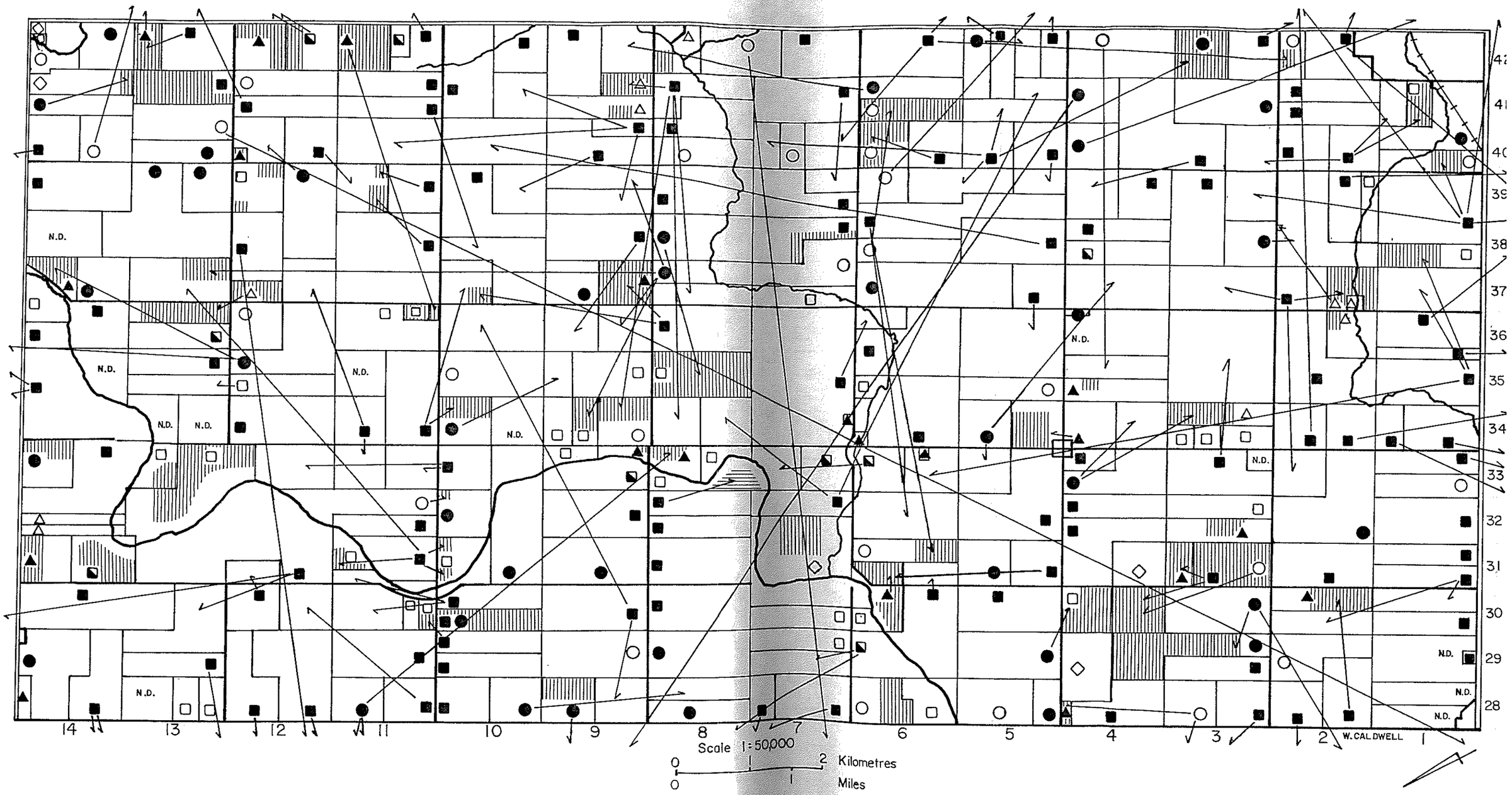
FIGURE 5:

LAND TENURE CLASSIFICATION IN EAST WAWANOSH TOWNSHIP



PARCEL HEADQUARTERS

- ■ FULL-TIME FARM
- ● PART-TIME FARM, LOCAL JOB
- ○ PART-TIME FARM, NON-LOCAL JOB
- ▲ RESIDENT, NON-FARM
- △ RESIDENT, MINOR FARM
- □ NON-RESIDENT
- ◪ NON-RESIDENT, SOME FARM
- ◇ GOVERNMENT OWNED PROPERTY
- N.D. NO DATA
- |||| LAND RENTED OUT (APPROXIMATE ACREAGE / LOCATION)
- → LINKAGE LINES (BETWEEN PROPERTY UNITS OF THE SAME FARM)


N.D.
N.D.
N.D.

(27.1%). The four remaining tenure types (not including government owned property), are numerically significant, comprising 22.3% of all land owners, but only 11% of the township's total acreage. This implies that there are significant differences between the individual tenure types, in terms of the average acreage owned and their relative numerical proportion.

It should be noted that the resident, non-farm, the non-resident and government owned properties (as well as some individuals classified as resident, minor farm and non-resident some farm) would not have been considered as census farms in the 1976 census (Tables 7 and 8). Consequently, the relative proportion of full-time farmers, part-time farmers with local jobs and part-time farmers with non-local jobs would be substantially higher if one were to only consider the farming population.

TABLE 10

Representation of Tenure Type and Acreage Owned

Tenure Type	Number	% of Total	Acreage Owned	% of Total
Full-time Farm	101	46.8	23,369	60.2
Part-time Farm, Local Job	39	18.1	7,076	18.2
Part-time Farm, Non-local Job	26	12.0	3,464	8.9
Resident, Non-Farm	17	7.9	1,291	3.3
Resident, Minor-Farm	9	4.2	703	1.8
Non-Resident	14	6.5	1,044	2.7
Non-Resident, Some-Farm	8	3.7	1,225	3.2
Government Owned	2	.9	664	1.7
Total	216	100.0	38,836	100.0

Land Ownership

The acreage owned by the individual landowners is a significant variable distinguishing the individual tenure types. With the exception of government owned property*, those tenure types which have a significant involvement in agriculture on the average own substantially more property than the remaining tenure types (Appendix IV). Nevertheless, there is substantial variation among the farming types, which generally corresponds with the hypothesized levels of intensity. Part-time farmers with local jobs, non-resident with some farm and part-time farmers with non-local jobs own 78%, 66% and 58% respectively of full-time farmers average of 231.4 acres. In contrast, resident non-farm, minor farm and non-residents on the average only own approximately 75 acres or 32% of what full-time farmers own. Generally, these differences in acreage owned segregate those who are significantly involved in agriculture, compared to those who have little if any agricultural involvement. Furthermore, these figures demonstrate a significant difference between those who are involved in farming.

These differences are magnified by the proportion of individuals owning less than 75 acres or more than 250 acres (Table 11). Those four tenure types which are significantly involved in agriculture each have fewer than 15% of their members owning less than 75 acres, whereas at least 40% of

*The government owned properties consisted of sizeable tracts of forest.

the remaining tenure types (not including government owned property) fall into this category. Conversely, of this latter group, only non-residents have any properties in excess of 250 acres, while 33.7% of full-time farmers and 18% of part-time farmers with local jobs, own in excess of this figure.

TABLE 11

Owned Acreage: Percentage Occurrence by Tenure Type

Tenure	Acreage Class 0-25	26-75	76-150	151-250	251-375	376-500	Over 500
Full-time farm	3.0	1.0	36.6	25.7	17.6	12.9	3.0
Part-time farm, local job	2.6	5.1	33.3	41.0	15.4	2.6	.0
Part-time farm, non-local job	.0	7.7	69.2	19.2	3.8	.0	.0
Resident non-farm	29.4	11.8	52.9	5.9	.0	.0	.0
Resident minor farm	11.1	33.3	55.6	.0	.0	.0	.0
Non-resident	28.6	35.7	28.6	.0	7.1	.0	.0
Non-resident some farm	12.5	.0	50.0	25.0	.0	12.5	.0
Government	.0	.0	.0	50.0	.0	50.0	.0
Total*	6.9	6.9	41.7	23.6	12.0	7.4	1.4

Chi square significant at .0001 level

*In this and succeeding tables, the "Total" column refers to the sum of the tenure types.

Land Rental

The rental of land supplements the acreage owned and thereby increases the size of the operational farm unit. Approximately 25-30% of all full-time and part-time farmers rent property, whereas no other tenure type rented property (Table 12). Although more full-time farmers rent property (29.7%) than either of the part-time categories, part-time farmers with local jobs, on the average rent a slightly larger

acreage than full-time farmers (AppendixIV). This suggests that part-time farmers with local jobs, have a somewhat greater reliance upon rented land, possibly suggesting a reluctance to invest the capital required to purchase land, and secondly, their different enterprise type orientation. (See Chapter V for further discussion).

TABLE 12

Acreage Rented: Percentage Occurrence by Tenure Type

Tenure	Acreage Class 0	1-10	11-25	26-75	76-150	151-250	251-500
Full-time farm	70.3	1.0	4.0	13.9	5.9	4.0	1.0
Part-time farm, local job	74.4	0.0	5.1	5.1	7.7	7.7	.0
Part-time farm, non-local job	76.9	3.8	7.7	3.8	7.7	.0	.0
All Others	100.0	.0	.0	.0	.0	.0	.0
Total	78.7	.9	3.7	7.9	5.1	3.2	.5

Chi square significant at .05 level

Farmed Area

For agricultural purposes, the acreage actually under cultivation (not including hay, pasture, property rented or property rented out) is a measure of size as important as the total acreage owned. Whereas 63.4% of full-time farmers annually cultivate more than 50 acres; 53.8% of part-time farmers with local jobs; 38.4% of part-time farmers with non-local jobs and only 25% of non-residents with some farm exceed 50 acres (Table 13). The remaining tenure types with the exception of resident minor-farm (with 22.2% cultivating between 1 and 20 acres annually) do not themselves grow any

cultivated crops. This is significant, in that it represents the extent to which each of the tenure types are involved in the most intensive use of arable land: the growing of cultivated crops. (See Chapter V for discussion of specific crops).

TABLE 13

Farmed Area: Percentage Occurrence by Tenure Type

Tenure	Cultivated Acreage 0	1-20	21-50	50-125	126-200	Over 200
Full-time farm	5.0	7.0	24.7	37.6	11.9	13.9
Part-time farm, local job	17.9	12.9	15.4	30.8	17.9	9.1
Part-time farm, non-local job	23.1	11.5	26.9	34.6	3.8	.0
Resident non-farm	100.0	.0	.0	.0	.0	.0
Resident minor farm	77.8	22.2	.0	.0	.0	.0
Non-resident	100.0	.0	.0	.0	.0	.0
Non-resident some farm	37.5	25.0	12.5	12.5	12.5	.0
Government	100.0	.0	.0	.0	.0	.0
Total	28.2	8.8	18.0	27.8	9.7	7.4

Chi square significant at .001 level.

Land Parcels and Layout

The actual number and distribution of owned and rented parcels is an important element describing the operational farm unit (Figure 5). Generally (Table 14), full-time farmers, part-time farmers with local jobs and non-residents with some farm, exhibit a marked tendency to own more than 1 parcel of property (combined 39.9% of these 3 types own more than one property), whereas, the remaining tenure categories are comprised of individuals usually owning only 1 property (combined 83.8% of these 5 tenure types own only 1 property). The impact of the ownership of more than 1 parcel of property and the frequent rental of land, (combined approximately 25% of

full-time and part-time farmers rented a total of 67 additional properties, averaging 58.8 acres/property rented), is evident in Figure 5, which in addition to showing tenure classification, also illustrates land rented and linkage lines between property units of the same farm. Generally, other properties owned or rented are in close proximity to the farm headquarters, although there are several notable exceptions. This general pattern of farm consolidation stems from such advantages as: increased accessibility, reduced transportation costs and improved livestock management. The importance of property operated outside of the township is also evident in Figure 5.

TABLE 14

The Number of Parcels Owned: Percentage Occurrence by Tenure Type

Tenure	Number of Parcels Owned 1	2	3 or more
Full-time farm	57.4	25.7	16.8
Part-time farm, local job	66.7	28.2	5.1
Part-time farm, non-local job	81.8	19.2	.0
Resident non-farm	76.5	23.5	.0
Resident minor farm	88.9	11.1	.0
Non-resident	100.0	.0	.0
Non-resident, some farm	62.5	12.5	25.0
Government	50.0	50.0	.0
Total	67.6	22.7	9.7

Chi square significant at .05 level.

A Locational Analysis

An examination of a map showing Land Tenure Classification in East Wawanosh (Figure 5) reveals a fairly random distribution of tenure types. Given the average location of

the eight tenure types (which was the mathematical center of the township: the boundary of concession 7 and 8, lot 35) it was assumed that unless there was some marked concentration the average location of each of the tenure types would not vary significantly from the overall average. Using the S.P.S.S. (1977) subprogram "Oneway" (an analysis of variance) the mean location (by lot and concession) of each tenure type was compared with the overall average location. The results revealed that there were no significant differences in location between the tenure types when compared to the overall mean location. This lack of variation suggests that there is no significant pull towards any particular phenoménon, such as an urban center, as has been found in the fringe of many cities (Troughton, 1975; Fessenmaier, Goodchild and Morrison, 1979).

Despite the lack of statistical significance, the two non-resident types are generally located in close proximity to the Maitland River. Interpretation of Figure 5 has established that approximately 59% of all non-resident properties are located on 22% of the land within 1 kilometer of the Maitland River. This concentration may represent land prices which are somewhat less expensive than in the remainder of the township (owing to a concentration of lower quality soils: Figure 4; a more rugged topography and a higher incidence of waste land), but more probably represents the desire of the non-residents to own property which is more aesthetically pleasing, resulting from the presence of the river, a rolling topography, and a greater concentration of woodlots

as illustrated in Figure 4 (Troughton, 1975).

The Soil Base

The rating of the capability of soils for agriculture by the Canada Land Inventory (CLI) represents an attempt to evaluate the inherent capabilities of a soil, prior to any improvement. Among others, Troughton (1978) and Hoffman (1975) have demonstrated that this classification of soils is reflected in their actual productivity, with higher crop yields on the better quality soils. With this in mind, it was hypothesized that the more intensive farming types such as full-time farmers, would be located on the better quality soils (Figure 4; Table 4), while those not depending upon agriculture for their income would be located on the township's poorer quality soils.

Generally, full-time and part-time farmers are located on class 1 and 2 soils (Table 15), which is not surprising, considering that they earn a significant portion, if not all, of their income from agriculture. These better quality soils, in addition to having high fertility, will also tend to be fairly flat, well-drained and relatively free of stones (Table 4). It is also interesting to note that a smaller proportion of part-time farmers are located on class 1 and 2 soils compared to full-time farmers. Full-time farmers have the largest concentration (72.3%) with a class 1 and 2 soil base, while part-time farmers with local jobs (69.2%) are somewhat more concentrated on these soils than are part-time

farmers with non-local jobs (61.5%). Considering the apparent reliability of the CLI classification, this may indicate that there is a corresponding drop in the agricultural productivity potential between these three groups.

In contrast, the resident, non-farm; non-resident; non-resident some farm and government owned properties generally have a class 5 and 6 soil base, which indicates low agricultural potential. In as much as these tenure types do not derive a substantial portion of their income from farming activity, they would therefore have no need to purchase what would probably be more expensive, high quality agricultural land.

The only apparent anomaly to this pattern, the resident minor-farm type (55.6% class 1 and 2) may be partially explained by the fact that 55.5% of these landowners are either semi- or fully-retired, thereby representing properties which may have previously been operated as full-time farms. A substantial portion of the properties owned by these landowners are also classified as class 5 and 6 (44.4%).

TABLE 15

Soil Capability: Percentage Occurrence by Tenure Type

Tenure	CLI Soil Class 1 and 2	3 and 4	5 and 6	0
Full-time farm	72.3	11.9	14.9	1.0
Part-time farm, local job	69.2	5.1	25.6	.0
Part-time farm, non-local job	61.5	11.5	23.1	3.8
Resident, non-farm	29.4	11.8	52.9	5.9
Resident, minor farm	55.6	.0	44.4	.0
Non-resident	28.6	14.3	35.7	21.4
Non-resident, some farm	37.5	12.5	50.0	.0
Government	.0	50.0	50.0	.0
Total	61.6	10.6	25.0	2.8

Chi square significant at .0005 level

The Assessed Value

The assessed value of the individual properties reflect not only the quality of land, but also property improvements, including buildings. While the data presented in Table 16 is not intended to reflect the actual market value of any individual property, it does indicate the relative worth of one property compared to another (Allen, 1979). Essentially, what Table 16 conveys is that full-time and part-time farmers own the properties with the highest assessed value (92% have properties assessed in excess of $4,000). This reflects larger acreages owned, better quality soils and a greater concentration of buildings. While there is some variability among the remaining tenure types, they generally own the lower value properties, reflecting smaller acreages owned, poorer quality soils and fewer buildings (79% of these 5 tenure types have properties assessed at $4,000 or less).

TABLE 16

Total Assessed Value: Percentage Occurrence by Tenure Type

Tenure	1-2500	2501-4000	4001-6000	6001-8000	8001-10000	10001-15000	Over 15000
Full-time farm	.0	3.6	17.9	27.4	15.5	21.4	14.3
Part-time farm, local job	2.9	20.0	17.1	22.9	14.3	20.0	2.9
Part-time farm, non-local job	.0	4.2	45.8	33.3	.0	16.7	.0
Resident, non-farm	43.8	37.5	.0	12.5	.0	.0	6.3
Resident, minor farm	33.3	44.4	11.1	11.1	.0	.0	.0
Non-resident	84.6	7.7	.0	7.7	.0	.0	.0
Non-resident, some farm	14.3	42.9	28.6	.0	.0	.0	14.3
Government	.0	50.0	.0	50.0	.0	.0	.0
Total	12.1	13.7	18.4	23.2	9.5	15.3	7.9

Chi square significant at .0001 level

Throughout this chapter several basic trends have appeared. Generally, there are two groups: those who are significantly involved in farming (full-time and part-time farmers, and non-residents with some farm), and, those who have little, if any, agricultural involvement (resident, non-farm and minor farm, non-resident and government owned property). These two groups are segregated by the total acreage owned, annual cultivated acreage, rented land, the number of parcels rented, the soil base and the assessed value. Furthermore, the differences between the individual tenure types tend to correspond with their hypothesized relationships. For example, full-time farmers have the largest acreages owned (including more property parcels); more class 1 and 2 land and higher assessed values. At the opposite end of the continuum, those having minimal, if any, involvement in agriculture have the smallest acreage (usually including only one parcel); do not rent property; are frequently located on a class 5 and 6 soil base and have the lower assessed values.

Within the following chapter, these initial differences between tenure types shall be pursued in greater detail, in which the relationships between tenure and enterprise type; crops and livestock and inputs and outputs are examined.

CHAPTER V

THE OPERATION OF THE AGRICULTURAL SYSTEM

The second major objective of this report is to identify and evaluate some of the major relationships between tenure and farm operation. Having established in Chapter IV who owns and operates the land in East Wawanosh, this chapter seeks to interpret factors such as enterprise type; crops and livestock and inputs and outputs which help to determine the intensity of land use for agricultural purposes.

Enterprise Type

The significance of enterprise type is that each type represents different operational decisions and a varying commitment to agriculture in terms of capital, and the amount and seasonality of labour. Table 17, which portrays the relative amount of time required in producing various livestock and crop types, reflects considerable variation. Dairy cattle, for example, require a substantially larger labour commitment than beef cattle. Moreover, certain elements of beef cattle production exhibit considerable seasonal variation, whereas hogs and dairy production do not. Similar variations in the amount and seasonality of labour required exist for various field crops. As a result of these differences some

TABLE 17

Yearly and Quarterly Labour Requirements for Livestock and Selected Crops on Ontario Farms

	Labour Index per Head				
	Total	Jan/Feb/Mar	Apr/May/June	July/Aug/Sept	Oct/Nov/Dec
Dairy Cattle					
Cow and following	1.0	.28	.25	.21	.27
Beef Cattle					
Beef cow and calf	.2	.07	.05	.02	.07
Purchased calf	.06	.02	.01	.01	.02
Purchased yearling (kept for 10 months)	.08	.03	.02	.01	.01
Wintering-steer calves (7 months)	.04	.02	.01	-	.01
Pasturing season-steers (6 months)	.017	-	.004	.008	.004
Sheep					
Ewe (with lamb)	.09	.04	.03	.01	.02
Swine					
Sow & young pigs to market wt.	.69	.17	.17	.17	.17
Sow & young pigs sold as weiners	.40	.10	.10	.10	.10
Feeder hogs/ 10 hogs	.24	.06	.06	.06	.06
Poultry					
Laying hens/ 100 hens	1.07	.26	.27	.27	.27
Selected Field Crops			Labour Index per Acre		
Corn, Silage	1.0	.05	.28	.29	.37
Corn, Grain	.73	.01	.28	.03	.41
Hay	.67	.04	.27	.35	.01
Spring grain	.73	.00	.23	.37	.13
White beans	1.0	.00	.33	.45	.21
Soy beans	.60	.00	.36	.08	.16

Source: Adapted from Farm Economics, Co-operative & Statistics Branch, O.D.A. & F.; Crop Enterprise Studies, Farm Economics, Co-operative & Statistics Branch, O.D.A & F., 1969.

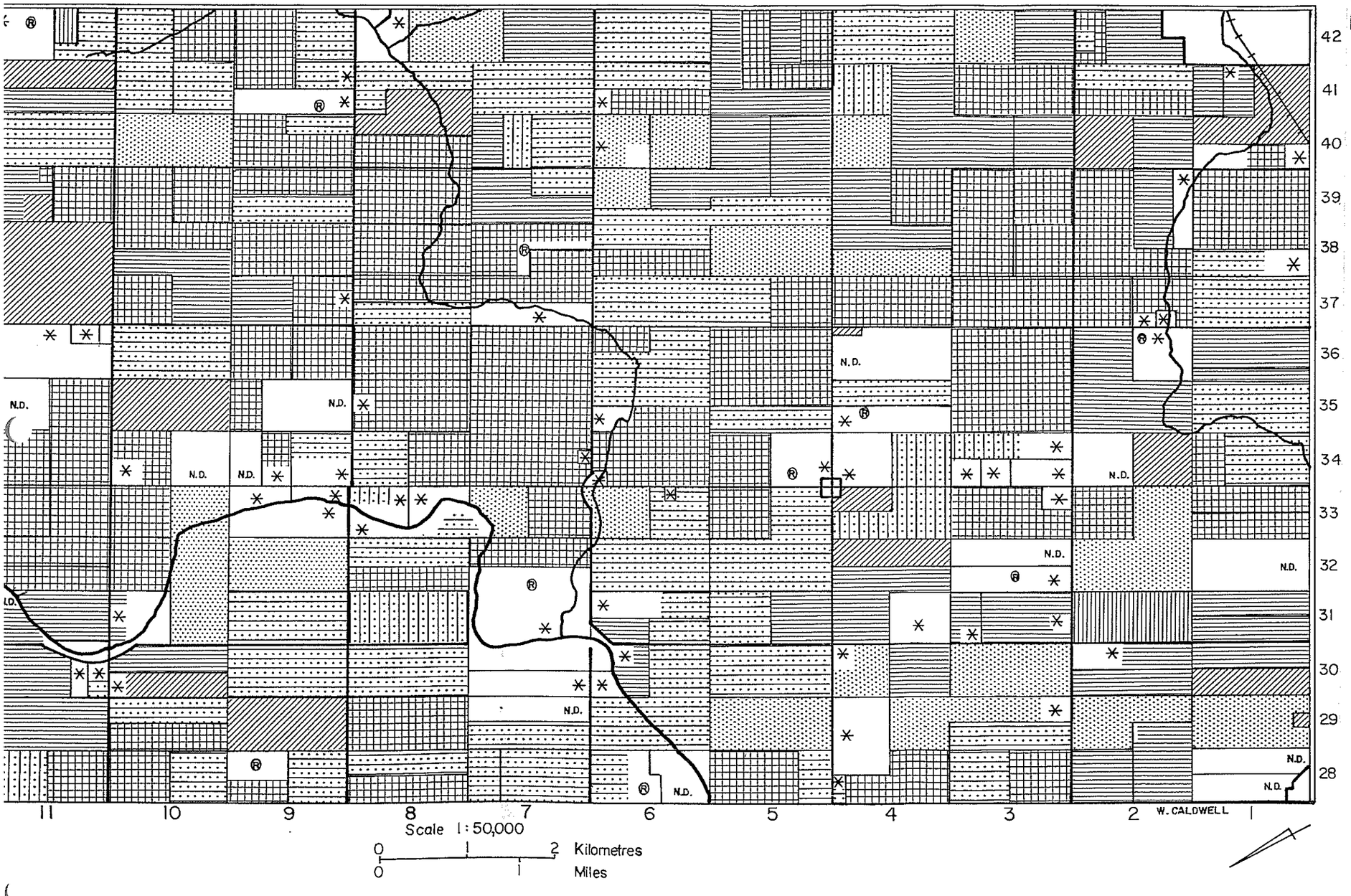
enterprises are more suited than others to part-time farming. Different enterprise types also involve varying amounts of capital investment. A dairy producer, for example, has a larger proportion of his capital tied up in livestock, equipment and buildings, whereas a cash cropper tends to invest in machinery and land.

In East Wawanosh Township, beef farming (27.3%) was the dominant farm enterprise, followed by mixed livestock (16.2%); dairy (13.0%); rental of land (13.0%); hogs (8.3%); other (6.5%); cash grain (6.0%); no agricultural income (4.6%); mixed general (3.2%); sheep (1.4%) and poultry (.5%). The distribution of these enterprise types, as illustrated in Figure 6, is fairly random throughout the township, with dairy farms exhibiting some concentrations in the south and around the periphery of the township.

Considering the variation in labour and capital requirements, it was anticipated that different tenure types would favour certain agricultural activities. A crosstabulation of tenure by enterprise type (Table 18) reveals that non-residents; resident, non-farm and government owned properties are exclusively classified as either no agricultural use or rents land. This reflects virtually no commitment to agriculture, both in terms of time and probably capital. It is worth noting however, that a large majority of the resident, non-farm type (88.2%) rent out their property, compared to only half of the non-residents, suggesting that a larger proportion of the arable land belonging to the resident non-

FIGURE 6:

FARM ENTERPRISE TYPE[1] IN EAST WAWANOSH TOWNSHIP



- DAIRY
- BEEF
- HOGS
- POULTRY
- SHEEP
- CASH CROP
- MIXED LIVESTOCK
- MIXED GENERAL
- * OTHER/MINOR AGRICULTURAL INCOME
- ® LAND RENTED-PROPERTY LINKAGE AND ENTERPRISE TYPE NOT KNOWN
- N.D. NO DATA

1 66% of income derived from a given enterprise type

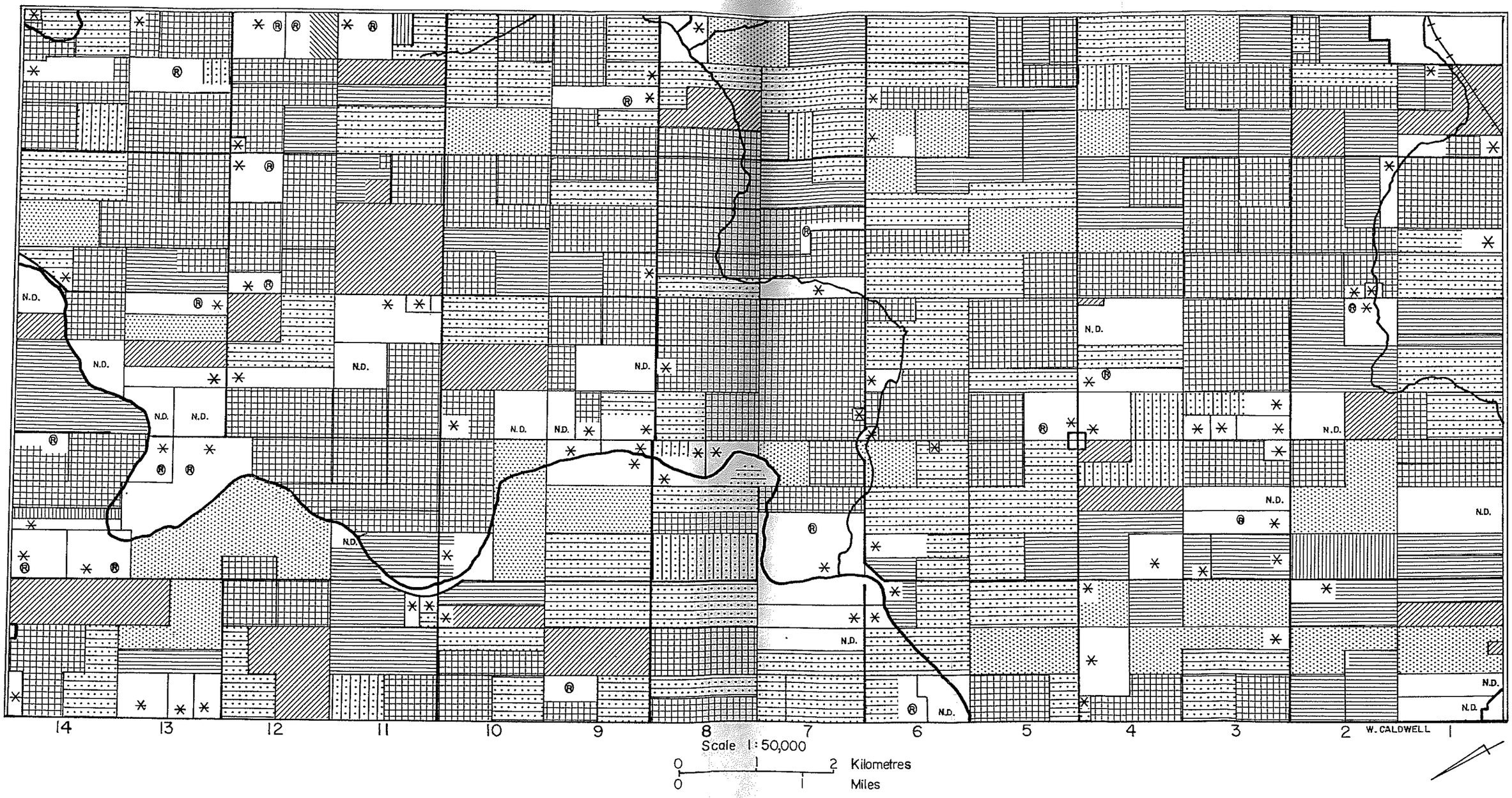

N.D.
14
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W. CALDWELL
1
Scale 1:50,000
0 1 2 Kilometres
0 1 Miles

TABLE 18

Enterprise Type: Percentage Occurrence by Tenure Type

Tenure	Dairy	Beef	Hogs	Poultry	Sheep	Cash Grain	Mixed Livestock	Mixed General	Rents Land	Other	No Agricultural Income
Full-time farm	25.7	32.7	12.9	.0	1.0	4.0	21.8	2.0	.0	.0	.0
Part-time farm, local job	5.1	41.0	5.1	.0	.0	10.3	20.5	10.3	2.6	5.1	.0
Part-time farm, non-local job	.0	34.6	11.5	.0	.0	11.5	15.4	3.8	7.7	15.4	.0
Resident, non-farm	.0	.0	.0	.0	.0	.0	.0	.0	88.2	.0	11.8
Resident, minor farm	.0	.0	.0	.0	11.1	.0	.0	.0	22.2	66.7	.0
Non-resident	.0	.0	.0	.0	.0	.0	.0	.0	50.0	.0	50.0
Non-resident, some farm	.0	12.5	.0	12.5	12.5	25.0	12.5	.0	.0	25.0	.0
Government	.0	.0	.0	.0	.0	.0	.0	.0	50.0	.0	50.0
Total	13.0	27.3	8.3	.5	1.4	6.0	16.2	3.2	13.0	6.5	4.6

Chi square significant at .0001 level

TABLE 19

Selected Crops Grown: Percentage Occurrence and Average Acreage by Tenure

	Percent of Each Tenure Type Growing Crop and Its Average* Acreage																	
Tenure	Barley		Mixed Grain		Grain Corn		Ensilage Corn		Hay		Pasture		Property Rented Out	
Full-time farm	17.8	32.2	67.3	35.7	59.4	60.0	68.3	42.8	86.1	48.0	74.3	37.0	5.9	56.0
Part-time farm, local job	12.8	52.6	48.7	24.2	51.3	59.9	64.1	34.0	74.4	31.3	59.0	45.0	17.9	63.3
Part-time farm, non-local job	7.7	6.0	57.7	24.8	34.6	58.3	31.8	24.5	61.5	30.0	76.9	25.3	30.8	65.9
Resident, non farm	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	88.2	46.5
Resident, minor farm	.0	.0	11.1	11.0	.0	.0	.0	.0	44.4	33.3	44.4	9.5	65.6	47.4
Non-resident	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	50.0	60.0
Non-resident some farm	.0	.0	12.5	24.0	37.5	75.0	12.5	65.0	25.0	31.0	50.0	48.0	37.5	65.3
Government	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	50.0	75.0
Total	11.6	34.2	48.1	31.7	42.6	60.3	47.7	35.9	63.9	41.7	58.3	36.0	24.1	56.4

*The Average value has been calculated for only those individuals growing the crop.

farm type is used for agriculture. Those individuals classified as resident, minor-farm, while having some agricultural income (less than $2,500) are predominantly classified as "other" (66.7%), which reflects a small amount of capital and labour investment.

Full-time farmers, part-time farmers with local and non-local jobs and non-residents with some farm involvement generally make an important contribution to agriculture; however, there are significant variations between these tenure types and their involvement in dairy, hogs, cash grain, mixed general, rents land and other (Table 18). As previously mentioned, dairy farming is one of the most intensive enterprise types, both in terms of capital and labour. Considering the absence of off-farm commitments, it is not surprising that nearly 93% of dairy farmers in East Wawanosh are full-time farmers (which represents 25.7% of all full-time farmers. Similarly, 12.9% of all full-time farmers are hog producers, which represents 72.2% of this enterprise type. A considerably smaller proportion of part-time farmers with local jobs are classified as hog producers (5.1%; part-time farmers with non-local jobs have a relatively high proportion of hog producers at 11.5%). In contrast, cash grain (which is probably the most seasonal and least labour demanding agricultural activity) and mixed general (which involves a substantial portion of cash cropping), are dominated by non-residents, with some farm, and part-time farmers with local and non-local jobs. Although no full-time farmers are

classified as either other or rents land; 7.6% of part-time farmers, with local jobs; 23.1% of part-time farmers, with non-local jobs and 25% of non-residents with some farm, fall into these two categories, suggesting a reduced commitment to agriculture and possibly a movement away from any agricultural activity.

Crops and Livestock

In association with enterprise type, the actual type, acreage and proportion of crops grown, as well as the type and number of livestock, is an important indicator of the intensity of land use for agricultural production. In addition to different labour requirements associated with each crop and livestock type (Table 17) there are also differences in capital requirements.

Crops: Type and Acreage

Within East Wawanosh, there are some significant variations between the tenure types in terms of the percentage of individuals growing a particular crop and the average acreage of the crop grown (Table 19; Appendix IV). A larger proportion of full-time farmers grow barley, mixed grain, grain corn, ensilage corn and hay than any other tenure type. Moreover, full-time farmers generally have the largest acreages of these crops, followed by part-time farmers, with local jobs; those with non-local jobs and non-residents with some farm involvement. These latter 3 tenure types, however, have quite large acreages of grain corn reflecting a preference

for cash cropping. Another indicator, which inversely represents intensity, is the proportion of individuals per tenure type renting out their property: 88.2% of the resident non-farm type rent out some of their property compared to only 5.9% of full-time farmers. Similarly, woodlot and scrub are also a good indicator of the intensity of land use. Although 84.7% of all landowners own an average 30.8 acres of woodlot the actual proportion of properties with a woodlot and the average acreage of the woodlot does not vary significantly between the individual tenure types. However, woodlot and scrub, when considered as a percentage of the total land use among different tenure types, varies considerably (Table 20). Combined, only 18.1% of the property owned by full-time farmers is occupied by woodlot and scrub, whereas 58.6% of non-resident owned property falls into these two categories.

Livestock: Type and Numbers

The actual percentage of holdings on which a livestock activity is present supports the opinion that there are significant differences among the tenure types (Table 21). Throughout East Wawanosh, a larger proportion of full-time farmers have pigs, beef and most significantly dairy, than does any other tenure type. In contrast to full-time and part-time farmers, who have relatively high levels of pig and beef involvement, the resident minor-farm and non-resident some farm types have high concentrations of poultry and sheep,

TABLE 20

Crops Grown on Owned and Rented Acreage: Percent of Acreage by Tenure Type

Tenure	Average Acreage Owned	Grain Corn	Ensilage Corn	Mixed Grain/ Wheat/ Barley/ Oats	Hay	Pasture	White beans/ Soy beans	Wood-lot	Scrub & Waste	Other/ Summer Fallow	Rented Out
Percent of Crop Type Grown on Owned Acreage											
Full-time	231.4	15.4	11.1	13.4	17.8	11.9	1.1	11.9	6.2	7.0	1.4
Part-time, local job	181.4	16.9	12.0	10.4	12.8	14.6	1.6	12.3	10.3	4.0	6.3
Part-time, non-local job	133.3	15.2	5.6	11.5	13.9	14.6	1.1	14.8	5.6	2.6	15.2
Resident, non-farm	76.0	.0	.0	.0	.0	.0	.0	19.6	21.7	4.6	54.1
Resident, minor farm	78.1	.0	.0	1.5	19.0	5.4	.0	26.9	9.2	4.0	33.7
Non-resident	74.6	.0	.0	.0	.0	.0	.0	30.3	28.3	1.2	40.2
Non-resident, some farm	153.1	18.3	5.2	2.0	5.2	15.7	.0	26.1	5.0	6.5	16.0
Government	332.0	.0	.0	.0	.0	.0	.0	57.2	29.1	2.4	11.3
Total	179.8	14.3	10.5	11.0	14.8	11.7	1.1	14.5	8.4	5.7	7.6
Percent of Crop Grown on Rented Acreage											
Full-time	25.6	27.0	10.9	15.2	16.8	13.3	2.8	-	-	14.1	-
Part-time, local job	27.2	59.6	3.3	11.4	5.1	19.1	1.4	-	-	.0	-
Part-time, non-local job	11.5	37.4	7.0	11.3	15.6	5.2	23.5	-	-	23.5	-
All Others	.0	.0	.0	.0	.0	.0	.0	-	-	.0	-
Total	18.3	36.6	8.7	13.7	13.7	14.2	3.8	-	-	9.3	-

TABLE 21

Livestock Activity: Percentage Occurrence by Tenure Type

Tenure	Livestock Activity					
	Pigs*	Horses **	Dairy ***	Poultry ****	Beef ***	Sheep
Full-time farm	43.6	23.8	41.6	23.8	74.3	4.0
Part-time, local job	38.5	30.8	23.1	23.1	71.8	2.6
Part-time, non-local job	42.3	26.9	11.5	42.3	65.4	3.8
Resident, non-farm	.0	.0	.0	.0	.0	.0
Resident, minor farm	22.0	.0	11.1	44.4	22.2	11.1
Non-resident	.0	.0	.0	.0	.0	.0
Non-resident, some farm	12.5	37.5	.0	12.5	25.0	12.5
Government	.0	.0	.0	.0	.0	.0
Total	33.8	21.3	25.5	22.7	57.4	3.7

* Chi square significant at .001 level
** Chi square significant at .05 level
*** Chi square significant at .0001 level
**** Chi square significant at .01 level

TABLE 22

Average Annual Production, for those Individuals Engaged in a Particular Livestock Activity

Tenure	Cattle for Market	Hogs for Market	Dairy Cows Owned	Beef Cows Owned
Full-time farm	138.0	407.2	38.9	25.3
Part-time farm, local job	101.2	318.0	14.0	25.1
Part-time farm, non-local job	41.4	470.6	13.7	16.7
Resident, minor farm	.0	1.8	1.0	4.0
Non-resident, some farm	50.0	624.8	.0	50.0

with non-residents, some farm having the largest concentration of horses and sheep. Part-time farmers, with non-local jobs are distinquished from full-time farmers and part-time farmers with local jobs by their higher concentration of poultry (42.3%). The resident non-farm, non-resident and government owned property types are free of any livestock activity.

The impact of these differences, in terms of the intensity of agricultural activity is magnified by the actual levels of livestock production. Table 22, which documents the average herd size and yearly production for those individuals engaged in a particular livestock activity, reveals a varying level of productivity. (Also see Appendix IV). With the exception of horses and the yearly production of hogs, full-time farmers, generally have larger herd sizes (dairy and beef) and produce more cattle and lambs than the remaining tenure types.

Generally, on the basis of total combined output, it is possible to rank those five tenure types, which have some agricultural involvement. On the average, full-time farmers have the largest scale of production, followed by part-time farmers, with local jobs and non-local jobs; non-residents, some farm and finally resident, minor farm.

Inputs and Outputs of the Agricultural System

Inputs of machinery, custom work, building and property improvements and the number of full-time and part-time

employees are generally perceived as an injection into the individual farm of capital or labour. Outputs, on the other hand, refer generally to the end product of the agricultural system, which in this instance is manifested in the gross farm income.

Together, inputs and outputs provide an appropriate basis for evaluating the actual intensity of agricultural land use. It has been hypothesized that the individual tenure types will vary in intensity from full-time farmers having the largest inputs and outputs in the agricultural system, down to non-resident landowners with the lowest level of inputs and outputs.

Labour and Capital Inputs

Farm Labour

One of the most tangible inputs into the agricultural system is human labour. Essentially there are two major distinctions, evident in Table 23 (a crosstabulation of the number of full-time and part-time farm workers per tenure type): one, there are declining numbers of full-time farm workers with the less intensive farming operations; and two, there is an attempt to replace this reduced full-time labour commitment with part-time labour. Among the four major farming types, full-time farmers have the largest concentrations of full-time farm workers (67% have 2 or more full-time workers) and the lowest concentration of part-time labour (43% have no part-time employees). Similarly, on the part-

time local and non-local job farms and on the non-resident some farm tenure type, the higher the proportion with full-time farm workers, the higher the proportion with no part-time employees. This trend is also illustrated in Appendix IV., where the average full-time farmer is shown to have 1.93 full-time farm workers and only .81 part-time farm labourers. Part-time farmers with non-local jobs have only .42 full-time employees, but have 2.0 part-time farm workers. Although the decline in full-time farm workers followed the expected trend, the increase in part-time labour suggests that there is a definite attempt to replace full-time labour with part-time labour, and considering the seasonality of some enterprise types, these attempts may have been quite satisfactory.

TABLE 23

The Number of Full-time and Part-time Farm Workers: Percentage Occurrence by Tenure Type

Tenure	Number of Full-Time Farm Workers					Number of Part-Time Farm Workers			
	0	1	2	3	4+	0	1	2	3+
Full-time farm	.0	33.0	50.0	12.0	5.0	43.0	39.0	14.0	4.0
Part-time farm, local job	36.8	44.7	10.5	5.3	2.6	13.2	55.3	18.4	13.2
Part-time farm, non-local job	65.4	26.9	7.7	.0	.0	7.7	26.9	34.6	30.8
Resident, non-farm	100.0	.0	.0	.0	.0	100.0	.0	.0	.0
Resident, minor farm	88.9	11.1	.0	.0	.0	11.1	88.9	.0	.0
Non-resident	100.0	.0	.0	.0	.0	100.0	.0	.0	.0
Non-resident, some farm	75.0	12.5	12.5	.0	.0	.0	42.9	14.3	42.9
Total	36.4	27.6	26.6	6.5	2.8	39.4	36.6	14.6	9.4

Chi square significant at .0001 level

It should also be noted that only 23.0% of part-time farmers with local jobs have full-time, off-farm employment, whereas 80.8% of those with non-local jobs have full-time jobs. This would suggest that part-time farmers with local jobs can become much more involved with their farming enterprise, expecially when one considers that a large proportion are self-employed.

Custom Work

The reliance on custom work reflects a reduced labour requirement for the individual operator and also represents a decision not to invest in expensive machinery. With this in mind an examination of Table 24, reveals that there are some significant differences among the tenure types. Although minor variations are found throughout the table the most significant differences exist for custom cultivating, sowing grain, and baling hay. The vast majority of full-time and part-time farmers have invested in the equipment (tractor, plow, etc.) enabling them to cultivate their own soil, whereas the resident minor-farm and non-resident some-farm have not. The use of custom work for sowing grain and baling hay further separates these tenure types. In both instances, full-time farmers have a low reliance upon custom work, whereas the other types are substantially more dependent upon it. Basically, these trends reflect the expected relationship between tenure and intensity.

TABLE 24

Custom Work Used[1]: Percentage Occurrence by Tenure Type

Tenure	Custom Work Employed						
	Combining	Cultivating*	Sew** Grain	Sew Corn	Cut Silage	Bale Hay*	Spray Crops
Full-time farm	52	4	10	28	41	3	36
Part-time farm, local job	45	3	21	37	32	27	39
Part-time farm, non-local job	60	5	37	35	67	15	37
Resident, minor-farm	100	25	0	-	-	67	67
Non-resident, some-farm	50	60	67	33	100	50	20

* Chi square significant at .0001 level
** Chi square significant at .005 level

Tractors: Numbers and Horse Power

The use of tractors, which represents a sizeable investment and a surrogate for machinery in general, is nearly universal in East Wawanosh Township. In fact, as noted in Table 25, only 15.4% of all land owners do not own a tractor. In addition to the number of tractors owned which corresponds with the hypothesized intensity levels, there is also a significant variation in the size of tractors. Compared to the other tenure types, for example, full-time farmers own more in the 50-99 and greater than 100 horsepower category, than in the less than 50 horsepower category. Similar observations can also be made for the other tenure types when comparing them to those of hypothesized, lower intensity. With one exception, the available average horsepower per rented and owned acre corresponds with the hypothesized level of intensity (Table 26). Generally, full-time and part-time farmers

1 Table does not include individuals who have no need of a particular farm activity (example, do not grow corn).

TABLE 25

Size and Number of Tractors: Percentage Occurrence by Tenure Type

Tractors Owned	Number of Tractors	Percent of Individuals per Tenure Type: Full-time Farmer	Part-time Farmer, Local Job	Part-time farmer, non-local Job	Resident Non-farm	Resident, Minor Farm	Non-Resident	Non-Resident Some Farm	Total
With less than 50 Horsepower *	0	36.6	30.8	23.1	70.6	22.2	78.6	62.5	39.7
	1	33.7	33.3	38.5	29.4	44.4	21.4	37.5	33.6
	2	20.8	15.4	30.8	0.0	33.3	0.0	0.0	17.8
	3+	8.9	20.5	7.7	0.0	0.0	0.0	0.0	8.9
Average Number Owned (Less than 50 HP)	-	1.04	1.3	1.23	.3	1.1	.21	.38	.96
With horsepower from 50 to 99 **	0	15.8	35.9	46.2	88.2	88.9	100.0	62.5	39.3
	1	43.6	30.8	46.2	11.8	11.1	0.0	25.0	34.1
	2	29.7	30.8	7.7	0.0	0.0	0.0	0.0	20.0
	3+	10.9	2.6	0.0	0.0	0.0	0.0	12.5	6.1
Average Number Owned (50-99 HP) **	-	1.4	1.0	.6	.12	.1	0.0	.63	.93
With 100 or more Horsepower	0	74.3	84.6	84.6	100.0	100.0	100.0	100.0	83.2
	1	19.8	10.3	15.4	0.0	0.0	0.0	0.0	13.1
	2+	5.9	5.1	0.0	0.0	0.0	0.0	0.0	3.7
Average Number Owned (100 or more HP)	-	.34	.21	.15	0.0	0.0	0.0	0.0	.21
Total Number Owned **	0	5.0	5.1	7.7	58.8	11.1	78.6	25.0	15.4
	1	10.9	17.9	26.9	41.2	55.6	21.4	62.5	21.0
	2	26.7	33.3	26.9	0.0	33.3	0.0	0.0	23.4
	3	32.7	23.1	34.6	0.0	0.0	0.0	12.5	24.3
	4	14.9	12.8	3.8	0.0	0.0	0.0	0.0	9.8
	5+	9.9	7.7	0.0	0.0	0.0	0.0	0.0	6.1
Average Number of Tractors/Individual/ Tenure Type	-	2.74	2.49	2.0	.41	1.22	.21	1.0	2.13

* Chi square significant at .05 level
** Chi square significant at .0001 level

have high ratios of horsepower per acre (.45 and larger), whereas the remaining tenure types have consistently low values (.23 and lower). The one anomaly is resident minor-farm, which has a ratio comparable with full-time and part-time farmers. Considering, however, that this tenure type has a typically small holding, even a small tractor will give a high horsepower per acre ratio.

TABLE 26

The Relationship Between Tenure and Gross Farm Income/Acre and Available Horsepower/Acre

Tenure	Average Gross $/ Owned and Rented Property/Acre	Average Tractor Horsepower/Owned and Rented Acre
Full-time farm	438.8	.672
Part-time farm, local job	328.9	.658
Part-time farm, non-local job	180.8	.464
Resident, non-farm	18.5	.23
Resident, minor-farm	16.9	.516
Non-resident	6.7	.082
Non-resident, some-farm	52.9	.208
Government Owned	N.A.	N.A.

Farm Improvements

Improvements to an individual property, such as the installation of drainage tile or new buildings, represents an input of capital. In many instances, this capital reflects increasing levels of intensity. A crosstabulation of various property improvements by tenure type over the last 10 years, (Table 27), reflects not only differing levels of intensity, but also a different orientation in land use. Full-time and part-time farmers, for example, have been quite active in the

TABLE 27

Selected Property Improvements During the Last 10 Years: Percentage Occurrence by Tenure Type

Tenure	New* House	New** Silo or Grainery	New Storage Facilities	New Barn ***	Agricultural**** Renovations	Fence Removal	Trees Planted ***
Full-time	5	40	30	41	66	74	1
Part-time, local job	13	39	33	21	62	59	7.7
Part-time, non-local job	8	31	31	19	77	73.1	7.7
Resident, non-farm	24	12	6	12	29	24.5	17.7
Resident, Minor farm	22	11	22	0	11	32.3	33.3
Non-resident	29	0	36	0	0	14.3	35.7
Non-resident, some farm	0	13	25	0	38	25	0
Government	0	0	0	0	0	0	100

* Chi square significant at .05 level
** Chi square significant at .01 level
*** Chi square significant at .0005 level
**** Chi square significant at .0001 level

building of new silos, graineries, storage facilities, new barns, agricultural renovations and the removal of fences, whereas only a small proportion of the remaining tenure types have invested in such improvements. These other tenure types have however, generally scored significantly higher than full-time and part-time farmers in the building of houses and the planting of trees. This different orientation of investment reflects what Troughton (1976) has called the operational as opposed to the amenity investment. Those involved in agriculture make an operational investment, with the hope that it will have a return in terms of maintaining

or increasing yield, productivity or income. An amenity investment, on the other hand, is generally made by those not dependent on an agricultural income and is frequently associated with a recreational use of the property.

The installation of drainage tile represents a significant capital expenditure aimed at improving crop yields and productivity. A crosstabulation of drainage tile installed within the last 10 years by tenure type (Table 28), reveals that those tenure types not significantly involved in agriculture have overwhelmingly abstained from installing tile, with only a few having installed between 1 and 5,000 feet. On the other hand, 59.6% of full-time farmers have installed drainage tile in typically large amounts (for example, 35.4% of all full-time farmers have installed more than 5,000 feet). Whereas a greater proportion of part-time farmers with non-local jobs have installed tile compared to those with local jobs (50.0% vs 38.5%), those with local jobs have installed it in much larger quantities. While 7.7% of those with non-local jobs have installed 5,000 or more feet, 28.3% of part-time farmers with local jobs have installed more than 5,000 feet. Based on this information one may conclude that there are basic differences between the tenure types in terms of their willingness to invest capital in what is perceived as a direct attempt to improve agricultural productivity. This is manifested in different levels of intensity among the tenure types.

TABLE 28

Drainage Tile Installed:
Percentage Occurrence by Tenure Type

Tenure	None	1-4999 (feet)	5000-19999	20000-49999	50000+
Full-time farm	40.4	24.2	20.2	10.1	5.1
Part-time farm, local job	61.5	10.3	15.4	10.3	2.6
Part-time farm, non-local job	50.0	42.3	7.7	.0	.0
Resident, non-farm	100.0	.0	.0	.0	.0
Resident, minor-farm	88.9	11.1	.0	.0	.0
Non-resident	85.7	14.3	.0	.0	.0
Non-resident, some farm	75.0	12.5	12.5	.0	.0
Government owned	100.0	.0	.0	.0	.0
Total	57.0	20.1	13.6	6.5	2.8

Chi square significant at .005 level

Agricultural Output: Farm Income

The individual farm output has partially been discussed in terms of crop and livestock production; however, one of the most reliable measures reflecting the production of the individual farm is gross farm income. As noted in Table 29, the gross farm income (including income from the rental of property) of the resident non-farm, minor farm and non-resident is consistently less that $5,000. In general, if any agriculture is practiced by these tenure types, it is, as reflected by the gross farm income, carried out on a small scale, with little emphasis on overall productivity, efficiency or total output. Full-time and part-time farmers, on the other hand, have typically large gross farm incomes with only a small proportion (10% or less) of part-time farmers grossing less than $5,000. Even though there is some marked variation among these three tenure types (74%; 34.6% and 15% of full-

TABLE 29

Gross Farm Income: Percentage Occurrence by Tenure Type

Tenure	No Income	1-1199	1200-2499	2500-4999	5000-9999	10000-24999	25000-49999	50000-74999	75000-99999	100000-149999	150000+
Full-time farm	0	0	0	0	1.3	7.8	16.9	28.6	14.3	14.3	16.9
Part-time farm, local job	0	0	0	7.7	11.5	30.8	15.4	7.7	11.5	7.7	7.6
Part-time farm, non-local job	0	0	0	10.0	20.0	30.0	25.0	5.0	5.0	5.0	0
Resident, non-farm	12.5	43.8	18.8	25.0	0	0	0	0	0	0	0
Resident, minor farm	14.3	57.1	28.6	0	0	0	0	0	0	0	0
Non-resident	53.8	23.1	23.1	0	0	0	0	0	0	0	0
Non-resident, some-farm	25.0	0	0	25.0	25.0	25.0	0	0	0	0	0
Government	50.0	0	0	50.0	0	0	0	0	0	0	0
Total	7.3	8.5	4.8	6.1	5.5	12.7	13.3	15.2	9.1	8.5	9.0

Chi square significant at .0001 level

TABLE 30

Agricultural Income as a Percent of Total Income: Percentage Occurrence by Tenure Type

Tenure	Less than 25 Percent	25-49	50-74	75-100
Full-time farm	0	0	3.1	96.9
Part-time farm, local job	3.2	19.4	29.0	48.4
Part-time farm, non-local job	21.1	36.8	31.6	10.5
Resident, non-farm	93.4	0	6.7	0
Resident, minor farm	87.5	0	12.5	0
Non-resident	100.0	0	0	0
Non-resident, some farm	100.0	0	0	0
Total	23.7	6.8	10.5	58.9

Chi square significant at .0001 level

time farmers, part-time farmers with local jobs and part-time farmers, with non-local jobs, respectively, grossed in excess of $50,000 in 1978 or 1979), agriculture typically represents a sizeable portion, if not all, of the individuals income (Table 30).

The actual output from the individual farm measured in gross dollars per owned or rented acre, shows a marked decrease in output among the individual tenure types (Table 26). Full-time farmers at $438.8/acre have the largest per acre output, compared to non-resident landowners, who have the lowest ($6.7/acre). There is also significant variation among the individual tenure types, which closely corresponds with their hypothesized relationship. These values, in addition to reflecting the actual output, also reflect the proportion of land in production, the presence or absence of livestock and renting out of land (which results in significantly lower gross returns to the rentor).

Although the actual net income per tenure type is unknown, agricultural income as a percent of total family income indicates the relative importance of agriculture to each of the tenure types (Table 30). With few exceptions, the resident non-farm; resident minor-farm; non-resident and non-resident some-farm all receive less than 25% of their income from either the rent of their property or agricultural produce. In marked contrast, full-time and part-time farmers receive a large proportion of their income from agriculture.

In fact 100% of full-time farmers receive more than 50% of their income from farming (96.9% receive more than 75%), as do 77.4% of part-time farmers with local jobs and 42.1% of part-time farmers with non-local jobs. As these figures indicate, there are marked differences, not only between those who are involved in agriculture and those who are not, but also between the individual tenure types. Although it is somewhat difficult to evaluate the impact of income on intensity levels, the following broad conclusions may be drawn. Those who receive a small portion of their income from agriculture are not motivated to maximize the yield and productivity of their property. In fact those individuals with no agricultural income (Table 29) either own properties with absolutely no agricultural potential or else they have decided that it was not worth their effort to develop their properties. Full-time farmers on the other hand, who frequently receive 100% of their income from their farming property, must attempt to increase their productivity, at least to the level assuring them of a satisfactory level of income. In other words, the extent to which an individual is dependent upon agricultural income has dictated the level of intensity, in terms of increased yield and productivity, to which that individual must strive.

Discriminant Analysis

The cumulative result of the variables discussed in this report has been to identify, separate and describe the

tenure situation within East Wawanosh Township. These differences are magnified by discriminant analysis, a statistical technique which seeks to statistically distinquish between two or more groups of cases. By mathematically weighting and linearily combining the discriminant variables, the technique has generally confirmed the separate identity of the selected groups (Klecka, 1975, 435).

The results of the three most significant discriminant functions are illustrated in Table 31. As measured by the Eigen value and percentage of trace, Function 1 accounts for the majority of variation among the tenure types.

The sensitivity of each variable in discriminating among the tenure types is identified by the coefficients shown in Table 31. Using these coefficients (which indicate the relative sensitivity of each variable to each function), a group centroid, which is the mean discriminating score for each tenure type, is produced for each function and is plotted in Figure 7 representing the distinctions between each of the tenure types. Essentially, the first two functions are identified on the basis of location of residence and income, whereas the third is segregated on the basis of off-farm employment and farm labour.

Another capability of discriminant analysis is its ability to predict or categorize group membership. Given the group centroid, individuals may, on the basis of their discriminant score, be attributed to the group having the most similar characteristics. As illustrated in Table 32, the

FIGURE 7

PLOT OF DISCRIMINANT SCORE 1 VS. DISCRIMINANT SCORE 2

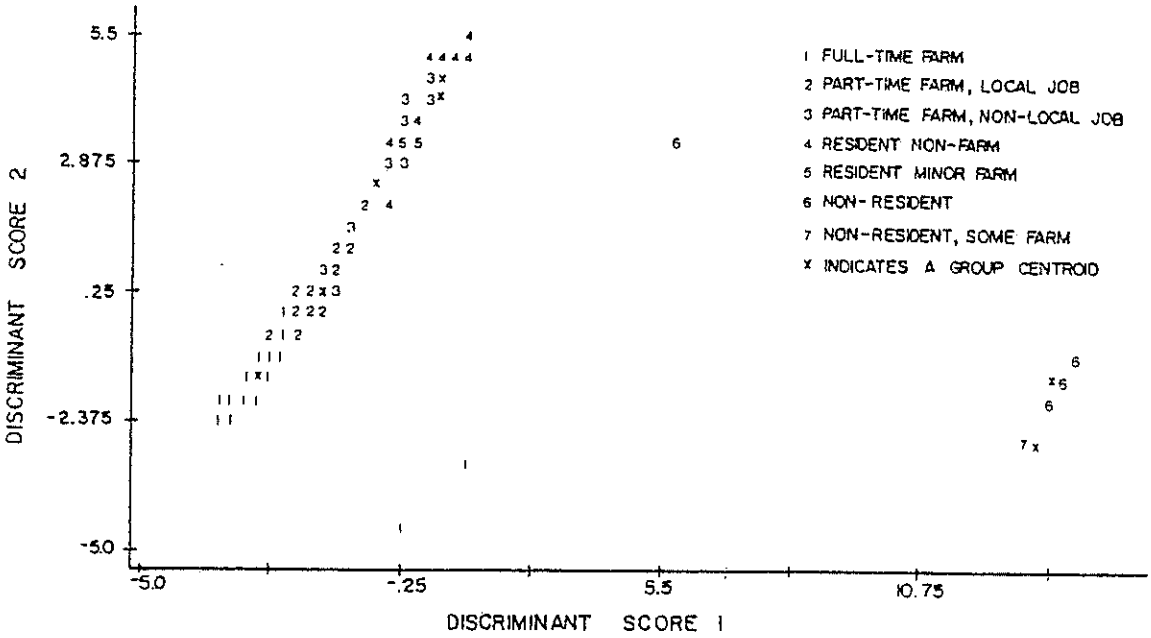


TABLE 31

Results of Discriminant Analysis

Discriminant Function	Eigen Value	Percent of Trace	Chi Square	Significance
1	23.10575	80.0	808.85373	0
2	4.92889	17.1	353.76331	0
3	.65961	2.3	99.24672	0.000

Standardized Discriminant Function Coefficients

	Function 1	Function 2	Function 3
Location of Residence	3.74786	-2.11901	-.08296
Owned Acreage	-.11806	-.00508	-.08761
Owner Off-farm Employment	.39057	.67746	-1.22494
Enterprise Type	.04041	.31136	.37906
Number of Full-time Farm Workers	-.20395	-.07888	.18212
Number of Part-time Farm Workers	-.08306	-.22230	-.60813
Gross Farm Income	-.60583	-.57777	-.46101
Agriculture as a Percent of Income	-.63714	-1.34637	-.45284
Owned Acreage of Crops	.21534	.04784	.20856

TABLE 32

Results of Discriminant Analysis: Actual by Predicted Group Membership

Actual Group	Predicted Group Membership as a Percent						
	Full-time Farm	Part-time Farm, Local Job	Part-time Farm, Non-Local Job	Resident Non-Farm	Resident Minor-Farm	Non-Resident	Non-Resident, Some Farm
Full-time Farm	100.0	0	0	0	0	0	0
Part-time Farm, Local Job	30.4	56.5	13.0	0	0	0	0
Part-time Farm, Non-Local Job	0	26.7	66.7	6.7	0	0	0
Resident, Non-farm	0	0	7.1	64.3	28.6	0	0
Resident, Minor-farm	0	0	0	57.1	42.9	0	0
Non-Resident	0	0	0	7.7	0	92.3	0
Non-Resident, Some Farm	0	0	0	0	0	0	100.0

83.6 percent of known cases correctly classified

Chi square significant at .0001 level

predicted group membership corresponds in 83.6% of all instances with the actual group membership. The variation shown among part-time farmers suggests that a sizeable proportion (30.4%) of part-time farmers with local jobs, more closely resemble full-time farmers than any other tenure type. While some individuals classified as part-time farmers with non-local jobs were projected as being part-time with local jobs, none were classified as full-time farmers. This would suggest that part-time farmers, with local jobs are more like full-time farmers, than are those with non-local jobs. Furthermore, the considerable overlap between the resident non-farm and resident, minor-farm suggests that these two groups are actually quite similar. In effect, these differences as presented in Table 32, suggest that the predicted group membership may be interpreted as representing a continuum which closely corresponds with the hypothesized relationship between tenure and intensity (Figure 2). That is, in almost all instances, the 16.4% of cases which were not correctly classified were categorized as belonging to a tenure type hypothesized as being either the next least or most intensive tenure type.

What this chapter has established is that the intensity of agricultural land use varies considerably between the different tenure types. In terms of enterprise type, crop and livestock patterns and inputs and outputs there is a marked variation in intensity ranging from full-time farmers through to those tenure types with no agricultural involvement.

The discriminant analysis procedure has also endorsed these differences, separating the tenure types, along a continuum which represents the hypothesized level of intensity (Figure 2).

CHAPTER VI

SUMMARY AND CONCLUSIONS

The main objectives of this report have been to identify the current tenure situation within the rural township of East Wawanosh and to examine some of the relationships between tenure and land use. It was hypothesized that a range of farm and non-farm types of tenure exist, which exhibit markedly different patterns of land use, particularly as expressed by the intensity of agricultural activity. Based on this study, several conclusions as to land use and tenure relationships in East Wawanosh may be drawn.

Firstly, a wide variation of tenure types within East Wawanosh has been established. Eight tenure types (Table 10) have been distinquished on the basis of their location of residence, off-farm employment and its location, and the level of agricultural activity, measured as gross farm income.

Secondly, in most instances, the land owned or operated by full-time farmers is used most intensively for agricultural purposes, while other tenure types exhibit a

gradual decrease in intensity with their hypothesized relationship, along a "continuum" (Figure 2).

Thirdly, there is a marked contrast between those tenure types significantly involved in agriculture (full-time farm, part-time and non-resident with some farm) and those having minimal, or no agricultural activity (non-resident, resident minor farm, resident non-farm and government owned property).

More specifically, these three conclusions reflect differences in the land base (parcel size, holding characteristics) and land use (crop, livestock and enterprise type and the total agricultural output as reflected by gross farm income).

The relationship between tenure and the operated land base is represented by the average acreage owned; the number of parcels owned; the acreage under crops; rented acreage and the quality of the parcel base as revealed by the soil capability and the total assessed value. Although the ranking of these variables would reveal some variability between the individual tenure types, in almost all instances, full-time farmers would show the largest value and thereafter part-time farmers with local and non-local jobs, and non-residents with some farm. By comparison, the remaining tenure types generally have smaller acreages (Table 11), fewer crops (Tables 19 and 20), fewer parcels (Table 14), and are located on the poorer quality soils within the township (Table 15). This reflects a greater potential for total

output among full-time farmers and at least some realization of economies of scale. This opportunity diminishes as the variables which define the operated land base, decrease.

Overall, there is a decrease in the intensity of use of land for agricultural purposes between the individual tenure types. The full-time farmers generally have the largest physical and financial output (Table 29). The next most intensive users of land are part-time farmers with local jobs who have significanlty greater scale and production than part-time farmers with non-local jobs. At the opposite end of the continuum (Figure 2), are those with minimal, or no agricultural involvement. Despite the significant decreases in intensity of land use for agricultural purposes, it should be remembered that combined, 38.6% of the property owned by non-resident, residents minor farm, residents non-farm and government owned property is rented to and operated by full-time and part-time farmers (Appendix IV).

Generally, the variation in intensity levels is the result of differential inputs, both in terms of labour (Table 23) and capital, and in the case of the latter, where and how the capital is invested. Operators engaged in significant levels of agricultural activity have tended to invest in agricultural items such as new barns, silos, graineries and drainage tile. Those with minor engagement in agriculture have demonstrated a greater propensity to invest in amenity items such as new houses and tree plantings (Table 27).

While the intensity of the individual operational unit decreases with size, it is more difficult to establish the levels of agricultural intensity per unit area. Nevertheless, measurement of two of the most important variables of capital and energy input (tractor horsepower per acre) and financial output (gross farm income per acre) results in markedly different values between the tenure types, which generally corresponds with their hypothesized relationship (Table 26).

The levels of agricultural activity demonstrated by full-time and part-time farmers would suggest that they each are committed to and concerned with the well-being and viability of the rural agricultural community. The changes in the local ownership base, however, suggest that the overall viability of agriculture is to a certain degree threatened. Full-time and part-time farmers who together own 87.3% of the townships property and through rental, operate 92.0% of the property, only comprise 76.9% of those land owners with more than 10 acres, within the township. While the development of additional tenure types has affected only a small portion of the townships total acreage (12.7%), the actual number of properties (Table 10) are, nevertheless, numerically significant (23.1%). Consequently, not only are the actual operating decisions for some properties out of the hands of the farming population, but there are also potential impacts on the properties which are operated by farmers, such as

Minimum Distance Standards as discussed in the "Agricultural Code of Practice" (Ontario Ministry of Agriculture and Food, 1976). In addition, non-farm individuals frequently have different values and reasons for owning property compared to full-time and part-time farmers (Troughton, 1976; Layton, 1976). The result, which may involve the potential for land use conflict, is compounded by the number of properties within the township, which are less than 10 acres in size, and are not farm operated (Table 9).

This last finding points to the usefulness of this report for rural planning, which requires a detailed analysis at the individual farm and property level. The spatial distribution of tenure types and their inherent characteristics and relationships is of prime importance to all elements of planning and resource management. What initially may have appeared to have been a fairly homogenous rural township, is actually a diverse interrelating system of land ownership, operation and use (Figure 5 and Figure 6).

This study has established the basis and need for additional research at the rural township level. Unfortunately, the scope of this report has not permitted an examination of numerous variables which further describe the relationship between tenure and land use. For example, further analysis could be expected to show relationships between tenure and individual operator characteristics such as age, education, occupation, length of ownership and by other measures of

intensity, such as production and yield per acre. In addition, the actual attitudes and values of the property owner would also contribute to the differences among the tenure types.

In summary, the significance and need for this type of study is endorsed by the complexities of land ownership, operation and use which have been found within the township of East Wawanosh. The results found within this report suggest that any future evaluation needs to consider the township, not as a homogenous rural farming community, but more precisely, as a complicated inter-related system of tenure and land use.

APPENDIX I

Conversion Factors from English to Metric

To Find:	Multiply:	By:
Centimeters	inches	2.54
Meters	feet	.3048
Meters	yards	.9144
Kilometers	miles	1.609344
Square meters	square feet	.0929
Square meters	square yards	.83613
Hectares	acres	.405

Temperature Conversions:

$^{\circ}F = 1.8(^{\circ}C) + 32$

$^{\circ}C = .56(^{\circ}F - 32)$

APPENDIX II

Sample Questionnaire

1. Name:_____
   Country of Birth:_____

2. Marital Status:
   [ ] single (including separated and divorced)
   [ ] married

3. Principle Residence:

Lot	Concession	Acreage of Principle Residence	Length of Ownership

4. Additional Properties Owned:

Lot	Concession	Acreage of Property	Length of Ownership

5. Properties Rented:

Lot	Concession	Acreage of Property	Number of Years Rented

6. Do you hold a job outside of your farm operation for more than 1 month in a year? [ ] no [ ] 1-6 months/year [ ] more than 6 months/year occupation_____

7. Does your spouse hold a job outside of your farm operation for more than 1 month in a year? [ ] no [ ] 1-6 months/year [ ] more than 6 months/year occupation_____

8. Do you consider yourself to be retired?
   [ ] no [ ] yes

   If you own property but do not farm any of it, nor have any livestock, please skip to question number 19.

9. What type of farming are you engaged in?_____

10. Number of people (14 years or older, including spouse and children) working on your farm... [ ] fulltime [ ] part-time (from 1-6 months)

11. Pigs: Total number of sows:_____
    Yearly production of market hogs:
    [ ] none [ ] 0-99 [ ] 100-199 [ ] 200-499
    [ ] 500-999 [ ] 1000-1999 [ ] over 2000
    Percentage of feed purchased:
    [ ] 0-24 [ ] 25-49 [ ] 50-74 [ ] 75-100

12. Horses: Total number of horses owned for commercial purposes?_____
    Total number of horses owned as pets?_____
    Percentage of feed purchased:
    [ ] 0-24 [ ] 25-49 [ ] 50-74 [ ] 75-100

13. Dairy: Total number of dairy cows?_____
Are heifer calves kept as replacement stock?
[ ] yes [ ] no
Are calves vealed? ... ...[ ] yes [ ] no
Are calves finished to market weight?.[ ] yes [ ] no
Percentage of feed purchased:
[ ] 0-24 [ ] 25-49 [ ] 50-74 [ ] 75-100

14. Poultry: Total number of laying hens:_____
Total number of broilers fed yearly:_____
Total number of pullets produced yearly:_____
Total number of turkeys produced yearly:_____
Total number of ducks produced yearly:_____
Total number of geese produced yearly:_____
Percentage of feed purchased:
[ ] 0-24 [ ] 25-49 [ ] 50-74 [ ] 75-100

15. Beef: Total number of cows producing calves:_____
Total number of calves sold as stockers:_____
Total number of cattle finished yearly:_____
Percentage of feed purchased:
[ ] 0-24 [ ] 25-49 [ ] 50-74 [ ] 75-100

16. Sheep: Total number of ewes producing lambs:_____
Yearly production of marketed lambs:_____
Percentage of feed purchased:
[ ] 0-24 [ ] 25-49 [ ] 50-74 [ ]75-100

17. Other livestock (please specify):_____

18. How many acres of the following crops do you grow?

Crop	On Owned Acreage	On Rented Acreage	On Share-Cropping
Grain corn	.....	.....	.....
Ensilage corn	.....	.....	.....
Wheat	.....	.....	.....
Barley	.....	.....	.....
Oats	.....	.....	.....
Mixed grain	.....	.....	.....
White beans	.....	.....	.....
Soybeans	.....	.....	.....
Turnip	.....	.....	.....
Flax	.....	.....	.....
Potatoes	.....	.....	.....
Cucumbers	.....	.....	.....
Orchards	.....	.....	.....
Hay	.....	.....	.....
Pasture	.....	.....	.....
Woodlot	.....	.....	.....
Scrub/waste	.....	.....	.....
Summer fallow	.....	.....	.....
Other (specify)	.....	.....	.....

Proportion of agricultural income derived from cash cropping as a %:_____

19. The total number of tractors you own with horsepower of:
[ ] 0-49 [ ] 50-99 [ ] 100-149 [ ] greater than 150

20. Do you hire someone to:
custom combine your grain, corn or beans? [ ] yes [ ] no
cultivate your fields? ... ...[ ] yes [ ] no
sow your crops?... ... ...[ ] yes [ ] no
cut your silage? . ...[ ] yes [ ] no
bale your hay? ... ...[ ] yes [ ] no
spray your crops?. ... ...[ ] yes [ ] no

21. Total number of buildings on property owned:_____
silos and graineries: _____

22. Buildings built in the last 10 years:
[ ] house [ ] silos and graineries
[ ] storage facilities [ ] barns (specify type):____

23. Have you done renovations to existing buildings in the last 10 years? [ ] no [ ] major [ ] minor
[ ] agricultural [ ] non-agricultural

24. If drainage tile has been installed in the last ten years, specify amount: [ ] none [ ] 1-4999 feet [ ] 5000-19999 feet [ ] 20000-49999 feet [ ] more than 50000 feet

25. Do you rent out any of your property or buildings:
[ ] yes [ ] no
If yes, [ ] house [ ] barn [ ] property
(lot:__; conc.:__; acreage__)

26. Have fences been removed in the last 10 years to increase field size? [ ] no [ ] yes estimate of total length:___

27. Total area cleared of woodlot or scrub in the last 10 years:_____

28. Total area planted in trees in the last 10 years:_____

29. Have you created any ponds in the last 10 years for farm use- [ ] yes [ ] no non-farm use- [ ] yes [ ] no

30. Total acreage of: productive woodlot___ non-productive woodlot___. Has timber been marketed in the last 10 years? [ ] yes [ ] no

31. Would you mind giving an approximate estimate of your yearly gross income derived from farming? _____
Contribution of agriculture to your total net income expressed as a percent:_____

32. Number of years of formal education:_____

33. Your age: [ ] under 24 [ ] 25-34 [ ] 45-54
[ ] 55-64 [ ] 65-74 [ ] 75 or over

APPENDIX III

Listing of Variables Coded for Each Property Owner

1. Identification Number
2. Tenure type
3. Country of birth
4. Age
5. Education
6. Marital status
7. Location of residence
8. Concession
9. Lot number
10. Acreage owned
11. Parcels owned
12. Maximum period owned
13. Minimum period owned
14. Total assessed value
15. Assessed value per acre
16. Dominant CLI class
17. % CLI Class 1
18. No. of properties rented
19. Rented acreage
20. Off-farm employment
21. Occupation
22. Spouse employed
23. Spouse occupation
24. Retired
25. Enterprise type
26. No. full-time farm workers
27. No. part-time farm workers
28. Presence of pigs
29. No. sows
30. Weiners sold
31. Hogs-yearly production
32. % feed purchased (hogs)
33. Horses present
34. No. horses-commercial
35. No. horses-pets
36. % feed purchased (horses)
37. Dairy presence
38. No. dairy cows
39. Heifers for replacement
40. Calves vealed
41. Calves sold at market wt.
42. % feed purchased (dairy)
43. Poultry-presence
44. Poultry type
45. Poultry significance
46. % feed purchased (poultry)
47. Beef-presence
48. No. beef cows
49. No. stockers sold
50. Fat cattle-yearly production
51. % feed purchased (beef)
52. Sheep presence
53. No. ewes
54. Lambs-yearly production
55. % feed purchased (sheep)
56. Other-type
57. % feed purchased (other)
58. Owned acreage -grain corn
59. -ensilage corn
60. -wheat
61. -barley
62. -oats
63. -mixed grain
64. -white beans
65. -soy beans
66. -turnips
67. -potatoes
68. -cucumbers
69. -orchard
70. -hay
71. -pasture
72. -woodlot
73. -scrub/waste
74. -summer fallow
75. -other
76. -unaccounted for
77. -rented out
78. Rented acreage-grain corn
79. -ensilage corn
80. -wheat
81. -barley
82. -oats
83. -mixed grain
84. -white beans
85. -soy beans
86. -turnips
87. -potatoes
88. -cucumbers
89. -hay
90. -pasture
91. -other
92. Cash cropping as a % of income

93. No. tractors owned
94. No. tractors 0-49 HP
95. No. tractors 50-99 HP
96. No. tractors 100-149 HP
97. No. tractors 150 HP +
98. Custom combining
99. Custom cultivating
100. Custom sew grain
101. Custom sew corn
102. Custom cut silage
103. Custom bale hay
104. Custom spray crops
105. Agricultural buildings present
106. No. silo/grainery present
107. New house
108. New silo/grainery
109. New storage facility
110. New barn
111. Agricultural renovations
112. Non-agricultural renovations
113. Amount drainage tile installed
114. House rented
115. Barn rented
116. Amount fence removed
117. Land cleared-acreage
118. Trees planted-acreage
119. Pond for farm use
120. Pond for non-farm use
121. Timber marketed
124. Gross farm income
125. Agriculture as a % of income

APPENDIX IV

Mean Values of Selected Variables for Each Tenure Type

Tenure	Average Value/Variable: Acreage Owned	Number of Parcels Owned	Total Assessed Value	Maximum Period Property Owned	Minimum Period Property Owned
All tenure types	179.8	1.43	7435	14.4	11.6
Full-time farm	231.4	1.6	9747	15.3	10.8
Part-time farm, local job	181.4	1.38	7390	16.6	14.5
Part-time farm, non-local job	133.3	1.2	6512	12.1	10.7
Resident, non-farm	76.0	1.24	4691	12.9	12.5
Resident, minor-farm	78.1	1.1	3257	15.8	14.0
Non-resident	74.6	1.0	1592	7.8	7.8
Non-resident, some farm	153.1	1.63	6155	13.8	13.5
Government	332.0	1.5	5425	7.0	7.0

Tenure	Horses	Yearly Production Hogs	Beef Cows	Yearly Production Cattle	Yearly Production Lambs	Dairy Cows
All tenure types	.6	92.9	5.17	48.9	2.9	8.2
Full-time farm	.57	130.3	6.84	84.0	4.7	15.8
Part-time farm, local job	.64	89.7	6.4	44.1	2.4	3.2
Part-time farm, non-local job	1.23	108.6	4.5	17.5	1.0	1.6
Resident, non-farm	0	0	0	0	0	0
Resident, minor-farm	0	.4	.4	0	1.4	.1
Non-resident	0	0	0	0	0	0
Non-resident, some farm	.63	78.1	6.3	6.3	1.9	0
Government	0	0	0	0	0	0

Tenure	Average Value/Variable/Individual						
	Number Full-time Farm Workers	Number Part-time Farm Workers	Acreage of Land Recently Cleared	Acreage of Trees Recently Planted	Number of Tractors HP 0-49	Number of Tractors HP 50-99	Number of Tractors HP 100+
All tenure types	1.14	.97	1.5	1.3	.96	.93	.21
Full-time farm	1.93	.81	1.2	.2	1.04	1.4	.34
Part-time farm, local job	.90	1.33	2.3	.5	1.3	1.0	.21
Part-time farm, non-local job	.42	2.0	.4	1.5	1.23	.6	.15
Resident, non-farm	0	0	1.1	1.8	.3	.12	0
Resident, minor-farm	.1	.89	1.9	5.4	1.1	.1	0
Non-resident	0	0	3.9	5.7	.21	0	0
Non-resident, some farm	.38	1.75	.9	0	.38	.63	0
Government	-	-	0	20.0	0	0	0

Average Value/Variable/Individual (Owned Property Only)

Tenure	Grain Corn	Ensilage Corn	Mixed Grain/ Wheat/ Barley/ Oats	Hay	Pasture	White Beans/ Soy Beans/ Garden Crops	Woodlot	Scrub & Waste	Other/ Summer Fallow Unaccounted for	Acreage Rented Out
All tenure types	25.7	18.8	19.8	26.6	21	1.9	26.1	15.1	10.3	13.6
Full-time farm	35.6	25.6	30.9	41.3	27.5	2.6	27.6	14.3	16.3	3.3
Part-time farm, local job	30.7	21.8	18.8	23.3	26.5	2.9	22.3	18.7	7.3	11.4
Part-time farm, non-local job	20.2	7.5	15.3	18.5	19.4	1.4	19.7	7.4	3.4	20.3
Resident, non-farm	0	0	0	0	0	0	14.9	16.5	3.5	41.1
Resident, minor farm	0	0	1.2	14.8	4.2	.2	21.0	7.2	3.1	26.3
Non-resident	0	0	0	0	0	0	22.6	21.1	.86	30.0
Non-resident, some farm	28	8	3	8	24.0	0	39.9	7.6	9.9	24.5
Government	0	0	0	0	0	0	190.0	96.5	8.0	37.5

Average Value/Variable/Individual (Rented Property Only)

	Acreage Rented	Grain Corn	Ensilage Corn	Mixed Grain/ Wheat/Barley/ Oats	Hay	Pasture	White Beans/ Soy Beans	Other
All tenure types	18.3	6.7	1.6	2.5	2.5	2.6	.7	1.7
Full-time farm	25.6	6.9	2.8	3.9	4.3	3.4	.72	3.6
Part-time farm, local job	27.2	16.2	.9	3.1	1.4	5.2	.38	0
Part-time farm, non-local job	11.5	4.3	.8	1.3	1.8	.6	2.7	0
All others	0	0	0	0	0	0	0	0

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