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**AN INTEGRATED APPROACH TO THE STUDY OF AGRICULTURAL
CHANGE ON MANITOULIN ISLAND**

by

MARC JOSEPH BONNEVILLE, B.Sc., B.A.

**A Thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of
Master of Arts
Department of Geography**

Carleton University

Ottawa, Ontario

September 1989

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ACCEPTANCE SHEET

**The undersigned recommend to the Faculty of Graduate Studies
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**"AN INTEGRATED APPROACH TO THE STUDY OF AGRICULTURAL
CHANGE ON MANITOULIN ISLAND"**

**submitted by Marc Joseph Bonneville, B.Sc., B.A.
in partial fulfilment of the requirements for
the degree of Master of Arts**

Thesis Supervisor

Chair, Department of Geography

Carleton University

September 1989

ABSTRACT

This study examines the nature of agricultural change on Manitoulin Island between 1951 and 1986 using an integrated approach consisting of social, economic, physical and spatial variables using regional, cartographic, historical-settlement, and quantitative methods of analysis. Selected areas of Ontario were compared with Manitoulin Island to determine how agricultural change proceeded in a similar, and superior region. Hypotheses investigated include absolute, and relative agricultural decline of Manitoulin Island given the poor physical resources and spatial isolation, and the increased localization of agricultural activity in advantaged areas of southwestern Ontario. Agricultural decline within Manitoulin Island was predicted to be greater in more marginal and isolated areas than in "core" areas. Data were obtained from government ministries, the Census, the literature, and a telephone survey of Island farmers. This study concludes that agriculture on Manitoulin Island has undergone absolute decline, and relative decline compared to southwestern Ontario. Similarly, agricultural decline was greater in the marginal and more isolated areas of Manitoulin Island than in the "core" areas.

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CHAPTER 1

INTRODUCTION TO THE STUDY OF AGRICULTURAL CHANGE

1.1 Introduction

Ontario's economy and prosperity are partly based on agriculture, although agriculture has been declining relative to other sectors of the provincial and national economies. From 1961 to 1976, the proportion of GNP contributed by agriculture to the Canadian economy dropped from 2.7% to 1.6% (McCuaig and Manning, 1982: 7). However, variety is the hallmark of agriculture in the province, and one would expect to find great regional differences in agricultural activity between a marginal area and the core farmland area of the province.

The physical attributes upon which agriculture is based differ greatly from one part of the province to another. Farmland in southern Ontario is the most productive in the country, whereas the Shield and adjacent fringe areas in the centre and north are less favourable, given their shorter growing season and frost-free period, harsher winters, and poorer soil capability and relative isolation from large populated centres (Beattie et al., 1981: 11). The Shield areas as well as the northern clay belts were viewed as reasonably good agricultural lands in the early years of European settlement, but were subsequently found to be marginal as farmland (Troughton, 1982).

The impetus to settle these lands can be traced partly to the historical pressure to settle the northern, at the time unsettled, portions of Ontario. The settlement of both good and bad farmland was undertaken as part of a colonization process of less densely populated areas of the province in the decades prior to the turn of the century. The settlement of lands

surrounding Lake Huron can be traced in part to the general spread of technological improvements in agriculture which aided this expansion (Ray, 1972: 45).

The economic advantages of southern Ontario with its superior physical conditions and greater access to inputs, markets and transportation have had long-term implications for provincial agriculture. From an economic point of view, farming in southern Ontario has had distinct advantages over much of the north (Ray, 1972: 48). Competition and the cost-price squeeze have had a greater detrimental effect on farmers in the fringe areas than those in southern Ontario (Beattie et al., 1981: 20). The combination of factors of production - land, labour, and capital - together with adverse climate, and physiographic conditions, put marginal regions at a severe disadvantage, making it extremely difficult for them to compete with the cumulative advantages of the core agricultural areas of southern Ontario (Beattie et al., 1981: 25).

The overall aim of this study was to gauge the direction and degree of agricultural change on Manitoulin Island both absolutely and relatively for 1951-1986 by employing an integrated view consisting of physical, social, economic, and spatial variables. Data sources used in this study include the Census of Agriculture and Population, literature sources, and a survey of farmers on Manitoulin Island. Changes in agriculture were assessed at different spatial scales. Manitoulin Island was compared to two other areas of the province to provide comparison and to determine where the trends on the Island fit into broad regional trends across the province. In addition, this study analysed data at the township level, in an attempt to determine whether or not the trends observable at the broad regional scale also occurred within Manitoulin Island itself.

The early 1950s mark a watershed for Ontario agriculture. This date represents the maximum extent of agriculture in the province in terms of its contribution to the provincial economy, area under cultivation, and the number of farms (Census of Agriculture, 1951, 1961). It would seem a logical starting point at which to begin a study of agricultural changes in the province.

The choice of study area was restricted to a fringe agricultural region outside of the productive southern Ontario region. Manitoulin Island was studied because of personal interest and because it fits the profile of an isolated area of declining agriculture. The Island has a unique position bordering the fringe of the Shield, separated as it is from northern Ontario by the North Channel of Lake Huron.

An analysis of agricultural trends on Manitoulin Island compared to those in selected counties of Ontario in absolute and relative terms between 1951 and 1986 reveals a Manitoulin Island industry resting on an increasingly narrow base. The range of agricultural commodities produced on the Island for sale had contracted to its lowest level ever (Wightman, 1982). The severe reduction in farm numbers from roughly 1,000 in 1951 to 331 in 1986 was clearly one of the most visible manifestations of this new agricultural order on the Island, although farms declined everywhere in Ontario during this period (Census of Agriculture, 1951, 1986). On the Island of the 1950s the one-time reliance on a mixed range of livestock products was severely curtailed in the narrow specialization of the 1980s (Wightman, 1982: 197; Beattie et al., 1981).

The decline of the turkey and sheep industries on the Island are part of the narrowing base of Island agriculture which has been going on since the 1950s. Once a major producer of provincial wool, the flocks on the

Island declined sharply to only 2,000 sheep in the 1970s from a high of over 25,000 in the 1920s (Wightman, 1982: 161). Similarly, the turkey industry on the Island, although never as important to the Island's agriculture as sheep or cattle, was once a sign of prosperity for farmers in the early 1950s, but it ceased to exist by the 1980s (Census of Agriculture, 1951, 1981). The complete breakdown of the turkey industry was the result of pressure from the factory-like system of production employed by farmers in southwestern Ontario (Wightman, 1982: 198).

Agriculture on Manitoulin Island in 1986 was mainly geared to rearing beef cattle and to a lesser extent dairy cattle. To all intents and purposes the Island can be characterized as an intensive/extensive pasture livestock region specializing in cattle. Although the production of cattle for beef and/or dairy products in 1986 was greater than at any time in the past, the Island's share of the provincial industry is vulnerable to outside competition especially from southwestern Ontario.

1.2 Definitions and Approaches to the Study of Marginal Agriculture

This section begins with a definition of terms and concepts used in this study and proceeds to a review of approaches to the study of marginal agriculture. The various meanings of social, economic, physical, and spatial marginality as related to agriculture are described and the research traditions from which marginal agriculture has been studied are presented. These research traditions are the regional, the cartographic, the historical-settlement, and the quantitative. There has been a deliberate split in the literature review, such that part is treated in this section under definition of terms and discussion of the traditions of study, with a discussion and definition of variables used to measure marginality being left for Chapter 2.

Marginal agriculture has been studied using several different thematic approaches, each with its own particular focus and central theme. The literature has typically been dominated by examinations of the social, economic, spatial, and physical aspects of marginality, with special emphasis being placed on the sensitive (or tenuous) nature of the area under study. Studies in the past have generally focussed on single themes, using a single research tradition as mentioned above. Crickmer's (1978) study of the role of physical factors in farmland abandonment in Nova Scotia is an example of a single theme study. In contrast this study utilizes the integrated approach (physical, social, economic, and spatial variables) to measure the degree of agricultural change. The integrated approach is felt to measure more appropriately the attributes of a region suspected of agricultural decline because it takes into account a broader spectrum of factors likely to affect farming than would be the case by simply judging this decline from either a strictly social or physical viewpoint.

One of the key characteristics of marginal agricultural areas is the spatial isolation of such land from core ecumene areas (Beattie et al., 1981). 'Ecumene' is the word used to connote a belt of continuous settlement beyond which human occupation of the landscape becomes patchy or discontinuous (McCann, 1982: 459). This discontinuity of settlement denotes a break or separation in services and opportunities that characterize the ecumene with its higher density of population and transportation networks. Therefore the zones of marginal agriculture are found in what Troughton (1977) has called the "broken ecumene."

The concept of agricultural marginality implies physical, spatial, economic and social conditions of adversity in agricultural operations. Agricultural marginality in this study is taken to mean the general change,

usually a decline, in agriculture as it can be measured using physical, spatial, economic, and social indicators or variables. It is unlikely that a region would rate highly in only one or two of these general indicators and poorly in the rest.

Social, economic, physical, and spatial marginality are described here as they will be referred to in the rest of this study. Social marginality is concerned with social factors that significantly disadvantage the agriculture of a region. The following factors are key elements leading to the condition of social marginality: low education levels, lack of health services, inadequate transportation, few educational opportunities, changing expectations, aging farmers, and lack of mobility (Beattie et al., 1981: 18). More enterprising farmers in marginal areas not burdened by all the above factors usually tend to migrate to regions of greater promise. This leaves behind less aspiring farmers to scratch out a living in a region with dwindling prospects (Beaujeu-Garnier, 1978; Francis, 1970: 22). This can also contribute to consolidation and better prospects for those who remain - allowing them to satisfy their expectations.

Economic marginality is related to factors of location, profit and capitalization. Frontier regions are not only disadvantaged by remoteness and distance from the prime agricultural regions, but also by farmers' mental perceptions of backwardness. Economic marginality refers to low levels of return on investment experienced by farmers operating at or near subsistence levels. Lack of capital in fringe areas tends to aggravate or encourage poor or declining returns on investment (Beattie et al., 1981; Goodall, 1987; Lamoureux, 1985).

Physical marginality refers to those environmental and ecological parameters which determine both relative and absolute limits to production

of crops. An absolute limit refers to the point beyond which a crop cannot physically grow, while relative limits refer, for example, to certain areas within a crop's growing range which experience better growth than other areas within that same general limit. Physical limits to agricultural cultivation are not necessarily fixed or static, but can be altered by people's technology and ingenuity (Francis, 1970; Grigg, 1982; Williams, 1975). A zone extending across Canada between 45 and 55 degrees north has been designated a major marginal agricultural area containing frequent evidence of physical marginality in addition to social and economic marginality (Beattie et al., 1981: 2; Troughton, 1977).

Shifting Margins

The onset of marginality can be said to begin when a given crop or husbandry activity fails to give the farmer a reasonable standard of living (Beattie, et al., 1981; Goodall, 1987). Margins of agriculture are not fixed but can shift because of the influence of a combination of factors, both physical and human. These shifts in the margins of cultivation consist of both retreats and advances. Reasons for these shifts include the physical capability of the land, climate, accessibility, level of technology, market demand, and expectations of what constitutes a reasonable return on investment and adequate income (Beattie et al., 1981: 3).

Retreating Margins

Retreating agriculture is a negative concept, which comes about by the contraction of cultivated or improved farmland and Manitoulin Island is thought to fit into this framework. This contraction has been found to occur through changes in climate, through soil degradation, or a fall in the prices of

agricultural produce caused by overproduction or increased competition at the national or international level. Overproduction causes a drop in acreage planted in the marginal areas because core agricultural areas are able to compete more effectively than the fringe agricultural regions (Ilbery, 1985: 101). Physical changes such as long-term decline in precipitation or a lower average temperature for a season can affect the prosperity of agriculture of any region. Variability of the climate is both natural and to be expected. Changes in rainfall, and/or length of growing period bring contraction of acreage in marginal areas, where there is a delicate balance of nature even in favourable years (Smith, 1975; Trewartha, 1980). This variability can usually be expected to affect the margins of agriculture to a greater extent than the agricultural core, as the marginal areas tend to operate within a narrower zone of climatic, and economic safety with fewer and smaller financial resources available. This small zone of safety concerns the minimum required number of growing days or precipitation needed during the growing season for instance. Any upset of the delicate balance would cause, in many physically marginal areas, great difficulty in harvesting crops of quality with a reasonably acceptable yield.

Retreating margins are one of the visible manifestations of the process known as circular and cumulative causation (Myrdal, 1957). The retreat of agriculture is initiated by an inability to meet financial commitments, which can be the result of low soil quality, uneconomic farm size, loss of market share, or financing problems. Farmers in marginal areas often suffer great difficulties coping with uncertainty as a consequence of advancing age, cash flow problems, inadequate managerial skills, and a rather bleak vision of their future in farming (McCuaig and Manning, 1982: 69).

At a certain point in the retreat from agricultural land, the minimum economic thresholds to maintain the structures necessary for agriculture, fail. Once contraction begins in the agricultural infrastructure (both physical and socio-economic) further contraction is inevitable. The spiral described by Myrdal is self-feeding. Once set in motion, the loss of services leads to the loss of some of the remaining viable farms. Costs to the remaining farms increase as services become more expensive. In turn this process accelerates the likelihood of the financial collapse of still more farms.

The Gaspé Peninsula is often cited as part of the retreating margin in eastern Canada (Lamoureux, 1985). In Gaspé between 1961 and 1976 there was an astounding 74% drop in the number of farms and a 52% loss in improved farmland (Lamoureux, 1985: 20). The losses in the Gaspé peninsula could be attributed to the desertion of economically marginal farmland of low agricultural capability partly encouraged by the provincial and federal governments under a joint regional development programme begun in the 1950s (Lamoureux, 1985: 66).

Advancing Frontier

Advancing frontiers usually connote prosperity and abundance. Advancing agriculture means the extension of the cultivated area by breaking new ground previously unused for agriculture in which hybrid crops play an important role. Advancing agriculture brings with it new opportunities and services that usually signifies a boom for newcomers who fill vacancies in the job market both within and outside of direct agricultural employment (Troughton, 1977). The advancing frontier of agriculture usually occurs during periods of relatively good markets that attract entrepreneurs to the challenge of farming.

The frontier advances into areas that are of lower agroclimatic capability than the agricultural heartland. In general the further the frontier advances the less desirable the agricultural attributes are. What were once frontier areas can attain a place within the heartland if improvements in infrastructure and capital infusion result in a consolidated and established community. These will only occur if the climate and other physical attributes are suitable. Even though suitably resistant and hardy crops are grown, a slight change in frost-free period or growing-degree days can severely affect the productivity of the advancing frontier or a newly consolidated agricultural community (McCuaig and Manning, 1982: 66, Simpson-Lewis et al., 1979).

In the Canadian context the agricultural frontier has recently advanced significantly in the Peace River region of Alberta and British Columbia, in spite of its harsh climate and relatively short growing season. It is possibly the best known and newest area opened to farming settlement, where significant additions to farmland are being made (McCuaig and Manning, 1982: 67). The Peace River region has between a 60 to 100 days growing season and an Agroclimatic Resource Index (a measure of potential agricultural productivity that is described later) which allows the growth of some new northern-hardy varieties of grain (Williams, 1975). During the period 1961 to 1976 this region experienced a 61% increase in the improved acreage of farmland, with 1,800,000 acres being added to the base of improved farmland (McCuaig and Manning, 1982: 67). There has been a 12% decrease in the number of farms through consolidation with average size increasing from 445 acres to 773 acres between 1961 and 1976 (McCuaig and Manning, 1982: 67).

Within the advancing margin there are the positive characteristics of expanded activity in agriculture, business, demand for services and products, as well as a population increase. There is a psychological component to this positive process, mainly in the perception of increasing opportunities which have a tendency to attract investment and entrepreneurs. This optimistic attitude or feeling in turn attracts new immigration, capital and services into the region (Beaujeu-Garnier, 1978; Jones and Eyles, 1979).

Research Traditions in Marginal Land Studies

Four broad approaches to the study of marginal agricultural lands are evident in the literature (Beattie et al., 1981:6). Many disciplines have conducted marginal land studies with each bringing a particular focus to the understanding of a complex problem. Major trends in the developments undertaken in the discipline of geography have influenced the methodology of marginal land studies. Although the geographic literature portrays four separate approaches to the study of agricultural marginalization these approaches are not mutually exclusive but overlap (Beattie et al., 1981: 6).

The earliest approach incorporated the concept of region, which had an old and historical tradition of fundamental importance to geographical thought. A region may best be defined as that portion of territory having certain characteristics enabling it to be recognizable as a unit, unique from other units surrounding it, which may themselves be identified by similar or different characteristic features (Grigg, 1965; Symons, 1972: 195)

A region may be defined in physical terms using climate, pedology, geology, or by a host of socio-economic criteria such as occupation, education or income. Historically, regional studies have concentrated on mostly physical aspects of marginality, especially the limits to the cultivation of

commercial crops (Francis, 1970; Symons, 1972: 89). The homogeneous region was extensively used in the promotion of the Canadian West as a boundless agricultural area during the periods of peak immigration. This no doubt had the unfortunate effect of creating the misconception that certain sub-standard agricultural regions were suitable settlement destinations (Beattie et al., 1981: 7; Mackintosh, 1934; Morton, 1938). From the historical perspective, the regional approach to the study of margins¹ agriculture provided a popular method of area classification (Morgan and Munton, 1971: 127).

Complementing the regional approach several authors have laid stress upon the cartographic tradition usually in the service of specific systematic interests such as climate and physiography. This tradition is epitomized by the Agroclimatic Resource Index (Chapter 2), a temperature-based index used to measure agricultural potential although many other indices have been developed for specific purposes such as the Corn Heat Unit.

Agricultural researchers have developed the Corn Heat Unit (CHU) as part of their investigations into the thermal requirements of corn. The CHU is a complex measure which makes use of both maximum and minimum temperature values. A CHU map will not only graphically portray the most productive areas in which to grow corn, but by extension, can be a vital indicator of the general productive potential of an agricultural region. Corn is now grown in many Ontario locations once considered too northerly by crop scientists and mapping its progress provides a record of the dynamic nature of agriculture (Hinman, 1986; Mangelsdorf, 1986).

Cartographic methods do not always include notions of region although the information can be used to this end and so too can the knowledge of

process garnered from those studying what might be labelled the historical-settlement approach.

The historical-settlement approach has proven itself useful to the study of marginality in agriculture. There is a great body of literature concerning the historical accounts of the settlement process pertaining to marginal lands. A landmark study which centred on the settlement approach to marginal agricultural land use was the sizable Canadian Frontiers of Settlement Series commissioned by the Dominion government in the 1930s (Dawson, 1934, 1936; Dawson and Young, 1940; Mackintosh, 1934; Morton, 1938). This series documented western settlement generally, the geographic setting, pioneering settlement, and pioneering of the northern prairies especially the Peace River Country. These studies with their emphasis on process add to the explanation not only of specific events but the process of marginalization. These studies can be further complemented as also can the regional and cartographic traditions by the quantitative approach.

The quantitative approach to the study of marginal agricultural has been advanced by the use of computers. The gradual introduction of computers in the 1960s capable of manipulating large data bases has partly resulted in the replacement of the qualitative-historical settlement studies in fashion up to that time (Beattie et al., 1981: 8).

Many of the sub-fields of geography expanded rapidly after the introduction of the computer. Socio-economic analysis was greatly expanded at this time and one of the first reports to come out of this new computer age was a study of the abandonment of Ontario's marginal farmland (Ontario Economic Council, 1966). Much of the research work carried on today concerning the problems of marginal agriculture is centred on the use of the

Census and provincial government statistics. It can be expected that the use of computers and census material will only increase in the study of agricultural change. Even though mathematics and statistics aid in a more succinct description of data, it is the integration of various approaches and concepts that has proven more important to this study.

For this reason, agricultural change on Manitoulin Island has been studied using an integrated view consisting of both variables and approach used. The choice of Manitoulin Island for this study and its comparison to defined regions in Ontario follows a regional approach. Cartographic methods were used to lend visual effect to trends developing within the Island itself. The settlement-descriptive approach was used to develop an overview of Manitoulin Island's place in the provincial scheme. Finally, the quantitative approach was employed to analyse Census data.

1.3 Structure of the Study

Subsequent chapters of this study have been organized in the following manner. Chapter 2 discusses the selection of study areas, their physical characteristics, the hypotheses, the data, and selection of variables. Chapter 3 contains the analysis of Census material from the study areas using land, labour, and capital variables. Graphical analysis was used to reveal trends in the comparison of Manitoulin Island to other areas. Chapter 4 reduces the scale of study to Manitoulin Island. Cartographic techniques were used to determine whether selected processes found to occur at the provincial level were in fact similar to those found within the Island itself. Chapter 5 contains a summary and conclusions and limitations of this study, including recommendations for further research into agricultural change.

CHAPTER 2

STUDY AREAS AND DATA

2.1 Selection of Study Areas

This study analyses change in the agriculture of Manitoulin Island by comparing it with selected areas of the province. The study of marginal agriculture cannot take place in a vacuum, because marginality is only a relative term. Therefore comparison with other regions is necessary if the actual changes to this Island's agriculture are to be fully appreciated.

Two areas were selected for comparison with Manitoulin Island; one that superficially at least was similar to it in terms of selected agro-economic and physical variables, and the other was different from it by virtue of belonging to the core agricultural heartland of the province. The reason for choosing an area similar to Manitoulin Island was to determine whether trends on the Island occurred in isolation or whether they were also occurring in counties with similar agricultural and physical characteristics *i.e.*, were the results or findings on Manitoulin Island repeated in physically similar regions or were they simply anomalous? The use of a comparison region with similar characteristics was to provide a control. The reason for choosing the core region for comparison was to determine how well the Island's agriculture fared in relation to the best farmland in the province.

The selection of study areas was accomplished by a cluster analysis of selected agro-economic variables. The variables used as part of the selection process were average farm sales, the ratio of improved to unimproved farmland, the percentage of farmers over 60 years old, the percentage of agricultural days devoted to off-farm work, and the average capital per

farm. These are important land, labour and capital variables often cited in the literature as key to measuring agricultural change (Beattie et al., 1981: 33). A great many variables could have been used in the selection of comparison areas but the above were felt adequate to obtain the relative positions of each of the counties. The data for these areas were obtained from the 1986 Canadian Census of Agriculture. Because of the necessity to work with Census data it was convenient to define the comparison groups in terms of Census Divisions (CDs).

The selection of the comparison groups was made using a hierarchical clustering analysis (using SPSS^X [Carleton University Computer Services]) of the province's CDs measured on the five selected variables listed above. The procedure starts with each of the 53 CDs in Ontario identified as separate entities and proceeds to cluster them together in steps, a pair at a time; the order in which CDs are clustered is a function of the similarity between them (Figure 2.1.1). Interest is focused on the final stages of clustering when the number of clusters is reduced to relatively few, ideally internally homogeneous, clusters. Eight groups was felt to give generalization without undue loss of detail based on within group error from the cluster analysis (Figure 2.1.1).

As previously mentioned, only two groups were initially relevant to this study, one similar to Manitoulin Island, and the other representing the "core" agricultural area of the province. Several counties belonging to the group similar to Manitoulin Island were deleted from study upon inspection of agro-physical features as described below. Certain counties were added to the "core" group by virtue of their superior agricultural potential based on physical and Census evidence.

Source: Base Map, University of Waterloo Map Library, 1981.

ONTARIO LOCATION OF COMPARISON AREAS

Southwestern Ontario

1. Essex	6. Oxford
2. Kent	7. Middlesex
3. Elgin	8. Huron
4. Haldimand-Norfolk	9. Perth
5. Brant	10. Waterloo

Eastern Ontario

11. Hastings
12. Lennox & Addington
13. Frontenac
14. Leeds
15. Grenville
16. Lanark
17. Renfrew

Map 2.1.1

The cluster analysis revealed the following CDs were similar to Manitoulin Island based on the five agro-economic variables: Grenville, Leeds, Lanark, Frontenac, Lennox and Addington, Hastings, Peterborough, Victoria, Muskoka, Haliburton, Renfrew, Parry Sound, Algoma, Rainy River and Kenora (Group 3, Table 2.1.1, and Figure 2.1.1).

Table 2.1.1-Summary of Cluster Analysis

Cluster Group	Census Divisions (Census Division Number)
1	Glengarry (1), Prescott (2), Stormont (4), Dundas (5), Ottawa-Carleton (6), Prince Edward (13), Northumberland (14), Durham (17), Dufferin (21), Wellington (22), Hamilton-Wentworth (24), Niagara (25), Lambton (34), Bruce (37), Grey (38), Simcoe (39), Nipissing (43), Sudbury District (46), Sudbury RM (47), Temiskaming (48), Cochrane (49), Thunder Bay (51)
2	Russell (3)
3	Grenville (7), Leeds (8), Lanark (9), Frontenac (10), Lennox & Addington (11), Hastings (12), Peterborough (15), Victoria (16), Muskoka (40), Haliburton (41), Renfrew (42), Parry Sound (44), Manitoulin (45), Algoma (50), Rainy River (52), Kenora (53)
4	York (18), Peel (20), Halton (23)
5	Metro Toronto (19)
6	Haldimand-Norfolk (26), Brant (27), Waterloo (28), Perth (29), Oxford (30), Elgin (31), Middlesex (35), Huron (36)
7	Kent (32)
8	Essex (33)

Source of Data: Census of Agriculture, (1986).

Physical criteria were used to ensure that the comparison groups determined on the basis of the cluster analysis were as nearly physically homogeneous internally as possible. A map of the ACRI for Ontario was consulted to determine how each CD fared on potential agricultural

productivity. The literature gave sufficient physiographic evidence to separate the CDs into broad categories based on soil depth, drainage, rocky outcrops, and relief (Section 2.3). Soil capabilities of the various CDs were determined using the Canada Land Inventory (CLI) (Section 2.4). This system ranks soils solely on their potential ability and limitations for agricultural use, based on seven classes.

Certain of those CDs that grouped with Manitoulin Island in the cluster analysis on the basis of the five previously mentioned variables were omitted from study for legitimate reasons. Victoria, Peterborough, and Haliburton had numerous boundary changes over the 1951-1986 period of this study. It was next to impossible to predict how these boundary changes would affect the analysis of census material. So the decision was made to delete them from study. The Districts of Muskoka and Parry Sound, even though they were grouped with Manitoulin Island, were deleted from the study. Given their very low levels of agricultural activity were very small absolute changes would lead to quite large percentage changes (Census of Agriculture, 1986). The Districts of Kenora, Rainy River, and Algoma were deleted from study because of their low Agroclimatic Resource Index value which indicated potential agricultural productivity per unit area lower than Manitoulin Island. The remaining Census Divisions in the comparison group were Grenville, Leeds, Lanark, Frontenac, Lennox & Addington, Hastings, and Renfrew. Eastern Ontario was the name given to this group of CDs considered similar to Manitoulin Island (Map 2.1.1).

As anticipated, there were a number of CDs in southwestern Ontario that clustered together making up the comparison area considered to be part of the prime agricultural lands in the province. The CDs that belong to this group were: Haldimand-Norfolk, Brant, Waterloo, Perth, Oxford, Elgin,

Middlesex, and Huron (Group 6, Table 2.1.1, and Figure 2.1.1). The CDs of Essex and Kent did not cluster with Group 6 at this stage of grouping but evidence found in the Census of Agriculture (1986) and the ACRI confirmed an agricultural potential even greater than the CDs of Group 6 (Table 2.1.1). Essex and Kent are definitely part of Ontario's prime agricultural lands and consequently they were included in this comparison group. The CDs making up the area unlike Manitoulin Island based on their superior agriculture are: Haldimand-Norfolk, Brant, Waterloo, Perth, Oxford, Elgin, Middlesex, Huron, Kent, and Essex. This group will be known as southwestern Ontario.

2.2 Climatic Characteristics of the Study Areas

Agriculture is a primary industry that is highly dependent on the physical environment for its long-term prosperity and survival. In this section, details of the physical environment for Manitoulin Island and the two comparison areas will be divided into three parts; the climate, the physiography and soil capability of the Canada Land Inventory. The physical environment is described to provide an appreciation of the special requirements and problems of agriculture.

Climate is a major influence on agriculture with the farmer exerting no real control over it. The farmer must be content to mitigate its most severe influences. The farm operator's ability to lessen the severity of the climate is basically reduced to irrigating dry fields provided water is available, employing selective cropping practices, and sowing hardy, climate-resistant crops. Crops must be physically suited to the environment, especially in a location with a difficult climate, before any thought can be given to commercial agriculture.

Two of the most important parameters used to describe climate are precipitation and temperature. The interactions between these two parameters in relation to plant growth are extremely complex and variable. For the purposes of this study, an index will be employed which describes the variation imposed by temperature-related variables only.

The index developed by Williams (1975) is called the Agroclimatic Resource Index (ACRI) which is based both on the length of the frost-free period and growing degree days. The length of the frost-free season is defined as the number of days between the last frost in spring and the first frost in the fall. Growth of most plants is usually restricted to this period. The longer the frost-free season, the more potentially valuable the area is for agriculture all other things being equal. Growing degree days are defined as each degree Celsius above a daily mean threshold temperature needed to grow a certain crop and are incorporated in the index to make adjustment for areas with long frost-free seasons with insufficient summer heat for crop maturation (Trewartha and Horn, 1980: 201; Williams, 1975). Williams used the shortest frost-free period (60 days) to be found on the 1:5,000,000 normal frost-free season map of Canada and then calculated the remaining frost-free zones of the country to be a multiple of this number (Simpson-Lewis, 1979: 15). The result was an index that became a multiple of the shortest frost-free period which greatly eased the comparison of agricultural regions.

There is a close approximation between the theoretical numbers generated for the ACRI map and actual values of hay production. Hay was used to test the accuracy or values of the ACRI because of its widespread use in Canada as a forage crop (Williams, 1975). Its hardy character inevitably resulted in its use in all agricultural regions of the country. Those regions

Sources of Data: Agroclimatic Resource Index, G. D. V. Williams, Agriculture Canada, 1975.
Base Map, University of Waterloo Map Library, 1981.

ONTARIO

AGROCLIMATIC RESOURCE INDEX

ACRI Value

1.0

1.5

2.0

2.5

3.0

critical agroclimatic
resource areas

Agroclimatic Resource Isolines

* Note positions of Agroclimatic Resource
Index isopleths are approximate only.

Map 2.2.1

with a lower ACRI than the datum of 3.0 for Essex County were compared to see if the observed value of hay produced was proportionate to this value on the index. From an agroclimatic standpoint, then, a location with an ACRI value of 3.0 should be considered twice as physically productive as an area with an ACRI of 1.5 (Simpson-Lewis, 1979: 16).

The ACRI can be used to compare the significance of agricultural land lost through urban encroachment and abandonment of agricultural land. As well, the benefits to agriculture made through the breaking of new ground can be assessed vis à vis their effectiveness in replacing land passing out of agricultural production as it is now possible to quantify the losses and gains on a physical productivity basis.

A comparison of the ACRI for different parts of the province provides a rapid means of comparing potential agricultural productivity. The ACRI for Manitoulin Island is between 2.0 to 2.5 and that for southwestern Ontario varies between just under 2.5 and 3.0 (Map 2.2.1). Eastern Ontario has an ACRI between 2.0 to greater than 2.5 (Simpson-Lewis, 1979: 17). Thus, the agricultural potential of southwestern Ontario from an agroclimatic point of view is up to 50 percent greater than Manitoulin Island and Eastern Ontario. This greater potential says nothing about differences in socio-economic opportunities, but rather is strictly concerned with physical potential as revealed by the length of the frost-free season which is an important controlling factor in Ontario agriculture.

The climate of Ontario is considered by many climatologists to have an unusually reliable precipitation regime, and there are seldom either markedly long dry or long wet spells (Hare, 1979; Trewartha, 1980). Mean annual precipitation in the Great Lakes region of Ontario ranges from 31.5 to 39.4 inches, with at least 130 days per year with measurable precipitation

(Hare, 1979: 28). Therefore, generally speaking, the Great Lakes region of Ontario which contains Manitoulin Island as well as southwestern and eastern Ontario receives adequate precipitation for agricultural purposes during the frost-free season. The limiting agricultural factor in Ontario as far as climate is concerned is the length of the frost-free season, and not precipitation.

2.3 Physiographic Influences on Agriculture

While physiographic influences on agriculture appear great, farmers can utilize certain strategies to cope with and lessen the effects of poor drainage, soil composition and slope. The physiography of the agricultural regions of Ontario is important to the understanding of agricultural productivity. Although Manitoulin Island, southwestern and eastern Ontario share certain physiographic characteristics they nevertheless contrast in significant ways. These physiographic characteristics contribute significantly to the state of agriculture found today in each of the three regions.

Manitoulin Island falls into one physiographic region. The seven counties of eastern Ontario are divided into the following physiographic regions: pre-Cambrian upland, moraines and drumlins, limestone plain and clay plain (Map 2.3.1). The ten counties and Regional Municipalities of southwestern Ontario are divided into: clay plain, sand plain, till plain, and moraine (Map 2.3.2).

Sources of Data: The physiography of Southern Ontario. Chapman and Putnam, 1984.
Base Map, University of Waterloo Map Library, 1981.

EASTERN ONTARIO **PHYSIOGRAPHIC REGIONS**

Physiographic regions

- Pre-Cambrian Upland
- Moraines and drumlins
- Limestone Plain
- Clay Plain

Sources of Data: The physiography of Southern Ontario. Chapman and Putnam, 1984.
Base Map, University of Waterloo Map Library, 1981.

SOUTHWESTERN ONTARIO **PHYSIOGRAPHIC REGIONS**

Physiographic regions

- Clay Plain
- Sand Plain
- Till Plain
- Moreine (Till)

Manitoulin Island forms part of the Niagara cuesta that begins in the Niagara Peninsula and extends to northern Michigan (Chapman and Putnam, 1966: 270). Dolostone covers the southern two-thirds of the Island, while the northern margin of this formation can be seen as perpendicular cliffs reaching a height 500 feet above the level of Lake Huron, but overall relief is gentle (Chapman and Putnam, 1966: 271).

Little of the area of Manitoulin Island is covered by deep drift as substantial areas of the bedrock were washed clean of any overburden by the waves of glacial Lake Algonquin resulting in sediment accumulation in the depressions (Hoffman and Wicklund, 1959: 14). A large part of the Island consists of scoured rock plains that are flat and covered with only a few inches of soil and strewn with large boulders and rubble (Hoffman and Wicklund, 1959: 15). The largest expanses of fine sand, silt, or clay can be found in the central part of the Island.

Drainage is a problem on Manitoulin Island as many areas are imperfectly or poorly drained (Hoffman and Wicklund, 1966: 19). From an agricultural point of view, by far the most obvious and most important characteristic of the Island soil cover is its superficiality. Almost two-thirds of the Island, most of it classed as the Farmington soil group, is too shallow for cultivation and is suitable only for forest or rough pasture (Chapman and Putnam, 1966: 273).

The counties of eastern Ontario share many physical similarities with Manitoulin Island. There are four physiographic regions (Map 2.3.1). The largest region is the rugged pre-Cambrian upland. The bedrock of this region consists primarily of granite and other pre-Cambrian rocks (Chapman and Putnam, 1966: 338). The shallow soils of this region tend to be acidic,

stony and sandy, and therefore of limited value to agriculture. The bedrock and surficial geology create a drainage pattern that is somewhat aimless with frequent bogs and swamps present. Such poor drainage is detrimental to agriculture (Gillespie and Wicklund, 1964: 9).

The limestone plains are located on the southern and eastern margins of the eastern Ontario counties (Map 2.3.1). This area is a relatively flat plain of limestone devoid of overburden for the most part (Gillespie et al., 1968: 9). Relief tends to be gentle and overall gradients slight, resulting in large swampy areas of ground. Soils tend to be shallow with great variety from clays to clay loams to stony (Chapman and Putnam, 1966: 338). Soils tend to be too wet in spring and too dry in the summer because of their general shallowness, which taxes agricultural productivity (Gillespie et al., 1968: 9). Agriculture is mainly found in the southern part of the limestone plain where till deposits are much deeper than those of the pre-Cambrian north (Gillespie et al., 1968: 11; Chapman and Putnam, 1966: 317).

The glacial till region consists of limestone bedrock covered in overburden made up of drumlins and moraines. This region lies between the limestone plain to the south and the pre-Cambrian region to the north (Chapman and Putnam, 1966: 313). The drift varies greatly in depth from north to south. Where drainage is less than adequate there are many lakes and swamps created between deposits of glacial drift. Agriculture is found predominantly on the higher well drained sections of this region.

The clay plains consist of clay flats interrupted by ridges of sand and rock with few swamps (Gillespie, et al., 1964: 9). This region constitutes a lowland of extensive level clay plains that extend intermittently from northwest to southeast (Map 2.3.1). Agriculture is found almost exclusively on the clay plains where drainage is better and the soil is deeper especially

when compared to the pre-Cambrian uplands found to the west (Map 2.3.1). The clay plain has a more favourable ACRI than much of the pre-Cambrian uplands (Map 2.2.1).

The first physiographic region of southwestern Ontario to be discussed consists of widely distributed clay landforms. This region is known as the clay plain (Map 2.3.2). Clay soils in this area are inherently fertile but poor drainage must be overcome artificially if agriculture is to prosper (Chapman and Putnam, 1966: 240). Although there are minor variations in elevation across this region, relatively minor changes do have a marked effect on the growth of vegetation and soil drainage. Throughout this clay region deep overburden covers the bedrock (Chapman and Putnam, 1966: 240).

The sand plain is an amalgamation of sub-regions in south-central Ontario which share similar characteristics including irregularities such as moraines and clay deposits (Map 2.3.2) (Chapman and Putnam, 1984: 251). Soils of the sand plain range from fine sandy loam to deep sands and good drainage. There is a tendency for soils to be of low agricultural quality unless tile drainage is installed for agriculture. Where drainage is generally not a problem, the soils have a tendency to erode once the organic layer has become exhausted, with serious consequences for agriculture.

The next physiographic region of southwestern Ontario to be discussed is the till plain which is an upland surface occupying a number of unconnected areas in the north-central part of the study area (Map 2.3.2) (Chapman and Putnam, 1966: 210). There are locational variations in the clay and silt makeup of the till as well as in its stoniness (Wicklund and Richards, 1961: 11). Development of the till plain soils under a hardwood forest complex has left favourable soil conditions. Overall the slopes are gentle, with good drainage, medium textured soil, advantageous pHs, and an

absence of stoniness which have all contributed to the high quality of these soils. Sub-surface deposits of lime together with a lack of stoniness have resulted in soil of good natural fertility that is easy to cultivate. The entire till plain contains some of the best agricultural soils in Ontario (Chapman and Putnam, 1984: 210).

The morainic regions of southwestern Ontario consist of a ridge and valley landscape with morainic ridges consisting of calcareous clay or silty clay, with the valleys typically containing alluvium of gravel, sand or silt (Wicklund and Richards, 1961: 10). Proper drainage and aeration of the soil greatly increases the value of ridge farms over those located on the poorer-drained soils of the valleys. Valley soils can be improved with tile drainage that increases warmth (wet soils tend to heat up less) and aeration (Chapman and Putnam, 1984: 234; Matthews and Richards, 1957: 10).

2.4 Soil Capability for Agriculture

The Canada Land Inventory (CLI) is a classification of soil capability for agricultural purposes made from soil survey data (Environment Canada, 1972). With such knowledge the quantity and quality of agriculturally valuable soils can be compared in different regions. The loss of valuable soils can also be gauged. Higher classes of agricultural soils tend to be found in conjunction with favourable climate *i.e.*, long growing season and milder winters.

The soil capability classification system adopted by the Canada Land Inventory (CLI) is an interpretive grouping of soil types based upon an evaluation of the physical conditions of the soil that influence agricultural land use (Reeds, 1972). In this classification the mineral soils are grouped into seven classes according to their potential and limitations for agricultural use. Table 2.4.1 gives an abridged description of the CLI soil classification.

Table 2.4.1-Canada Land Inventory. Soil Capability Classes

Class 1- no significant limitations in use for crops.

Class 2-moderate limitations that restrict the range of crops or require moderate conservation practices.

Class 3-moderately severe limitations that restrict the range of crops or require special conservation practices.

Class 4-severe limitations that restrict the range of crops or require special conservation practices or both.

Class 5-very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible.

Class 6-capable only of producing perennial forage crops, and improvement practices are not feasible.

Class 7-no capability for arable culture or permanent pasture.

Source: Environment Canada, (1972).

Under the CLI, soils have been classified according to the limitations each places on sustained agricultural production. The first three classes are considered capable of sustaining production of common cultivated crops, the fourth is marginal for sustained arable culture, the fifth is capable of use only for permanent pasture and hay, the sixth is capable of use only for wild pasture, while the seventh class is for soils and land types (including rock outcrops and small unmappable bodies of water) considered incapable of use for arable culture or permanent pasture (Environment Canada, 1972). Even

though soils in classes 1-3 are suitable to cultivated crops, they also lend themselves well to permanent pasture suitable for forage.

In general the highest classes of soil (classes 1-3) are better drained medium-and heavy-textured soils that will produce high yields of most common field crops. Climatic limitations are not considered in the main classification scheme of soils under the CLI, though they are part of the sub-classification given concerning certain kinds of limitations (Environment Canada, 1972).

It is reasonable to expect that all other things being equal, the greater the area of high quality soils (classes 1-3) the more important the agricultural industry of an area. Miller and Hoffman (1970) have published tables showing the acreages in each capability class for the counties of Ontario. Table 2.4.2 lists the percentage of the total area contained within capability classes 1-3 for each county in the southwestern Ontario comparison group.

Table 2.4.2-Percent Total Area In Capability Classes 1-3 (S.W. Ont.)

Essex-----	93	Oxford -----	93
Kent-----	96	Middlesex -----	92
Elgin -----	85	Huron-----	86
Haldimand-Norfolk ---	60	Perth -----	91
Brant-----	81	Waterloo-----	64

Sources of Data: Canada Land Inventory, (1966); Miller and Hoffman, (1970).

The counties of southwestern Ontario have approximately 85% (weighted average) of their total surface area within the CLI classes 1-3. This concentration of highly productive agricultural soils largely explains southwestern Ontario's pre-eminent position in provincial agriculture which

stands in sharp contrast to the situation found on Manitoulin Island. As a result of physiography and climate on Manitoulin Island, only 16% of the total land area is included within soil classes 1-3 (Hoffman and Noble, 1975: 5).

The percentage of soils in classes 1-3 found in the counties of the eastern Ontario comparison group are listed in Table 2.4.3. When taken as a group, only 16.2% (weighted average) of the total area of the seven eastern Ontario counties fall within soil classes 1-3. The fact that Manitoulin Island and the eastern Ontario counties both have similar percentages of high capability farmland further underlines the value of using eastern Ontario as a physically similar area to compare with Manitoulin Island.

Table 2.4.3-Percent Total Area In Capability Classes 1-3 (E. Ont.)

Grenville -----	50	Leeds -----	22
Frontenac -----	11	Lennox & Addington----	19
Hastings-----	16	Renfrew -----	12
Lanark -----	15		

Sources of Data: Canada Land Inventory, (1966); Miller and Hoffman, (1970).

Agricultural potential in the three study areas is influenced to a great extent by the combination of physical factors of climate, physiography, and soil capability. Manitoulin Island has been shown to have climatic and soil constraints imposed on its agriculture (as measured by the ACRI, the rather shallow and stony soils, and finally by the low percentage of class 1-3 soil as measured by the CLI). These are only physical indicators of agricultural potential and say nothing about the social and economic influences affecting Manitoulin Island.

Eastern Ontario is similar to Manitoulin Island in the poor physical resources it has for agricultural purposes. The influence of the climate as measured by the ACRI is only slightly better than Manitoulin Island's but not as favourable as southwestern Ontario. The agricultural problems of eastern Ontario stem partly from shallow soils of low natural fertility, and poor drainage. Eastern Ontario and Manitoulin Island have the same low percentage of their total areas in CLI soil classes 1-3, indicating generally poor agricultural soils. Eastern Ontario has only slightly better physical resources for agriculture than does Manitoulin Island. So eastern Ontario is expected to show similar agricultural characteristics but because it does not suffer from the spatial isolation of Manitoulin it is expected to have a slightly improved position compared to the Island.

It has been shown that the southwestern Ontario comparison area has the best physical resources in the province for agriculture. The climate of this area is the best in the province according to the ACRI which predicts a sizeable contribution to provincial agriculture. Soils are deep and fertile, and drainage problems tend to be somewhat localized.

2.5 Hypotheses of Study

This study investigates the nature of farm change using selected land, labour and capital/economic and community infrastructure variables. Several broad research questions/hypotheses will be investigated. Hypothesis A - Absolute agricultural decline is expected on Manitoulin Island over the study period given the poor physical resources and spatial isolation. Hypothesis B - The decline of Manitoulin Island agriculture relative to southwestern Ontario is expected, as demonstrated by the increased localization or "shift" of agricultural activity to the more

advantaged areas of southwestern Ontario. Hypothesis C - Agricultural decline within Manitoulin Island is predicted to be uneven *i.e.*, greater in more marginal and isolated areas of the Island than in "core" Island areas.

Many specific hypotheses identified in section 2.7 are divided into broad categories of land, labour, and capital/economic and community infrastructure. An explanation is given detailing what each hypothesis or variable is expected to demonstrate prior to testing with actual data from the study regions in Chapter 3. A selection of the variables described in section 2.7 will also be used in Chapter 4 to determine the degree of uneven decline suspected within Manitoulin Island agriculture.

2.6 Data Sources

Information for this study has been acquired from several sources. Much of the statistical data have been acquired from Statistics Canada (Censuses of Agriculture: 1951, 1961, 1971, 1981, 1986) and to a lesser degree from Agriculture Canada and other federal and provincial ministries. The Census of Agriculture was used extensively as a data source to test the validity of hypotheses of change in agricultural activity based on the literature. The literature itself was a major source of data containing information not usually found in the Census.

In addition to information from the Census of Agriculture and from the literature, a survey of individual farm operators on Manitoulin Island was conducted to provide current and timely data that are otherwise unobtainable from the literature and Census material alone. The sampling frame consisted of a list of 220 farmers (out of a total of 331 census farms on the Island) given to the author by the Manitoulin Island Livestock Cooperative of Gore Bay. A sample of 30 farmers was used for the survey as

this represents the minimum number required for small samples in keeping with proper survey techniques (Hammond and McCullagh, 1978: 149; Sheskin, 1985). A random number table was consulted to determine the sample members for the survey. A telephone survey was the chosen method of conducting this survey as the response rate is usually high, and this method is time - and cost - effective compared to alternative methods (Sheskin, 1985: 22). The telephone survey was conducted in the evenings during the month of March when farmers would most likely be available. The subject matter of the survey is divided into sections which can be broadly defined as farmland composition, farm labour patterns, agricultural and social services available, financial services used, and transportation and marketing of agricultural products (Appendix 5). The results of survey questions have been tabulated in Appendix 6.

2.7 Variables Employed

This study uses an integrated approach to examine the hypothesized decline of agriculture on Manitoulin Island from 1951-1986. The agro-economic variables selected for study fall broadly under the headings of land, labour, and capital/economic and community infrastructure (Table 2.7.1). These variables were deemed important to the determination of agricultural marginalization or decline according to the International Geographic Union's typology of agriculture (Beattie et al., 1981: 33).

Table 2.7.1 Agro-Economic Variables

Variables**Land**

Farm Size
 Fragmentation
 Percent improved land
 Land value

Labour

Age of farmer
 Education, useful skills
 Expectations
 Part-time, Full-time
 Productivity

Capital/Economic and Community Infrastructure

Income, standard of living
 Mechanization
 Agricultural Services
 Credit Sources
 Social-Community Services
 Transportation and Marketing

Source: Beattie et al., (1981: 33).

The literature has suggested what trends to expect in each of the variables in marginal agricultural areas. The hypothesized changes in the variables presented here were tested in Chapter 3 with actual data from the study areas. Each variable will measure the general level of agriculture on Manitoulin Island compared to the other study areas and to determine what the direction of this change means. Even though eastern Ontario and Manitoulin Island belong to the same group in the cluster analysis it is expected that the Island will exhibit even lower levels of agricultural activity because it suffers relatively greater spatial isolation from centres of population.

Land variables include farm size, the total number of farms, the total area of farmland, fragmentation, the percentage of improved farmland, and

land value. In general, larger farms are expected to be found on poorer farmland, as more land is needed when overall quality is low just to ensure enough workable acres (Beattie et al., 1981). Based on land quality it is expected that Manitoulin Island will have the greatest increase in farm size both in absolute and relative terms followed by eastern Ontario and lastly southwestern Ontario.

Under the pressure of rising input costs, increased levels of mechanization, changing markets and fluctuating prices, farmers in Ontario have used a strategy of increasing the size of their land holdings in order to rationalize the use of machinery and infrastructure to remain competitive (Mandale, 1984). Farm size (related to total number of farms and total area of farmland) usually increases in a favourable economic climate, and unless income rises by an amount greater than the cost of additional acreage there is no point expanding (Symons, 1972: 77). Much of this enlargement of land holdings had come about through both purchase and leasing or renting of land. Renting land became one strategy farmers employed to expand their operations without having to incur the added burden of debt by purchasing this land outright (Ilbery, 1985: 104). Mandale's (1984: 92) study of Kent County, New Brunswick, found that many farmers were unable to expand their operations through the purchase of idle land because of a reluctance by owners to sell. This reluctance to sell idle land produced a fragmented pattern of land ownership as those parcels of newly acquired land were often not adjacent to the central farm.

It seems that farmers have been forced to rent isolated parcels in different parts of the western world including Scotland (Clark, 1979) and North America (Carlyle, 1983). Fragmentation of farms is a direct response to modern agricultural technology and advancement. The economies of scale

which might be obtained from such an arrangement have to be matched against the diseconomies of distance of isolated parcels.

Fragmentation is a factor linked closely to size, and is an important issue in the economic development of many regions. The rearrangement of farm boundaries might indicate the establishment of more efficient units, and in many cases the consolidation of holdings into larger and more economic farms is encouraged by large farm machinery (Bradley and Beaulieu, 1973; Raymond and Rayburn, 1963; Symons, 1972). It is expected that in both absolute and relative terms fragmentation will be highest in southwestern Ontario and lowest on Manitoulin Island although because of the discontinuous nature good agricultural soils on the latter and the high cost of farmland in the former (sections 2.3 and 2.4). Even though there is a discrepancy in the fact that both high farmland costs and patchiness of soils both translate into higher levels of fragmentation, this variable nonetheless can provide some useful insight into agricultural change.

Improved farmland is land which has been altered in some way such that its agricultural productivity has been increased. The process of farmland improvement can be as involved as installing drainage tiles on wet land or as mundane as clearing boulders from a field. Unimproved land refers to land recorded by the Census of Agriculture as part of total farmland area, but on which no work has been undertaken to boost productivity; it includes farm woodland, wetland, and rough pasture. Unimproved land usually has soil of low quality.

The percentage of farmland that is improved is of vital importance to the determination of agricultural marginality. Increases in improved land can be thought of as a barometer of progressively managed farmland. Gains in improved land indicate an intensification of land use that is usually

accompanied by productivity gains (Mandale, 1984; McCuaig and Manning, 1982). In both absolute and relative terms Manitoulin Island is expected to have the smallest increase in the level of improved land with southwestern Ontario having the highest percentage.

There are two factors influencing farmland values: expected farm income and anticipated returns for non-farm use (McCuaig and Manning, 1982: 39). Cycles of higher land prices encourage farmers to intensify the use of their land, either by intensive cultivation or by the transformation of their land to non-farm uses that are more remunerative (Symons, 1972). Anything that raises the value of farmland, leaves farmers with the difficult decision of selling the farm or making the required improvements for increased intensification, "thereby justifying the use of high value land for agriculture" (Troughton, 1981: 180).

The presence of larger urban centres has affected the value of agricultural land in southwestern Ontario. Additionally, the physical benefits enjoyed by this region of the province, together with a large potential urban market, place upward pressure on the value of agricultural land. This makes land much more expensive to acquire than in other areas of the province. The ACRI and CLI both point to the overwhelming physical and natural advantage of southwestern Ontario over both Manitoulin Island and eastern Ontario. The agricultural value of land in southwestern Ontario would be expected to be higher than in Manitoulin Island but the urban demands result in widening the gap even further. Manitoulin Island is expected to have the smallest increase in the value farmland followed by eastern Ontario, with southwestern Ontario having the highest value farmland. The gap is expected to widen both absolutely and relatively between Manitoulin

Island and southwestern Ontario signifying increasing marginality in the former.

The following group of variables is concerned with the characteristics of the farm labour force. The persistence of marginal farming is at least in part due to the failure of human resources to respond appropriately to the disadvantages imposed by marginal environments be they social, economic or physical (Troughton, 1977).

The older the average age of operators in a region the more likely it is that there is a "fading interest and stake in agriculture" (Beattie et al., 1981: 21). An increased aging of farm operators was found to exist by Lamoureux (1985) in a study of retreating agriculture in the Gaspé region of Québec. In Mandale's (1984) marginal land utilization study of Kent County, New Brunswick, it was similarly found that the average age of farmers was increasing at a greater rate than in the province as a whole. The failure to attract or keep young potential farmers reflects the better prospects in off farm occupations (Beaujeu-Garnier, 1978; Manning and McCuaig, 1982). This can be explained as an inability to attract "new blood" to farming. As well as an older average age of operator, the trend toward increasing average age of operators will be interpreted as an indication of an agricultural region in decline. Manitoulin Island and eastern Ontario are expected to undergo an increase in the relative percentage of its farmers 60 years old and over with southwestern Ontario having the smallest percentage. The reverse situation is expected for the percentage of farmers under 25 years old. Absolute change is difficult to assess as there has been a decline in the number of farmers in each region over the study period.

Education is vitally important to the long-term success of the farm operation. Lamoureux's (1985) study of declining agriculture in the Gaspé

and Mandale's (1984) study of land utilization in Kent County, New Brunswick, both indicate the value of education in improving the farmer's judgement and ability to run a successful operation. A negative aspect of education is the tendency of those with education to leave the farm for work in rural non-agricultural and urban occupations (Beaujeu-Garnier, 1978). Low education levels often force farmers to stay attached to the land as there is little else they are qualified to do off the farm even if there is a desire to leave (Troughton, 1977). The use that farmers make of new advances in agricultural research can be seen as part of a technology transfer process (Mandale, 1984). In relative terms it is expected that the level of education will be highest in southwestern Ontario, followed by eastern Ontario, and lastly, by Manitoulin Island. The Island's spatial isolation and small size provide the justification for this prediction. Absolute change does not provide useful information in this context because the total number of farmers has fallen drastically in all regions of this study.

The expectations of the farmer can heavily influence his actions and goals. Thus the decision-making behaviour of farmers can be viewed as a reflection of a wide range of goals, from family security, and a satisfactory income to belonging of the farming community (Gasson, 1973; Ilbery, 1985). In the past, farmers operating on the agricultural margin tended to have very strong feelings of community and rural values, which have been linked to low economic expectations, as well as a reluctance to change (Beattie et al., 1981; Ilbery, 1985; Symons, 1972). Farmers in the core tended to exhibit similar strong attachment to place, but they had rising expectations and a desire for a good life (Beaujeu-Garnier, 1978). There is not likely to be much difference in the study regions of today as far as farmers expectations are concerned, as all want the trappings of a modern life (Ricour-Singh, 1981: 7).

Part-time farming is on the increase across Canada, but historically it has been greatest in marginal regions where off-farm work is at its highest (Troughton, 1977). It is reasonable to anticipate a trend towards part-time farming in marginal areas as the securing of off-farm work has been characterized as an attempt by farmers to supplement a faltering operation (Beattie, et al., 1981; Lamoureux, 1985).

Farmers in the past usually had many skills other than farming and routinely performed jobs in and around their communities. With the long dormant period that winter brings to Ontario, much time was left on farmers' hands, especially those not involved in livestock production. Off-farm work during this slack time was often used as a means to make ends meet especially when times were tough on the land (Lamoureux, 1985). The percentage of farmers who work full time on the farm can be used as an indication of agricultural health (McCuaig and Manning, 1982; Morgan and Munton, 1971). In absolute and relative terms there is expected to be a increasingly higher incidence of part-time farming on Manitoulin Island with southwestern Ontario having the lowest overall level.

Underemployment generally, and not only in farming specifically, is a major problem in declining agricultural areas where jobs have a tendency to be created in resource-based industries, such as forestry and mining. Resource-based jobs are often seasonal and prone to layoffs, often leaving the workers with a less-than-steady employment record (Lamoureux, 1985; Mandale, 1984). Underemployment is often a feature of farm work, where much of the year can be devoted to the pursuit of non-farm work as a way to supplement inadequate farm income. Even though part-time farming is predicted to be higher on the Island, it is also expected that the ability of farmers to find off-farm work will also be diminished due to the small size

of the Island's population and its isolation from larger urban centres and the employment they generate. A decline is predicted over the study period in the off-farm work available to farmers on Manitoulin Island both in absolute and relative terms compared to the other study regions because it is expected that a greater potential for finding off-farm work exists in the core agricultural area. Thus, the level of off-farm work can be used as an indication of the success part-time farmers have in securing alternate income needed to keep their farms afloat.

In his study of Kent County, New Brunswick, Mandale (1984: 115) found that labour was in short supply, chiefly because of long hours, and an inability of farmers to pay reasonable wages, and an absence of personnel skills of the farmer. Family labour has gradually been supplanted by hired labour over the last few decades in Kent County, but this labour supply has generally been inadequate to meet demand. Lack of farm labour or the inability to attract it has been cited as a possible factor affecting "those farmers struggling to establish and nurture a commercial operation, and in this respect, it has played a role in speeding the abandonment of farmland in Kent County" (Mandale, 1984: 115). The ability to hire off-farm labour is related to full and part-time farming. Full-time farmers are expected to be in a position to hire more off-farm labour than are part-time farmers who are often financially strapped and struggling to keep the farm operational. It is expected that southwestern Ontario will have the largest absolute and relative increase in level of hired labour with Manitoulin Island and eastern Ontario lagging behind.

Productivity can be measured in a variety of ways. Morgan and Munton (1971: 40) indicate that "to assess productivity properly accurate flows of energy and movement of matter within the system have to be

measured, not an easy task even within simple agricultural systems". In a study of Sweden's agricultural productivity Wolpert (1964: 541) was concerned with determining the "single most profitable combination of enterprises that is within the resource limitations, e.g., the potential productivity which the individual farmer could attain if his goal were optimization and his knowledge perfect". Actual productivity is simply the net return to the farmer's labour (Ilbery, 1985: 104). It is predicted that the absolute and relative percentage of provincial gross returns per farmer and per acre of farmland will be increasing at a much faster rate in southwestern Ontario than either Manitoulin Island or eastern Ontario.

The subsequent variables have been placed under the heading of capital/economic and community infrastructure. Capital is a key element in the production function of any business and in agriculture it has been replacing land and labour in importance as measured by the increasing level of mechanization per farm as well as other capital inputs. The expanded role of capital has been interpreted as the "farmers' response to rising costs of land and labour, due to increased competition for their use, and the relative cheapness of machinery, fertilizers and other capital investments, which have remained low in price because of technological innovations and economies of scale in manufacturing" (Ilbery, 1985: 106).

Income is one of the most important capital variables covered in this study. A region's dwindling percentage contribution to total provincial agricultural income indicates relative agricultural decline. The maintenance of a farming region's percentage contribution to total provincial income over a period of years indicates that its farms have not been in a state of relative decline, while an increasing trend would indicate that the region is improving its relative agricultural performance. It is predicted that

Manitoulin Island's absolute and relative contribution to total provincial agricultural income will decline over the study period, compared to the increase expected in the contribution of southwestern Ontario.

The rate of mechanization is one of the important components of capital investment in agriculture, the others being land/buildings, and livestock. Mechanization is the rate of investment in machinery used in the production of agricultural commodities. There is a relationship between high levels of mechanization on prosperous farmland and a consequent lack of it in areas of stagnation or decline (Beattie et al., 1981: 22).

In general there is expected to be a positive relationship between the level of credit available and the rate of mechanization. It has been found that the farming of marginal lands continues to be accomplished using relatively high inputs of manual labour and low investments in mechanization and improved management practices (Beattie, et al., 1981, Troughton, 1977). Mandale (1984) found that Kent County, New Brunswick, suffered from economic performance below the Maritime average because it lagged behind in average mechanization per farm. The rate of mechanization is related to the intensity with which the land is worked. The use of the latest machinery and the most up-to-date materials and methods has become the hallmark of modern farming, and in some ways, necessary for agricultural survival (Lamoureux, 1985; Mandale, 1984). It is hypothesized that the rate of mechanization will be increasing at a much greater rate both in absolute and relative terms for southwestern Ontario than in either Manitoulin Island or eastern Ontario.

Myrdal's (1957) circular and cumulative causation can be used to illustrate the decline of agricultural infrastructure. A faltering region plagued by "out-migration of human and capital resources from the

agricultural margins escalates rural decline" (Beattie et al., 1981: 24). The failure of farms leads to a decreasing demand for a variety of services such as farm equipment, seed supplies, veterinarian services, fertilizers and sprays, transportation and service stations as well as many others (Parson, 1977). The time is reached when agricultural support services have been pared down to such an extent that those farms remaining have a tendency to failure and this in turn hastens the few remaining support services to falter as well in a downward spiral (Beaujeu-Garnier, 1978; Myrdal, 1957; Parson, 1977). Southwestern Ontario is predicted to have the highest level of agricultural services over the study period increasing both absolutely and relatively with eastern Ontario coming second and Manitoulin Island lagging behind. This prediction is made on the basis of the Island's relative isolation from larger populated centres which enhances its marginal nature.

Credit and financial services are necessary if a farmer is to operate with reasonable efficiency, as he must have sufficient free capital to invest in fixed and movable equipment for his operation. The capitalization rate per improved acre of farmland in the core agricultural areas is expected to be much higher than on the margins. To develop his enterprise a farmer will invariably need credit (Ilbery, 1985: 106). The farmer in the marginal area does not have the collateral that the core area farmer has and even if loans are secured the terms of the loan are usually not as favourable (Ilbery, 1985: 106). Thus credit sources available and actual credit secured are highly indicative of the health of a farming region (Beattie et al., 1981: 22). Southwestern Ontario is predicted to have the largest increase in credit and financial services both in absolute and relative terms followed by eastern Ontario with Manitoulin Island having the least.

In addition to business requirements, farms have household needs that are satisfied by community and social services, such as education, health and general retailing. When the farming sector falters, it has detrimental effects on this service sector. It becomes rather difficult for those remaining services to continue in business with an ever dwindling clientele (Lamoureux, 1985; Wightman, 1982). Manitoulin Island is predicted to have relative decline in community and social services compared to southwestern Ontario because it has remained somewhat of an isolated backwater of the province. Eastern Ontario is expected to show modest gains in these services over the study period. All areas are expected to show an absolute increase in these services over the study period partly because of demand created by increased population in eastern and southwestern Ontario, and partly through demand made possible because government assistance programmes such as unemployment insurance and old age pensions given Island residents a measure of security (Census of Population, 1951, 1986; Wightman, 1982: 207).

Transportation and market access are vital to commercial agriculture. It is essential to have adequate transportation to convey farm produce to buyers. Furthermore, certain items require special attention. "Perishable produce requires speed and frequency of movement, or special attention concerning the possible spoilage, or perhaps both" (Symons, 1972: 72). A poor and/or inadequate transportation system will stifle farming activity. The importance of transportation costs in the determination of spatial variations in farming types is widely accepted. Manitoulin Island is no exception (Grigg, 1982; Ilbery, 1985: 122). Manitoulin Island is expected to have experienced both absolute and relative decline in the transportation available for its agricultural materials compared to southwestern Ontario.

Generally, farmers have very little control over the marketing of their produce, as none of them is large enough to dominate a sizable segment of the market. As a consequence, the farmer is not in a good bargaining position in dealing with prospective buyers of produce. Often farmers have banded together in co-operatives for the disposal of their crops and livestock, to force dealers into better terms of trade. It is hoped that "where a single farmer cannot bargain from a position of strength because of small size, a marketing organization with many farmers can speak from an improved position" (author unknown). The relative strength of an agricultural region can be partially measured by the market access its farmers have and the ability to provide farmers with a reasonable return for their efforts. Manitoulin Island is predicted to have lost its absolute and relative market share of the provincial livestock industry (cattle) to southwestern Ontario.

Marketing has a direct bearing on the return farmers will receive from their labour and investment. Marketing organizations in Ontario follow one of two basic types; the first involves an agricultural marketing board which enforces a quota system regulating all facets of production, transportation and sale of produce, and the second is a non-regulated system in which farmers decide on production targets and methods of transportation, and sale of produce is unrestricted (OMMB, 1988a).

The literature has suggested what trends to expect for each of the variables in marginal agricultural areas. The variables introduced in this section have laid the groundwork for Chapter 3 where they will be applied to actual data from each study area to determine the direction of agricultural change. These variables are felt to provide sufficient evidence to determine

whether in fact agricultural change on the Island has meant decline both in absolute and relative terms.

CHAPTER 3

THE ANALYSIS OF AGRO-ECONOMIC VARIABLES

3.1 Introduction to Analysis

An integrated approach using numerous physical, social, and economic variables was used to investigate the dimensions of agricultural change on Manitoulin Island relative to the better lands of the province. Trends in land, labour, and capital variables are investigated in this chapter; they represent the social and economic side of the integrated approach and they are interpreted in the light of spatial variations in the physical environment.

The hypotheses (section 2.5) tested in this chapter deal with the nature of change in farm viability on Manitoulin Island using the above mentioned land, labour, and capital variables. As marginalization is a relative term, changes occurring on Manitoulin Island are measured against those occurring in the comparison areas of southwestern, eastern Ontario and the province at large. It is expected that Manitoulin Island will demonstrate an overall absolute decline in the level of its agricultural activity and demonstrate a relative decline in comparison to southwestern Ontario. The hypothesis of decline of Manitoulin Island agriculture relative to that in southwestern Ontario, leading to increasing localization of agricultural activity on the better lands of the province will be tested. The trends in eastern Ontario are expected to show far more agricultural activity than is found on Manitoulin Island.

Subhypotheses relating to each variable will be tested, and the validity of the general hypotheses will be evaluated in each of the following sections. As the integrated approach was taken, the hypotheses will not

necessarily be dealt with in the order they appeared in the Hypotheses of Study (section 2.5).

3.2 Land

The quality of farmland has a direct bearing on agricultural activity. The discontinuity of soil and terrain suited to agriculture in many marginal areas is reflected in the small output of farm produce. It must be remembered that within any given region farms on the poorer lands tend to be larger than those farms located on the more productive lands even though there has been a tendency for farms in all areas of Ontario to increase in size.

Farm Size

Between 1951 and 1986 average farm size on Manitoulin Island was considerably greater than in either southwestern Ontario or eastern Ontario and furthermore the gap widened through that period. Figure 3.2.1 indicates that average farm size (total farmland) on Manitoulin Island has risen dramatically in comparison with the province, eastern Ontario, and southwestern Ontario. The increase in Manitoulin Island farm sizes from an average of 304 to 544 acres between 1951 and 1986 (respectively) came about largely through the consolidation of holdings by the absorption of unused farmland (Wightman, 1982: 208). In Mandale's (1984) study of Kent County, New Brunswick, a similar expansion of farm size through a process of absorption of existing farmland was observed. In Kent County, the watchword among those who were determined to remain in farming was "enlarge the farm or go under" (Mandale, 1984: 89). Likewise on Manitoulin Island, those who remained on the farm continued to expand the size of their

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.1

operation over the period 1951-1986. Absolute size of Manitoulin Island farms has grown much faster than elsewhere.

The survey conducted by the author indicates that average farm size on Manitoulin Island is substantially larger than stated in the Census. In fact, the average farm size was found to be 1,067 acres compared to 544 acres in the 1986 Census of Agriculture. It must be remembered that most farmers on Manitoulin Island own woodlots separate from their farms which could simply have been included as part of their farm, thereby inflating the average farm size. Approximately 22 percent of Island farmland was classified as woodland in 1986 (Census of Agriculture, 1986). The discrepancy between the Census and the survey differ by degree and not direction as both sources point towards increasing average farm size in this region (Appendix 6).

As average farm size increased the total number of farms decreased from 956 to 331 during 1951-1986 confirming that widespread farm amalgamation took place (Census of Agriculture, 1951, 1986) (Figure 3.2.2). It seems logical that the acquisition of existing farmland was the preferred method of increasing the size of existing farms than the breaking of new ground. Breaking new ground is a very expensive and lengthy affair that is usually avoided by farmers if the opportunity exists to acquire cleared farmland (Mandale, 1984: 48; McCuaig and Manning, 1982: 14). Cleared farmland contains a large portion of good land that has already been worked, and preparations needed prior to its use are few. Approximately half of the respondents to the personal survey indicated that they expanded their operations through acquisition of faltering farm units because a large proportion of the land had already been prepared for farming. Although existing farmland was taken over by expanding farms to a large extent,

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.2

much farmland did nonetheless go out of production entirely. In each year of this study, the total area of farmland declined in all regions, indicating that remaining farms did not absorb all lands previously worked (Figure 3.2.3).

Intimately related to loss of farmland is land quality. Southwestern Ontario had the smallest loss of total farmland at 11% (Figure 3.2.3) while also having 85% of its soils within CLI classes 1-3 (Miller and Hoffman, 1970). Eastern Ontario and Manitoulin Island had three and four times the percentage loss of farmland than was the case for southwestern Ontario while both had only one sixth of their areas within CLI classes 1-3 (Hoffman and Noble, 1975: 5). It seems reasonable to assume that southwestern Ontario farmers had less reason to let farmland pass out of production than the farmers of Manitoulin Island or eastern Ontario.

Improved Farmland

It is a common practice in agricultural studies to compare the percentage of improved to unimproved land as part of the evidence in determining farm viability (Ilbery, 1985: 102). The ratio of improved to unimproved farmland is a reflection of the physical capability of the land. Decline in the total area of farmland has largely come about by the abandonment of unimproved land in all study areas (Census of Agriculture, 1951, 1961, 1971, 1981, 1986) as there was a general rise in percentage of farmland that was improved (Figure 3.2.4).

The higher quality soils of southwestern Ontario have made it much more attractive for farmers to improve their farmland (McCuaig and Manning, 1982: 14). Figure 3.2.4 indicates that southwestern Ontario has a much greater percentage of improved farmland than Manitoulin Island and

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.3

PERCENTAGE OF TOTAL FARMLAND IMPROVED

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.4

eastern Ontario. The percentage of improved farmland has risen in all three areas to a greater or lesser extent. Total farmland improved in southwestern Ontario varied from a low of 80% in 1951 to 88% in 1986. The percentage of total improved farmland in eastern Ontario varied between 40% in 1951 to 47% in 1986. Manitoulin Island had the lowest percentage of total farmland improved ranging from 25% in 1951 to 27% in 1986 (Figure 3.2.4).

The survey of farmers on the Island revealed that some 22 percent of farmland was improved. It must be remembered that total farm area on the Island contains substantial amounts of forest and very rough land. Some of the increases in improved farmland were no doubt the result of work carried out by farmers upgrading previously unimproved land, although this cannot be determined from the Census returns.

Both eastern Ontario and Manitoulin Island had a small decline in percentage of total farmland improved between 1981-86 but southwestern Ontario did not (Figure 3.2.4). This small rise in percentage of improved farmland can be viewed possibly as an indication of further concentration of agricultural activity in this core region of the province, but because of the short nature of the trend this finding can only be considered preliminary (Census of Agriculture, 1981, 1986).

Over the study period there was a large absolute decline of improved farmland on Manitoulin Island and in eastern Ontario (Census of Agriculture, 1951, 1986). Southwestern Ontario underwent a very small absolute decline in improved farmland.

Fragmentation of Farms

Fragmentation of farms whereby the farm unit comprises non-contiguous parcels, is considered to be indicative of modern expanding

agriculture. It is hypothesized that fragmentation will be highest in southwestern Ontario and lowest on Manitoulin Island. Unfortunately, the Census of Agriculture provides only indirect, general indications of farm fragmentation. Characteristics of farmland ownership can be used as such an indirect measure, where high rates of ownership are linked to stagnating agricultural activity.

It appears from Figure 3.2.5 that there was an overall decline in the percentage of farmland owned in each study area, with ownership being higher on Manitoulin Island than in southwestern Ontario. Farmland owned by operators on Manitoulin Island declined from 93 to 78 percent between 1951 and 1986. Over the same time period the corresponding values in southwestern Ontario declined from 86 to 73 percent while eastern Ontario declined from 91 to 81 percent. Manitoulin Island and eastern Ontario were above the provincial average while southwestern Ontario was below, indicating expanding agricultural activity in the later (Figure 3.2.5). Exactly the reverse situation existed for percentage of total farmland rented with Manitoulin Island and eastern Ontario below the provincial average and southwestern Ontario above (Figure 3.2.6).

Perhaps the best measure of increasing fragmentation available from Census data is the percentage of total farms partly owned and partly rented which have increased steadily in all regions over the study period (Figure 3.2.7). This category generally represents farms with a core of owned land to which rented land has been added. The trend to renting farmland has been "encouraged" by increase in land costs which is treated in the next section.

More precise information concerning fragmentation of holdings could only be obtained from a survey of farmers. The survey of Manitoulin Island

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.5

PERCENTAGE OF TOTAL FARMLAND RENTED

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.6

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.7

farmers indicated a complex fragmentation of the farmland. The survey found that 57 percent of total farmland was owned and each farm contained on average two parcels of land separate from the central farm. On average these parcels of land were 6 miles from the central farm and they had been used for 16 years. The findings of this survey contradict the Census values due to survey design and sample size, but it did reveal the complicated nature of fragmentation on the Island. Farmers related in the survey that the difficulty in purchasing farmland is partly related to the increasing competition for land between themselves and the expanding tourist lodges, cottagers and professionals buying hobby farms as vacation retreats. This difficulty in buying farmland on the Island has led to an increase in the renting or leasing of idle farmland by those farmers wanting to expand production. There was a roughly equal split between rented and owned parcels. It was also mentioned by farmers that the patchiness of Island soils also accounts for much of the fragmentation of farmland.

The explanation of why rented farmland is more prevalent in southwestern Ontario than in Manitoulin Island or eastern Ontario is no doubt complex, but this situation seems to be consistent with the literature. Troughton (1982) found that the decline in percentage ownership of farmland partly reflects the difficulty farmers have expanding operations through purchase due to cost and/or unavailability of land for sale. In southwestern Ontario land costs are extremely high, driven up by competing uses for that land. Despite what was said above regarding the increasing price of land, the greater percentage ownership of farmland on Manitoulin Island probably reflects the lower cost of land and the generally stagnating state of agricultural activity which makes renting farmland less of a priority (McCuaig and Manning, 1982: 39).

Land Value

The viability of farmland can often be determined by its price. Higher capability farmland will command greater prices because production from that land can be made to compensate for its greater cost. There are two principal factors affecting the value of farmland: "expected farm incomes and anticipated returns from non-farm use" (McCuaig and Manning, 1982: 46).

The urban system in southwestern Ontario is developed to a higher degree than in the other areas of this study and as a result farmland costs tend to rise rapidly because of the non-farm demands on the use of that land (Ilbery, 1985: 103; McCuaig and Manning, 1982). In Manitoulin Island and eastern Ontario land values have risen under similar pressures, but to a lesser degree (Table 3.2.1).

Table-3.2.1 Percentage Change in Agricultural Land Value per Acre 1961-76

Region	Census Div.	1961 \$ value/acre	1976 \$ value/acre	% change 1961-1976
	Province	138.5	893.3	545.0
	Manitoulin	24.9	112.5	351.8
<u>E. Ont.</u>	Leeds & Grenville	61.2	412.2	569.2
	Lanark	38.5	347.3	802.1
	Frontenac	48.1	345.8	618.9
	Lennox & Addington	59.4	364.4	513.5
	Hastings	48.0	378.5	688.5
	Renfrew	39.9	244.4	512.5
<u>S.W. Ont.</u>	Haldimand-Norfolk	343.2	1,489.6	334.0
	Brant	311.8	1,462.8	369.2
	Waterloo	230.7	1,438.1	523.4
	Oxford	232.2	1,310.7	464.5
	Perth	149.5	1,020.1	582.3
	Huron	110.3	829.3	651.9
	Middlesex	166.8	1,132.1	578.7
	Elgin	244.5	1,178.0	381.8
	Kent	254.3	1,152.9	353.4
	Essex	355.7	1,498.3	321.2

Source: Lands Directorate, Environment Canada (1979).

**PERCENTAGE OF PROVINCIAL AVERAGE INVESTMENT
IN LAND AND BUILDINGS PER FARM**

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.2.8

As Table 3.2.1 indicates, per acre land costs in southwestern Ontario remained roughly three to five times greater than eastern Ontario and well over ten times those of Manitoulin Island over the 1961-1976 period. As the potential income to be made in food production rises, so does the value of the land necessary for that production (Manning et al., 1979). Competition for the best land forces prices higher as more land is sought to create economically viable farming operations. The better the quality of the land, the more amenable it is to investment in equipment and buildings; "a greater return is possible on the best land than from a similar investment on poorer land" (Manning et al., 1979: 12).

The value of both farmland and buildings on the farm are combined in a single Census figure. Southwestern Ontario consistently had the highest average value of farmland and buildings per farm over the study period, varying between 30% and 16% above the provincial average for 1951 and 1986 (Figure 3.2.8). Both Manitoulin Island and eastern Ontario are well below the provincial average. Manitoulin Island ranged from 58 to 49 percent of the provincial average for 1951 and 1986, while eastern Ontario varied between 61 to 60 percent for the same period (Figure 3.2.8). The convergence in Figure 3.2.8 between 1981 and 1986 indicates that the Island may have improved the value of its farmland relative to southwestern Ontario, although this is somewhat tentative as it was observed for one data period.

It is important to consider that in terms of absolute value of farmland southwestern Ontario maintained the highest value over the 1961-76 period, while Manitoulin Island had the lowest (Table 3.2.1). Manitoulin Island has roughly maintained its relative percentage of provincial average investment

in land and buildings over the study period (Figure 3.2.8). Therefore, land value of farmland in the study areas support the hypotheses of absolute decline of Manitoulin Island agriculture while the relative decline of the Island was less conclusive.

Hypotheses and Land Variables

Confirmation of the hypotheses is important to the overall study. By identifying the variables supporting each hypothesis it is possible to keep a "running total" of agricultural performance.

One of the hypotheses confirmed in this section is the absolute decline of Manitoulin Island. Farm sizes, fragmentation, percent improved land, and land value all supported the hypothesis the absolute decline of the Island. These variables have shown that Manitoulin Island behaved as predicted for a declining agricultural region.

The second of the hypotheses confirmed a decline in the agriculture of the Island relative to southwestern Ontario. All the variables mentioned above except land value have demonstrated that a relative shift has taken place in agricultural activity from Manitoulin Island toward the more advantaged areas of southwestern Ontario. The only variable to demonstrate any discrepancy with this hypothesis was land value. The relative increase in land value of Manitoulin Island over 1981-1986 may not mean anything because of the short period of observation, but the relative increase for this period may be powered by non-agricultural demand.

3.3 Labour

Various socio-economic analyses of farm populations indicate that the persistence of marginal farming is due at least in part to the failure of human resources to respond appropriately to the disadvantages imposed by marginal environments (Troughton, 1977). This does not mean that a marginal environment could be made into a high quality one if only farmers responded appropriately. Rather, the worst effects of a marginal situation could be moderated somewhat. The following section will discuss the most important characteristics of the labour force working the land namely the age of farmer, education, expectations of farmers, part-time and full-time employment, and productivity of labour. These characteristics are important components in the assessment of agricultural change within a region or between regions.

Age of Farmer

Farming as an occupation, tends to suffer from the increasing average age of its members, a feature which is particularly acute in marginal areas. Between 1951 and 1986 Manitoulin Island generally had an increasing percentage of farmers aged 60 years and older (Figure 3.3.1). Interestingly, of the regions in this study the Island had the lowest percentage of farmers 60 years and older in 1951. The situation on the Island where 18 percent of farmers were 60 years and older in 1951 was not much different from other non-study areas of the province which varied between 18 and 22 percent (Census of Agriculture, 1951). Over this study there was a distinct increase in the percentage of farmers 60 years and older in all regions, but the Island and eastern Ontario maintained the highest levels every year after 1951.

PERCENTAGE OF FARMERS 60 YEARS OLD AND OVER

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.3.1

PERCENTAGE OF FARMERS UNDER 25 YEARS OLD

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.3.2

Between 1951 and 1986, as communication and transportation improved, the younger people on the Island increasingly perceived "outside opportunities" and moved off the Island (Wightman, 1982). During the early 1950s the forest industry was still a large employer on Manitoulin Island, and there was less need for the young to seek employment off the Island (Wightman, 1982). Since 1951 the non-native population of the Island has dropped from about 8,500 to 6,800, its level at the turn of the century (Wightman, 1982: 205). This net decline has been concentrated in rural areas, almost two thirds of it occurring during the 1960s after the end of major forest employment and during a period of agricultural adjustment (Wightman, 1982). Forest employment had been used as a safety valve, providing farmers with a means of supplementing an often inadequate farm income. Wightman's (1982) study found that it was mostly the younger members of the rural Manitoulin population (sons of farmers) who left the Island to find work once forest employment began declining. This migration of many young Islanders to the mainland would help account for the increasing percentage of Manitoulin farmers 60 years and older after 1951. The distinct increase in 1981-1986 percentages of older farmers can be interpreted as resulting from the acceleration in the general migration of young people off the farm observable in most regions of the province (Census of Agriculture, 1981, 1986).

Over the study period the percentage of older farmers on Manitoulin Island has increased at a greater rate than any other region. Although the Island never had the highest percentage of older farmers it had nevertheless approached the level of eastern Ontario by 1986 (Figure 3.3.1). The rapid increase in older farmers on Manitoulin Island can only be interpreted as an

indication of the relative decline in agriculture compared to southwestern Ontario. It was pointless to look at the absolute increase in farmers over 60 years old because of the drastic reduction in the number of farm operators over the 1951-1986 period (Figure 3.2.2).

Not unexpectedly, the graph of the percentage of farmers under 25 years old is very nearly the inverse of the percentage of farmers 60 years and older (Figure 3.3.2). Southwestern Ontario has the highest percentage of the youngest farmers and the lowest percentage of older farmers over the study period. The future of agriculture in southwestern Ontario seems brighter precisely because older retiring farmers are replaced by young farmers to a greater extent than in the other study regions. The vitality of southwestern Ontario agriculture relative to eastern Ontario and Manitoulin Island is one reason for the higher percentage of younger farmers found there. The expectations of the young farmers can be perhaps better realized in southwestern Ontario.

Education of Farmer

The formal educational backgrounds of farmers affect the long-term productivity and success of a region's agriculture as mentioned in section 2.7. Education levels within the general population have risen dramatically in Ontario since 1951. University, college, and technical school education has become more accessible to the young people of the province over the last few decades, and high-school has become standard education for most. Lamoureux (1985: 61) found a similar rise in education levels in her study of Gaspé agriculture over the same period.

Determining the level of education of farm operators for this study proved difficult because of the manner in which the data were originally

collected by Statistics Canada. Data on education from the population Census is not related to farmer characteristics for the agricultural Census in the two individual publications. Only since the 1971 Census has Statistics Canada conducted a programme linking the Agricultural Census with the Population Census, the so-called Ag-Pop linkage. The Ag-Pop linkage was useful for the generation of cross-referenced agriculture and population variables. The 1981 Ag-Pop linkage had not been completed at the time of printing (1989), and was therefore unavailable for this study. Thus analysis of the education background of farmers is restricted to 1971-81.

The small number of farms on Manitoulin Island required that educational data be amalgamated with Algoma to safeguard confidentiality of farmers. Thus, changing levels of education can only be analysed between 1971 and 1981 and Manitoulin Island cannot be isolated from Algoma. As a result the amalgamated Census Division (CD) is called Manitoulin-Algoma.

The dramatic rise in the percentage of farmers attaining a secondary and post-secondary education during the 1971-1981 period (Table 3.3.1) is a reflection of trends in the population at large (Census of Population, 1971, 1981). Absolute numbers did not increase, presumably because of the decline in the total number of farmers (Census of Agriculture, 1971, 1981). It is possible that some of the increase in the percentage of farmers with a higher education was the result of older farmers with lower levels of formal education simply retiring and some was the result of lower educated operators being forced out of farming.

Table 3.3.1 Education Levels of Farm Operators at the County Level

		Percentage of Total Farm Operators			
Education Levels		Manitoulin- Algoma	Province	S. Ont	E. Ont
University Degree+	1971	4.1	4.4	3.8	3.8
	1981	11.9	11.9	9.7	12.8
Some University	1971	3.6	5.4	5.3	5.4
	1981	18.6	19.3	18.9	19.0
Some Non-University	1971	5.2	9.3	8.9	8.6
	1981	10.7	9.6	9.4	10.3
Graduated High-School	1971	24.2	25.1	26.0	23.7
	1981	20.3	24.7	25.1	21.3
Some High-School	1971	62.9	55.8	56.1	58.5
	1981	38.4	34.5	35.9	36.4

Sources of Data: Statistics Canada, Agricultural-Population Linkage, (1971 & 1981).

The percentage of farm operators with some post-secondary, non-university education increased better than threefold in all areas. Farm operators graduating from high-school and those with some high-school education increased, but only marginally. The retirement hypothesis was supported by the large decline in the percentage of farm operators with less than Grade 9 education.

Differences in education levels between the regions of this study are difficult to interpret. Table 3.3.1 only covers two census periods, 1971 and 1981. The most striking feature is the increase in the overall education level of farm operators and not any marked differences between the regions. It was expected that the greater investment tied up in southwestern Ontario farms in addition to the high concentration of educational facilities found there would both encourage a higher level of schooling.

The high proportion of university graduates in Manitoulin-Algoma certainly raises questions. While Manitoulin-Algoma had a high percentage of university graduates, this would not necessarily be true for Manitoulin as it does not have its own university. The inclusion of Algoma might have unduly influenced the education levels of Manitoulin-Algoma found in Table 3.3.1 giving a distorted picture unrepresentative of either region.

When absolute numbers are small, a small absolute change affects percentages greatly. The number of farmers in Manitoulin-Algoma was only 970 and 885 in 1971 and 1981 respectively compared with southwestern Ontario's 32,945 and 28,520, and eastern Ontario's 9,929 and 8,201 for the same period (Census of Agriculture, 1971, 1981). Any absolute change in Manitoulin-Algoma would greatly alter the percentage of an educational group because the number of farmers is low, while a similar absolute change would not affect southwestern Ontario to nearly the same extent because the number of farmers is much larger. Reasons for the lack of a sizeable education differential between the farmers of Manitoulin-Algoma according to the Ag-Pop linkage and the other two regions are only speculation at this time.

The author's survey of Manitoulin Island gave a lower percentage for university educated farmers than was revealed in the Ag-Pop linkage. The survey indicated that 2 farmers had a university degree or some university training, while the 6 farmers (20 percent) that had some post-secondary non-university education compared well to the Ag-Pop linkage. The survey also indicated that 6 farmers (20 percent) graduated from high school and 8 farmers (27 percent) had some high school education. It was also found that 8 farmers (27 percent) of Island farmers surveyed had less than grade 9

education. Overall, the survey and the Ag-Pop linkage were in agreement with the exception of university education (Table 3.3.1).

The survey found that most farmers have no formal agricultural training and simply learned from their fathers through a lifetime of living on the farm, although many had taken short courses related to agricultural improvement. Roughly three quarters of farmers surveyed received all their education on Manitoulin Island, while the remainder received part or all their education off-Island. The fact that the majority of farmers received all their education on the Island supports the general hypothesis of relative decline of the Island because of the lower university educational component compared to the other study areas. Absolute change in education for the Island is difficult to interpret because of the amalgamation of Manitoulin and Algoma into one Census Division.

Expectations of Farmers

It was anticipated that the expectations of farmers would help support the hypotheses of absolute and relative decline of marginal areas in favour of core agricultural areas because it was thought attitudes toward successful farming would differ. Studies have shown that while substantial differences between rural and urban opinions, aspirations, lifestyles, and political activities were evident as late as the 1950s, these distinguishing characteristics have all but disappeared (Manning and McCuaig, 1982; Ricour-Singh, 1981). Since 1951 farmers in this study have striven to enlarge their operations (Figure 3.2.1) and increase production (Figure 3.4.2 and 3.3.6) both out of necessity to survive on the land as well as through the adoption of urban aspirations (Ricour-Singh, 1981). It is thought that the adoption of urban aspirations of ever increasing expectations of material

comfort has partly fueled the expansion of farming operations in the regions of this study although by differing degrees.

The expansion of farm size between 1951-1986 coupled with the steady growth of capital investment in the farm are two examples that can be attributed to the positive expectations the farmer has for a better life in the future (section 3.2). This effort to expand and update operations (while not successful in every case) can be attributed in large part to the expectations of farmers to benefit from the conveniences of modern life. It is unlikely that major attitudinal differences exist between farmers in the different regions of this study (Ricour-Singh, 1981).

Part-time, Full-time Farmers

The labour practices of farmers in the study areas involve considerable variety. There is great latitude in the involvement each farmer devotes to working the farm: full to part-time farm employment including various amounts of hired and family labour. Trends in the labour practices of Manitoulin Island farmers compared with those from southwestern and eastern Ontario are expected to re-inforce the core/marginal dichotomy of provincial agriculture. It was anticipated that there would be more part-time farmers and a greater number of days worked off-farm on Manitoulin Island than in southwestern Ontario.

Figure 3.3.3 indicates the percentage of farmers who worked off-farm during the year. Manitoulin Island and eastern Ontario were somewhat above the provincial average. Each had about 40 percent of their farmers undertaking off-farm work in 1951 and approximately 50 percent in 1986. Southwestern Ontario on the other hand had the lowest percentage of farmers working some days off-farm, which ranged between 32% and 38%

for 1951 and 1986 respectively. Southwestern Ontario had a high of 40 percent in 1971 (Figure 3.3.3).

It is interesting to note that even though a greater percentage of farmers on Manitoulin Island worked off-farm they did so for fewer days on average than farmers in either southwestern or eastern Ontario (Figure 3.3.3 and 3.3.4). Lack of opportunity to obtain longer term off-farm employment was most likely the reason Manitoulin Island farmers had significantly fewer days worked off-farm than either of the other study areas. Eastern Ontario had the highest number of days worked off-farm by those farmers reporting such work, while southwestern Ontario was slightly below the provincial average (Figure 3.3.4).

It is reasonable to assume that even though southwestern Ontario had the smallest percentage of part-time farmers, farmers in that area also had the greatest opportunity to work off-farm. Southwestern Ontario is part of the industrial heartland of the country and urban, non-farm-related employment is correspondingly greater than that expected on Manitoulin Island (Manning and McCuaig, 1982; Troughton, 1982). The author's survey of Manitoulin Island indicated that 17 farmers (57 percent) were full-time farmers. The survey also found that of the 13 farmers (43 percent) who work off-farm half of these worked off-farm temporarily in construction or township work, and the other half worked full time off-farm combined with various levels of part-time farming.

Paid farm labour is important to the functioning of the farm as a commercial operation and is a barometer of agricultural health. The lack of ability to hire and pay labourers is a signal that the farm could be operating at a little above subsistence level (Ilbery, 1985).

**PERCENTAGE OF FARMERS WHO WORKED SOME
OFF-FARM DAYS**

Sources of Data: Census of Agriculture, 1961, 1971, 1981, 1986.

Figure 3.3.3

**AVERAGE NUMBER OF DAYS WORKED OFF-FARM
BY FARMERS REPORTING**

Sources of Data: Census of Agriculture, 1961, 1971, 1981, 1986.

Figure 3.3.4

AVERAGE WEEKS OF PAID LABOUR PER FARM

Sources of Data: Census of Agriculture, 1961, 1971, 1981, 1986.

Figure 3.3.5

2

MICRO
THE MICROFILM SYSTEM

On Manitoulin Island the average number of weeks of paid labour per farm was consistently the lowest of all regions over the 1961-1986 period (Figure 3.3.5). Southwestern Ontario had the highest average number of weeks of paid labour per farm at 23 and 32 weeks for 1961 and 1986 (Figure 3.3.5).

The author's survey indicated that slightly better than half of farmers hired off-farm labour typically for only 1-2 weeks during the haying season (Appendix 6). Most farmers indicated an inability to pay for hired labour for longer periods, or that they could function by substituting family for hired labour. Trends in low percentage of full-time farmers and the low level of hired off-farm labour on the Island have been confirmed by the survey and support what was illustrated in Figures 3.3.3 and 3.3.5. Although the survey findings did not examine temporal labour trends they were nevertheless useful as extra evidence supporting the hypotheses.

The overall labour practices of farmers support the hypothesis of absolute decline of Manitoulin Island as shown by the increase in percentage of part-time farmers and the increase in the days worked off the farm. Additionally, the very small increase in the ability of Island farmers to hire off-farm labour over the study period gives the impression of stagnation on the farm. The relative decline of Island agriculture was even more evident as the labour indicators mentioned above fell further behind southwestern Ontario over 1961-1986. Relative decline of the Island's agriculture was demonstrated as it maintained and slightly increased its percentage of part-time farmers and the days worked off-farm by those farmers seeking additional employment. Finally, the weeks of paid labour per farm clearly

demonstrated the increasing relative ability of southwestern Ontario to attract needed farm labour compared to Manitoulin Island.

Productivity

Manitoulin Island was expected to have a lower productivity than the other regions of this study (Grigg, 1982; Ilbery, 1985: 38). Determination of productivity in this study depended upon measuring the percentage of provincial gross returns per farm as well as percentage of provincial gross returns per acre of farmland (Figure 3.3.6 and Figure 3.3.7 respectively). As farming is primarily an economic activity the return on investment is an important indicator of agricultural health. Predictably, Figure 3.3.6 supports what was suspected concerning possible agricultural decline on Manitoulin Island. The gap between the share of provincial gross returns received by Island farmers and southwestern Ontario farmers widened substantially over 1951-1986. Eastern Ontario was very close to the Manitoulin values. The slightly increasing gap between eastern Ontario and the Island is significant because it indicates the gradual decline of Manitoulin relative to the former.

The percentage of provincial gross returns per acre of farmland (total farmland including improved land) reveals how productive the farmland was in each region. Although the absolute numbers were very small, the order was important in comparing the percentage of provincial gross returns per acre of farmland. The return per acre of farmland in southwestern Ontario was approximately 5 and 11 times greater than Manitoulin Island in 1951 and 1986 respectively (Figure 3.3.7). Eastern Ontario had a somewhat greater share of provincial gross returns per acre than Manitoulin Island but was still below the provincial average.

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.3.6

**PERCENTAGE OF PROVINCIAL GROSS RETURNS
PER ACRE OF FARMLAND**

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.3.7

There has been a decline in Manitoulin Island's share of the province's returns since 1951 although a slight increase appeared between 1981 and 1986. Eastern Ontario showed similar trends. The explanations for these increases remain unknown but it could be that having released large areas of unimproved land from the area of census farms in the 1960s and 1970s, the returns on remaining land are now higher. On the other hand southwestern Ontario grew the most between 1951 and 1961, and thereafter increased very slowly until 1986.

Part of the productivity equation must include an accounting of the expenses incurred in agricultural production. Gross expenses are all those expenses necessary to the operation of the farm such as fertilizers, fuel, electricity, mortgage payments, and paid labour. Percentages of provincial gross expenses per acre of farmland closely follow the returns per acre, (Figures 3.3.8 and 3.3.7 respectively). The relative profitability of farming in each area can be measured by taking the difference between the percentage of provincial gross returns and gross expenses per acre.

The graph of relative profitability leads to some interesting general conclusions concerning agricultural productivity in the study regions (Figure 3.3.9). Manitoulin Island had the sharpest decline in relative profitability of any region, declining in each year of the study. Eastern Ontario declined in each year of the study but recovered between 1981 and 1986 although expenses outstripped returns even during this period. Southwestern Ontario had a rather complex graph as returns were greater than expenses for only 1951 and 1986, and were less for the years 1961 to 1981 (Figure 3.3.9). There was a dramatic rise in southwestern Ontario's relative profitability during the period 1981 to 1986, as returns outstripped expenses.

PERCENTAGE OF PROVINCIAL GROSS EXPENSES
PER ACRE OF FARMLAND

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.3.8

**RELATIVE PROFITABILITY PER ACRE AS THE DIFFERENCE
BETWEEN PROVINCIAL GROSS RETURN AND GROSS
EXPENSES PER ACRE**

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.3.9

The general trend revealed by Figures 3.3.6, 3.3.7, 3.3.8, and 3.3.9 is that relative profitability of Manitoulin Island declined continuously since 1951. Eastern Ontario showed trends similar to Manitoulin Island, having a fairly high relative profitability per acre in 1951 but declining quite drastically for each Census year except the last where it had a rise similar to that in southwestern Ontario (Figure 3.3.9).

Hypotheses and Labour Variables

Overall the variables considered in this section support the hypothesis that Manitoulin Island's agriculture has declined relative to southwestern, and less so with respect to eastern Ontario. Variables supporting the hypothesis of relative decline are: age of farmer, part-time and full-time farmer, and productivity. Those variables not supporting the hypothesis of relative decline of the Island are: education and expectations.

The hypothesis of absolute decline of Manitoulin Island is supported by age of farmer, part-time and full-time farmers. There was no evidence that education and expectations of farmers supported this hypothesis.

3.4 Capital/Economic and Community Infrastructure

The substantial capital requirements of commercial farm operations simply cannot be met in most marginal regions. Due to the generally lower levels of production and greater risk of crop damage, the farmer on the margin has extremely restricted opportunities compared to the farmer in the core region for the accumulation of the capital resources needed to purchase new equipment or expand operations (Beattie et al., 1981: 22). In marginal regions access to credit, though less significant today, proved difficult prior to the 1950s (Beattie et al., 1981). Even though there has been a trend toward economies of scale, farming of marginal lands endures with relatively high expenditures of labour and low financial investments in mechanization or improved practices (Beattie et al., 1981: 22). The availability of capital within any particular region can be biased towards the most productive farms, which tend to be run by farmers with greater sophistication in fiscal matters (Ilbery, 1985: 106).

Capital can be regarded as money to obtain the inputs necessary for agricultural production. Capital also combines aspects of real and money capital since it includes inventories of materials and completed goods, as well as easily realizable assets. Regional infrastructure can be considered to compliment the capital needs of farmers by virtue of its indispensable relationship to agricultural production. Infrastructure and marketing organizations that are used by, or of potential use to, farmers will also be examined in this section.

Income of Farmers

The changing nature of a region's contribution to provincial agricultural income can be a telling indicator of its relative agricultural

health. In this study, the income measure used is the percentage contribution of each study area to total provincial agricultural income; thereby the effects of inflation are eliminated. In 1951 southwestern Ontario contributed approximately 41% of the provincial agricultural income, while Manitoulin Island and eastern Ontario contributed roughly 0.5 and 8 percent respectively. In 1986 southwestern Ontario's contribution had increased to approximately 48% of the provincial agricultural income while Manitoulin Island's and eastern Ontario's contribution had decreased to roughly 0.2 and 5 percent respectively (Figure 3.4.1). Even though Manitoulin Island's contribution to provincial agricultural income has always been small, the relative difference between the Island and southwestern Ontario has widened over the 1951- 1986 period.

Rate of Mechanization

Trends in the rate of mechanization for the different regions of this study support the hypotheses of absolute and relative decline in agriculture and the concentration of investment on the better lands. Mechanization was calculated by dividing the monetary investment in mechanization per farm by the provincial mean to arrive at regional values quoted as a percentage of the provincial mean (Figure 3.4.2). Southwestern Ontario had a rate of mechanization approximately 25 and 19 percent above the provincial average for 1951 and 1986. Manitoulin had a mechanization rate roughly 22 and 32 percent below the provincial average for 1951 and 1986 while eastern Ontario had a mechanization rate of 21 and 24 percent below the provincial average for the same period. It is significant that eastern Ontario and Manitoulin Island had similar values in the early period but diverge after 1961, suggesting the Island began to decline relative to eastern Ontario.

**PERCENTAGE CONTRIBUTION TO PROVINCIAL
AGRICULTURAL INCOME BY AREA**

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.4.1

**PERCENTAGE OF PROVINCIAL INVESTMENT IN
MECHANIZATION PER FARM**

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.4.2

PERCENTAGE OF PROVINCIAL INVESTMENT IN MECHANIZATION PER ACRE OF FARMLAND

Sources of Data: Census of Agriculture, 1951, 1961, 1971, 1981, 1986.

Figure 3.4.3

The percentage of provincial investment in mechanization per acre of farmland indicates an even wider spread between the regions than was evident for investment in mechanization per farm. Figure 3.4.3 shows that in 1951 southwestern Ontario was 57 percent above the provincial average while Manitoulin Island and eastern Ontario were 64 and 45 percent below the provincial average respectively. By 1986 southwestern Ontario had declined to 32 percent above the provincial average while the Island and eastern Ontario were roughly 76 and 43 percent below the provincial average (Figure 3.4.3). The expectation that investment in mechanization would have become increasingly concentrated in southwestern Ontario has been confirmed. Although the trends indicate that there has been a small relative decline in the concentration in southwestern Ontario compared to the Island it is also important that over the study period the former maintained its much greater investment in mechanization. On the Island itself there has been a great absolute decline in investment in mechanization over the entire study period.

The low levels of mechanization per acre on Manitoulin Island compared to southwestern Ontario or the provincial average does not bode well for the vitality of its agriculture. A lack of capital has been part of the reason Manitoulin Island has consistently fallen below the provincial average investment in mechanization per farm and per acre. However even if capital and hence machinery were readily available on Manitoulin Island its patchy spatial pattern of soils and prevalence of rocky outcrops are not conducive to the use of large scale farm machinery (Chapter 2). An essential point is that Manitoulin Island does not have the same rate of mechanization

because it is known that the same advantages as those in southwestern Ontario do not occur.

Services Available

The range of services available to an agricultural region form an integral part of the structure necessary for economic pursuits and community life. A discussion of services has been included in this section because they are intimately related to capital and agricultural output.

A sampling of the services available in each of the three regions of this study was accomplished by recording all services listed in the telephone directories of one town in each region for 1951 and 1986. It is felt that comparing the changes in the services listed in the telephone directories of these towns would reflect the relative decline of agriculture in Manitoulin Island already observable. The towns chosen for study were Gore Bay on Manitoulin Island, Elmira in southwestern Ontario, and Kemptville in eastern Ontario. These towns were chosen because they had similar populations within their respective regions and none was located very close to a major centre, a feature which would inflate the listings of services in the telephone directory. Rural service centres were chosen in each area rather than major urban centres because they are more dependent on agriculture for their survival and consequently would make a more reliable barometer upon which to gauge agricultural health.

The nearest major centres to Gore Bay, Kemptville, and Elmira are Sudbury, Ottawa, and Kitchener respectively. According to the Census the 1951 populations of these towns were 2,589 in Elmira, 1,488 in Kemptville, and 700 in Gore Bay, while in 1981 populations were 7,063 in Elmira, 2,496 in Kemptville, and 780 in Gore Bay. It is interesting to note that Gore Bay

had a population of 670 in 1930 (Wightman, 1982: 165). Obviously the population of Gore Bay has stagnated while those in Elmira and Kemptville have continued to grow. The largest centre on Manitoulin Island is Little Current with a population of 1,600 in 1986 and not Gore Bay (Census of Population, 1986). Gore Bay was selected because it is a sizable town on the Island but not the largest, and as such was felt to represent a similar retail and trade function as important to its immediate region as Elmira and Kemptville were to their respective regions.

The services available to the agricultural community in each region have been divided into agricultural, semi-agricultural, credit and financial, and community. The numbers of establishments offering services were simply counted and the frequencies of each type recorded (Appendices 1-4). Frequency of establishments listed in the telephone directories were used because of an inability to gauge the size of establishments or range of products offered by them. It must be kept in mind that frequencies of services from the telephone directory was intended to provide only a general indication of the level of services available.

Agricultural Services

The agricultural services listed in the directories are those that are concerned with direct inputs or services required by the farmer to produce from the land. These include farm implement dealerships, fertilizer and seed suppliers and government agricultural offices. Agricultural services in Gore Bay declined from 4 to 2 for the years 1951 and 1986. There was a slight decline of these services over the same period of 33 to 31 in Kemptville and 57 to 44 in Elmira (Table 3.4.1).

Table-3.4.1 Services Available to Communities, 1951 and 1986.

		Agricultural	Semi-agricultural	Credit&Financial	Community
Gore Bay	1951	4	12	2	42
	1986	2	21	3	99
Kemptville	1951	33	47	5	61
	1986	31	78	19	279
Elmira	1951	57	67	10	115
	1986	44	142	41	411

Sources of Data: The Bell Telephone Company of Canada, (1951, 1986).

There has been a concentration of these services through a trend towards fewer but larger, centralized establishments (Beattie et al., 1981). Centralization of services has been ongoing across the country as retailers of farm services attempt to balance economies of scale with accessibility to farmers (Manning et al., 1979; Troughton, 1979). The reduction of agricultural services from 4 to 2 may or may not have affected the farmers of Gore Bay because of the unknown size of the remaining establishments. But Gore Bay has fewer agricultural services relative to Elmira and Kemptville which reinforces the hypothesis of the relative agricultural disadvantage of Manitoulin Island as a whole.

In addition to the number of agricultural services, the range of services available is important as well. Range refers to the different types of products sold. It was impossible to know the complete range of services offered by an agricultural dealership other than what could be surmised from its listing in the telephone directory. Not all farm implement dealers sell the same product lines and many target only a segment of the market. Some dealers sell tractors and farm trucks but not combines or harvesters for example. Depending on where farm implement dealers are located the

farmer will have a greater chance of buying what he needs, close to his farm when more dealers are present.

The survey conducted by the author indicates that overall the farmers are satisfied by the agricultural products and services that are available to them, but all farmers mentioned that perhaps as many as 10 significant (2 in Gore Bay alone) implement dealerships and suppliers of agricultural materials have closed on the Island over the last 5-10 years. The survey respondents indicated that the closing of these agricultural suppliers has meant higher prices because of less competition. They also relate that the agricultural cooperatives on the Island have increasingly improved their level of services taking up the slack left by these failed suppliers, but the prices are consequently very high. The distances that farmers have to travel to the remaining agricultural suppliers have increased in the last 5-10 years because there are fewer but larger suppliers on the Island. Those remaining dealers can order any item not generally kept in stock but at a significant cost of money and time. It is interesting to note that 12 farmers surveyed (40 percent) travel to southwestern Ontario to buy agricultural implements presumably because of cheaper prices for them in the long run but compared to their southwestern Ontario counterparts they are disadvantaged because of extra transportation costs to the Island. Likewise the same number of farmers will organize their own shipments of fertilizers bought in southwestern Ontario and transported back to the Island on cattle trucks returning from auctions. The survey generally confirms the difficulty farmers on the margins have in purchasing agricultural supplies, and in the case of Manitoulin Island most items are available but the costs of purchasing them can be prohibitive.

Appendix 1, Agricultural services, shows the actual listings in the telephone directories for each town in 1951 and 1986. Although Kemptville and Elmira lost some establishments between the two years, nonetheless they offer an extensive range of services specifically useful to the farm business. Gore Bay on the other hand, has a rather dismal list of services for agriculture, a feature which is consistent with the expected lack of farm services in a declining agricultural region. Gore Bay never had much in the way of agricultural services in 1951, so the failure to improve its range of agricultural services by 1986 is not unexpected when compared to Elmira. This finding is consistent with the literature which states that "the farmer on the margins has extremely restricted opportunities compared to the farmer in the core region for the accumulation of new equipment and materials necessary to run and expand operations" (Beattie et al., 1981: 22).

Semi-Agricultural Services

A range of services, such as plumbing and building supplies, contractors, hardware, stores and garages, termed here semi-agricultural services, cater to both the agricultural side of the farm business and to the farmer's household needs, as well as to the non-agricultural community at large. For example, a Canadian Tire store sells to farms and other businesses, and to both the agricultural and non-agricultural household sectors. Appendix 2 lists the semi-agricultural services compiled from the telephone directories of each town. Table 3.4.1 indicates that there was roughly a doubling of the number of semi-agricultural establishments in each town between 1951 and 1986. But again, the range of services available in Elmira was greatest followed by Kemptville and finally Gore Bay, a distant third. Gore Bay had the fewest semi-agricultural services with only one quarter of

Kemptville's and nearly one seventh of Elmira's number. The greater range in Elmira is not unexpected given its greater size, but what is important is the trend in Gore Bay to relatively fewer services between 1951-1986. Part of the trend in Gore Bay can be explained simply by the number of farms and population generally within the respective regions but also the relative decline of Manitoulin Island compared to southwestern Ontario.

One result of the relative decline in semi-agricultural services in Gore Bay is that farmers are forced to travel longer distances to purchase needed supplies for the farm. So what is unavailable in Gore Bay might be obtained in Little Current or some other town on the Island, otherwise the farmer is forced to travel to Espanola or Sudbury adding to expense and time. The author's survey found that roughly half of all farmers are willing to travel distances up to 140 miles to purchase needed semi-agricultural supplies for the home or farm (Appendix 6). The purchase of off-Island supplies is a negative feature in a region already saddled by many undesirable agricultural attributes.

Credit and Financial Services

In 1951 Gore Bay had one bank and one insurance agent, Kemptville had one bank and four insurance agents, and Elmira had three banks and four insurance agents. Even with the limited range of credit and financial services available in 1951 farmers near Elmira had greater choice in credit and financial services than farmers in either Gore Bay or Kemptville. By 1986 Gore Bay's credit and financial services had grown little to only five listings, while Kemptville had 19, and Elmira had 41 such services (Table 3.4.1).

Credit and financial services available to farmers increased in each town between 1951 and 1986. Gore Bay had the smallest increase in numbers followed by Kemptville and Elmira with the largest. Elmira and Kemptville had a much wider range of companies available (Appendix 3). Elmira offered the greatest number of options to its farmers (Table 3.4.1). The relatively small increase (from 2 to 5) in the number of credit and financial services listed in the telephone directory of Gore Bay re-inforce the hypothesized declining nature of Manitoulin Island agriculture. Even though the possibility exists for the few financial services situated in Gore Bay to be large, there is, nevertheless, a decided lack of them. The key point is that a restricted choice of financial services hampers the farmer's ability to expand operations and restricts the accumulation of capital to purchase necessary inputs (Beattie et al., 1981; Manning and McCuaig, 1982).

Farmers revealed in the author's survey that there were not enough banks on the Island which resulted in poor competition, and excessive travel distances to the bank (15 miles on average). Interestingly, 16 of the 30 farmers surveyed found everyday banking services on the Island to be adequate, and half of farmers indicated loans were difficult to obtain because of the risks involved in farming, and the time needed to approve farming loans was said to be excessive. Most farmers related to the author they felt banking problems were experienced by farmers in general and as such were not exclusive to the Island. These same farmers related that Island banks were once able to approve farming loans but now head office authorization must be sought before any loan is given.

Gore Bay's credit and financial services have grown very little since 1951 relative to the scale of growth in either Elmira or Kemptville. The author felt Gore Bay to be representative of the general lack of credit and

financial services to be found on the Island. The Manitoulin Island farmer shopping for competitive credit and financial services to expand his operations is less likely to negotiate terms as favourable as his counterparts in southwestern Ontario and to a lesser extent eastern Ontario. The relative deterioration of Gore Bay's credit and financial services further re-inforced the hypothesis of declining Island agriculture.

Social and Community Services

The process of decline in community infrastructure, such as schools, community services, general retailing (part of social and community services), or the failure to keep up with what is thought to be acceptable norms, further reduce the attractiveness of an area to the residents or to potential in-migrants (Beattie et al., 1981: 24). Table 3.4.1 indicates the marked differences in the number of community services available to the residents of the three towns. Although community services expanded in all three towns between 1951 and 1986, the difference in the range of community and social services available to each widened dramatically over this period. In 1951 Gore Bay had 42 listings, Kemptville had 61 and Elmira had 115. By 1986 Gore Bay had 99 listings while Kemptville had 279 and Elmira had 411 (Table 3.4.1). Examination of the types of social and community services available to each of these three towns revealed the dominant position of Elmira (Appendix 4).

The personal survey as it related to social and community services on the Island led to some interesting observations. It seems that for most everyday items, the Island can easily supply the needs of farmers, but, for specialty items, many indicated the need to make off-Island trips. The distances most farmers were willing to travel on the Island and to a lesser

extent off-Island to purchase these items was stated to be from 16 to 140 miles. Most farmers cited lower prices and greater selection as the chief reasons for making these long shopping trips to places such as Sudbury and Espanola. Most farmers found the prices and selection of groceries on the Island to be within acceptable limits, but again almost half related that frequent trips to Espanola (60 miles away for many) were justified because of selection and superior prices. The satisfaction of farmers with the above mentioned purchases was more favourable than first anticipated. These findings nevertheless support the general hypothesis of relative decline of Island agriculture.

The variety (range) of community and social services can be better understood by inspection of Appendix 4. Health care professionals and health-related services will be used for illustration. Table 3.4.2 was compiled using Appendix 4 and contains only those services listed under health care in the telephone directories of Gore Bay, Kemptville and Elmira.

Table-3.4.2 Health Care Professionals & Health Related Services Listed in the Telephone Directories of 1951 & 1986

Year	Gore Bay	Kemptville	Elmira
1951	dentist doctor drug stores(2) optometrist	(2) dentists (2) doctors (2) drugstores hospital (private) nursing home Red Cross surgeon	chiropractor (2) dentists (8) doctors (2) drugstores optometrists private hospital
1986	ambulance Cancer Society dentist (2) doctors drugstore Health Centre hospital (small) nursing home optometrist	ambulance chiropractic clinic (2) chiropractors community hospital (2) dentists district hospital (14) doctors (5) drugstores health council Health Unit Heart & Stroke Found. medical centre mental health association (3) nursing homes optometrists Red Cross Victorian Order of Nurses	(2) ambulances association for retarded (4) chiropractors (9) dentists denturist (11) doctors (3) drugstores General Hospital health clinic hearing aids Heart & Stroke Found. (2) medical gas medical group medical labs mental health association (3) nursing homes optician (2) optometrists Regional health Unit Victorian Order of Nurses

Sources of Data: The Bell Telephone Company of Canada, (1951, 1986). See Appendix 4.

It was evident that each town in 1951 had a restricted range of health services when compared to 1986. By 1986 each town had increased dramatically the range and number of most health care services. The number and variety of health services in Elmira and to a lesser extent Kemptville contrasted with Gore Bay's modest complement.

Elmira had a general hospital listed in its telephone directory, while Kemptville did not. This health service can be considered as a higher order

service because of its potentially wide usage not only by Elmira but also by towns and villages in the surrounding region. Many of these residents can make use of the general hospital in Elmira rather than having to travel to the next closest general hospital in Kitchener 15 miles away. The range of services available in a general hospital and not usually found in a community hospital are those involving major elective surgery and sophisticated emergency wards. Community hospitals tend to be involved in community health services, including simple operations. Immediate access to a general hospital is not available to the farmers of Kemptville or Gore Bay, which only have small community hospitals to serve their needs. Beyond the general hospital, health services were not terribly different in Elmira and Kemptville. Larger centres are assumed to have an increasingly negative influence on the range of health services offered in nearby smaller centres as distances between the two decline because specialized services can be more cost effective by centralization in the larger centres. The population base of small centres would not justify the expense of duplicating all health services already offered in the larger centres.

Services in general act as a magnet, keeping residents and drawing new immigrants to a community. They make life easier and more rewarding. Often the lack of services as on Manitoulin Island, whether agricultural or community, will force out residents especially the young tired of living in the backwaters of the province. The depletion of the range (variety) of agricultural and community support infrastructure makes life difficult for the remaining farm operators and tends to hasten their failure, "which in turn further erodes the need for the remnants of the supporting infrastructure in an ever-downward spiral" (Beattie et al., 1982: 24; Parson, 1977).

The author's survey of Manitoulin Island farmers indicated that routine medical ailments and very minor surgery could be treated at the two Island hospitals. All farmers questioned by the author stated that the level of services offered by these two hospitals to be of excellent quality, and they were satisfied with their family doctors. The majority of farmers surveyed also indicated the need to remove patients with serious ailments or those requiring major surgery to one of three Sudbury general hospitals. Most farmers also mentioned the Island was connected to Sudbury by helicopter air ambulance which improves the level of health services available to Manitoulin Island residents. Although health services on the Island were better than anticipated, the need to remove serious health cases to Sudbury because of a lack of personnel and/or equipment reinforces the marginal nature of the area.

Transportation

Successful farming is based on a number of critical variables, one being transportation, which entails the ability to convey farm produce to buyer, and supply the farm operator with necessary supplies (Symons, 1972: 72). Transportation charges have always made up a large fraction of the costs of agricultural production, and minimizing these costs will extend the areas of production for any market. The relationship of transportation to dairy and beef cattle production is discussed below as these commodities are all important to the agricultural income of Manitoulin Island.

Dairying is a protected and highly regulated industry and is therefore more stable than the beef cattle industry. In a marginal situation it is expected that dairying would not lose market share or producers to the same extent as in the beef cattle industry. The hypothesis of this section is that,

because the dairy industry is protected, transportation will play much less of a role in contributing to the relative agricultural decline of Manitoulin Island than would be the case for the unregulated beef cattle industry.

Theory suggests a relationship between distance from transportation and distance to market and the ultimate profits that may be realized by the farmer (Ilbery, 1985; Symons, 1972). In the case of Manitoulin Island the only point of shipment of agricultural products to market since the 1940's has been Little Current, the only land-link to the mainland (Map 4.1.1). It is to Little Current that Island farmers must take their cattle to be transported to market if they are not consumed on the Island.

Manitoulin Island provides a small market for its agricultural produce and the regions of northern Ontario would seem the likely destination for any surplus. The distances from the Island to Sudbury and Sault Ste. Marie are roughly 60 and 150 miles respectively or about a third of those to southern Ontario, and it would be in the best interest of farmers to sell into these markets as smaller transportation charges would mean a higher margin of profit. But the attempted penetration of the urban markets of Sault Ste. Marie and Sudbury have not met with great success, and they are as unresponsive to cattle or other Manitoulin commodities as they were earlier in the century (Nesbitt, 1976). Southwestern Ontario agriculture easily competes against the Island's agricultural produce in both Sault Ste. Marie and Sudbury because lower cost of production more than compensates for the extra transportation charges levied to ship produce to these northern markets (Nesbitt, 1976).

Setting aside the physical differences mentioned in Chapter 2 the distances Manitoulin Island produce must be shipped to compete in the large southwestern Ontario market show how disadvantaged Island farmers really

are. Analyses of the beef and dairy industries are used to illustrate the disadvantages of Island farming as these sectors have accounted for nearly 90 percent of farming income over the last few decades (Wightman, 1982).

Dairy Transportation

The next few paragraphs are felt to provide background material useful to understanding the dairy transportation system used in the regions of this study. The transportation of milk prior to the formation of the Ontario Milk Marketing Board (OMMB) in 1965 was highly inefficient. Competition between milk transporters resulted quite often in different milk trucks servicing neighbourhoods on the same road. The cost in milage, time and energy all added to milk producers' costs and reduced transporter profits (OMMB, 1988a).

Transportation routes today are set up so that neighbouring producers are served by the same transporter if at all possible. Because there has been one quality standard for milk since 1982, whether the milk is used for the beverage or industrial milk market, there have been further opportunities to rationalize routes and reduce costs (Hurd, 1982). The rationalization of milk transportation has resulted in reducing the payment that producers make to the transportation pools through their milk cheque deductions.

Each farmer pays a set charge per hectolitre of milk shipped to cover the costs of transportation. The actual cost of transportation vary between geographic areas (or pools) depending on how close producers are to each other and milk processors (Hurd, 1982). Ontario has been divided into four transportation pools, with all areas within a pool paying the same charge (Table 3.4.3). Southern Ontario, the Thunder Bay area, Kenora-Rainy River and the rest of Northern Ontario make up the four pools (MacDonald, 1988).

**Table-3.4.3 Ontario Milk Marketing Board Transportation Deductions
per Hectolitre of Milk Shipped (May 1, 1988)**

Milk Pool	Transportation Charges per Hectolitre Shipped
Southern Ontario	\$2.05
Northern Ontario	\$2.30
Thunder Bay	\$1.75
Kenora-Rainy River	\$3.65

Source: The Ontario Milk Marketing Board, (1988).

Thunder Bay has the lowest transportation charges because of the proximity of producers to their local market. Southern Ontario and then Northern Ontario have the next lowest charges. The Kenora-Rainy River Pool has the highest transportation charge because of the substantial distances between producers and processing facilities in that area (Table 3.4.3).

Manitoulin Island is within the Northern Pool, while both eastern and southwestern Ontario fall are within the Southern Pool. This means that the Manitoulin Island dairy farmers pay approximately 11 percent more to ship their milk than do operators in the other two comparison areas (Table 3.4.3). This implies a lower margin of profit for the Island farmer who already has to contend with land of lower agricultural capability on which to grow feed for dairy cattle.

Beef Cattle Transportation

Transportation is important to the beef cattle sector as this sector is the largest generator of farm income on Manitoulin Island with beef farms outnumbering dairy farms by more than ten to one (Census of Agriculture,

1986; Wightman, 1982). Prior to 1944 cattle transportation on the Island was haphazard and difficult, as farmers made separate arrangements with drovers. In 1944 a cooperative began to organize trucking services for farmers. Without this transportation service to an established sale barn many a small farmer was at the mercy of cattle dealers and drovers who tended to under-value cattle in a farmer's barnyard (Judges, 1988).

After 1944, there have been organized cattle sales at Island sales barns where farmers have received reasonable returns for their efforts. However, not all cattle produced on the Island are sold there. Although a limited number of Island cattle are shipped to Waterloo and Toronto, the major competitors for the sale of Island cattle, however, are the sales barns located in Grey and Bruce Counties (Judges, 1988: IV.6). These sales barns in Grey and Bruce are located in the towns of Keady, Hanover, and Cargill.

In the summer, buyers from Keady, Hanover and Cargill are sent to Manitoulin Island to get commitments from the local cattle producers to ship to their respective sales barns. These advance buyers promote low commission rates, and higher prices than would be available on the Island. The cattle farmers of Manitoulin Island, who use the Grey and Bruce sales barns, appear pleased with the level of service (Judges, 1988). Island farmers indicate that the Grey and Bruce sales barns will send a truck to pick up cattle after only a telephone call has been made with transportation charges deducted from the sale price.

A similar service is operated by the sales barn in Little Current, and the operators of these barns truck Island cattle to the sale from anywhere on the Island. The cattle producer does not have to physically transport his own cattle to market regardless of whether an Island or southern Ontario

sales barn in chosen. The competition between sales barns has been a real benefit to cattle producers because it improves their bargaining position.

The author's survey of Manitoulin Island farmers is interesting because it generally confirms Judges' (1988) transportation findings. The survey indicates that the farmers on the Island are generally satisfied with the quality of transportation available to them but were unanimous in voicing their disappointment with its high cost. The Manitoulin farmers surveyed were particularly careful to explain that the high cost of transporting beef cattle to market was the single biggest impediment to their effective competition at the Public stockyards in Toronto, and sales barns of southwestern Ontario. Those farmers who shipped cattle to the Little Current sales barns for auction indicated that, although the costs of transportation were relatively low because of the short distances on the Island, the prices eventually paid by off-Island buyers had to reflect the need for further transportation to southern Ontario.

The survey indicated that routes used to transport cattle depend on the season. A summer ferry from Manitoulin to the Bruce Peninsula substantially reduced shipping time, and hence costs, to southern Ontario. In winter, cattle must be shipped the overland route around Georgian Bay to reach southwestern Ontario, a route which can double the distance of the summer journey. Even though farmers related that transportation was reliable and prompt, the costs associated with farming in a physically limited region relatively isolated from its markets supported the general hypothesis of the marginal nature of Manitoulin Island agriculture.

Marketing

Dairying is a protected and highly regulated industry and therefore is more stable than the beef cattle industry. In a marginal situation it should be expected that dairying would not lose market share or producers to the same extent as in the beef cattle industry. The hypothesis is that because the dairy industry is protected it will not have declined in relative terms to the same extent as the beef cattle industry on Manitoulin Island compared to the other regions under study. The discussion below involves an assessment of the dairy and beef cattle marketing strategies used in the study areas.

Dairy Marketing

Commercial dairying on Manitoulin Island began in the 1960s with the formation of the Ontario Milk Marketing Board (OMMB). It is "ironic that the only other successful endeavour in the search to diversify agricultural income on the Island has again proved to be with cattle" (Wightman, 1982: 200). In a move to specialized beef rearing, many Island farmers turned away from dairy production. With the encouragement of the Ontario Milk Marketing Board, certain farmers have elected to keep dairy cattle, which have since proven to be remunerative (Wightman, 1982: 200).

The Ontario milk producers' organizations in 1960 were fragmented and lacked clear direction and purpose. This disunity was the direct result of a weak bargaining position in the marketplace. Returns to the vast majority of milk producers for labour, management and investment were inadequate and there were numerous inequities and inefficiencies in the milk marketing system (OMMB, 1988b). In 1963 the Ontario government commissioned a study to determine how to solve what appeared to be an ever increasing problem (Hurd, 1982: 3).

To accomplish its objectives the OMMB received advice on matters of concern to the dairy industry from 54 County and District Milk Committees. Milk producers from each area elect representatives to these committees. These committees represent the views of more than 9,800 licensed farms producing milk in Ontario as of 1988 (OMMB, 1988b).

The quota system introduced by the OMMB regulates milk production to strict limits, with penalties applied for over-production, or the production of inferior quality milk. On Manitoulin Island milk production levels have remained essentially the same, varying between 3,984 hl in 1975-76 to 3,891 hl in 1986-87. Provincial milk production in 1975-76 was 2,417,963 hl and in 1986-87 it was 2,313,294 hl (MacDonald, 1988: 8). The number of milk producers on Manitoulin Island has remained quite stable over the years, due in large measure to the stabilizing influence of the OMMB. The decline in the number of farms producing milk on Manitoulin Island between 1976 and 1987 was roughly 16% while provincial decline over the same period was 36% (Table 3.4.4). However, other areas that have had a more rapid decline may have had better opportunities to convert to other types of farming.

Table-3.4.4 Licenced Milk Production Units in Ontario 1976 to 1987

County/ District	1976	1978	1981	1982	1983	1984	1985	1986	1987
Manitoulin	19	19	17	17	17	17	16	16	16
Province	15,446	12,340	11,524	11,346	11,135	10,846	10,504	10,179	9,935

Sources of Data: The Ontario Milk Marketing Board Statistical Handbooks, (1984-85) & (1986-87).

The benefits to Manitoulin Island of the OMMB can be seen in the maintenance of market share and a slower percentage decline in the number

of dairy farms than in the province at large. All dairy farms within respective milk pools receive the same payment for each unit of milk shipped and get the same deductions for transportation of that milk from their monthly OMMB cheques, (Tables 3.4.5 and 3.4.3 respectively). This marketing organization has greatly improved the chances of once struggling dairy farmers receiving adequate compensation for their work. On Manitoulin Island a dairy quota from the OMMB is considered remunerative by Island standards and has therefore encouraged farmers to continue in dairying (Wightman, 1982).

Table-3.4.5 Producer Milk Prices For Class 1 Milk (May 1988)

<u>Milk Pool</u>	<u>OMMB Payment to Farmers</u>
Southern Ontario	\$54.51/hl
N. Ont., Thunder Bay	\$55.80/hl
Kenora-Rainy River	\$57.80/hl

Source: The Ontario Milk Marketing Board (1988).

The stabilizing influence of the OMMB is a major reason for the small decline of dairy farms on Manitoulin Island as seen above. A lack of viable alternatives due largely to physical limitations on the Island also contribute to the durability of dairy farms there.

Profits of dairy farmers are due to the efficiency of their operations and the production of low cost feed for their cattle. Since all dairy farmers within each Milk Pool pay the same rate for transportation of milk and receive the same payments for milk shipped, it is incumbent upon each farmer to operate as efficiently as possible. All dairy farmers must sell their milk to the OMMB so better access to markets cannot be used as a reason for

success or failure of dairy farms in Ontario. The ability of the Island to maintain its relative share of the dairy farms in the province supports the section hypothesis concerning stability in this highly regulated industry. This finding runs counter to the general hypothesis predicting a relative decline of agricultural activity on the Island, and the shift of agricultural activity towards the higher capability lands of southwestern Ontario.

Beef Cattle Marketing

The Manitoulin Island cattle producers' nearly total reliance on one commodity underlines the importance of efficient beef marketing if their share of a declining industry is to be maintained. It was felt that conditions in the beef industry will support the hypothesis of decline of Manitoulin Island's agriculture relative to the more advantaged areas of southwestern Ontario.

Consumer preferences and changing tastes directly affect the demand for Ontario beef. Any decline in that demand means that producers must compete for a larger share of a shrinking market with dire consequences for those unable to compete. The population of the country is growing at less than 1.0% annually and as such is getting older, and consuming less food on a volumetric basis (Judges, 1988). The Canadian per capita consumption of beef declined steadily during the decade ending in 1980, levelling off during the last five years (Judges, 1988: II.1). Even though the beef industry has been fighting these trends with campaigns promoting beef consumption, there is nothing to indicate that with a stable population and a constant per capita consumption, the demand for beef products in Canada will change significantly in the years ahead (Table 3.4.6).

Table-3.4.6 Trends in Per Capita Consumption of Beef & the Canadian Cattle Population 1982-1987

	1982	1983	1984	1985	1986	1987
Per Capita Consumption of beef in Canada (kg)	40.4	40.0	38.3	38.8	38.8	38.2
Beef Cattle Population						
(,000) - Canada	3,401.0	3,302.0	3,254.0	3,109.0	3,242.0	3,255.0
- Ontario	365.0	365.0	357.0	350.0	344.0	345.0
- Manitoulin	8.3	8.5	8.5	8.0	7.5	7.0
- Grey Co.	29.0	30.0	30.0	28.0	29.8	31.0
- Bruce Co.	19.0	21.0	20.0	21.0	20.9	20.0

Sources of Data: Census of Agriculture (1981, 1986), Ministry of Agriculture and Food (1987) Judges (1988,II.4).

There are year-to-year fluctuations in the Canadian cattle population as farmers build up and sell off their herds according to consumer demand. The long term picture indicates that the total number of beef cattle in Canada has declined at roughly the same rate as the per capita consumption of beef (Table 3.4.6). In Ontario the beef cattle population has declined 5 percent between 1982 and 1987 (Table 3.4.6).

There have been some recent shifts in the size of the beef cattle herds recorded in specific counties (Judges, 1988). The Counties of Grey and Bruce located south of Georgian Bay are primarily beef cattle producing areas that have shown growth in a declining industry. Their predominant agricultural activity in 1976 was mixed farming, specializing in beef, with hogs, poultry, and sheep also important but secondary (McCuaig and Manning, 1982: 78). Grey and Bruce actually expanded their percentages of Ontario's total beef cattle population (Table 3.4.6). In contrast to Grey and Bruce Counties, Manitoulin Island's beef cattle population declined by 16 percent between 1982 and 1987. The Island's beef cattle population declined at three times

the Ontario rate reinforcing the hypothesis of absolute agricultural decline of this region within the province (Table 3.4.6).

Cattle change hands weekly in the province usually at community sale barns. On Manitoulin Island sales barns have been run by an agricultural cooperative. The Cooperative offers the same services to major buyers as the drovers, and accordingly farmers have obtain prices up to 20 percent higher for their cattle (Judges, 1988). Table 3.4.7 indicates the total number of Ontario cattle sold through community sales barns has declined from 1982 to 1987. Regional increases in cattle sales have occurred at Grey and Bruce community sales barns for the same period. The northern and eastern Ontario percentages of total cattle sold have remained relatively constant (Table 3.4.7).

Table-3.4.7 Cattle Sales Through Community Sales Barns in Ontario

	(thousands)					
	1982	1983	1984	1985	1986	1987
Total in Ontario	818	841	819	788	790	730
Grey & Bruce Co.	118	123	121	140	170	157
Northern & Eastern Ont.	40	39	35	34	37	41

Source: Judges (1988: II.4)

Manitoulin Island has over the last five years lost market share to Grey and Bruce Counties. In 1982, Manitoulin Island had 2.3% of Ontario's beef cattle population, by 1987 it had dropped to 2.0%. Grey and Bruce Counties have increased their combined share from 13.2% to 14.7% (Table 3.4.6). Even though Manitoulin Island cattle have a reputation for quality and receive good prices at cattle sales their market share has been declining nonetheless (Judges, 1988; Wightman, 1982). This supports the general

hypothesis of the relative decline of Island agriculture and the shifting of agricultural activity toward the better lands in southwestern Ontario.

Manitoulin Island's declining share of the Ontario beef cattle industry is the result of an inability to compete with cost of production in other parts of the province due in part to relative spatial isolation from markets and lower land capability. Grey and Bruce Counties are able to produce cattle for market at prices giving their farmers a reasonable living because they are not affected to the same degree by problems affecting Manitoulin Island farmers. Even though Manitoulin Island produces high-quality beef, the costs of production for the provincial marketplace ensures only the leanest farms survive. Supply and demand run the cattle industry and regardless of high quality the declining demand for Island cattle has been translated into a reduction in supply by Island farmers.

The author's survey of Island farmers generally supported what has already been written above concerning the marketing of cattle. The survey revealed that 25 farmers (83 percent) on the Island considered their farms to be beef or mixed beef operations, and 4 farmers (13 percent) identified their operations as mixed dairy. Beef cattle are overwhelmingly important to Island agriculture. When asked if they were satisfied with arrangements to market their cattle most farmers voiced strong opinions. Farmers in general said that Island cattle do compete well against southern Ontario cattle at auctions and they were sought as breeding stock by southern Ontario cattle producers. According to the survey the greatest handicap to farming on the Island was the distance from the major markets in southwestern Ontario where virtually every farmer shipped varying quantities of cattle. This distance in fact forced Island farmers to compete at a disadvantage because of the high costs involved in moving their cattle to auction. These

findings confirm the hypotheses of relative and absolute decline of Manitoulin Island, and the predicted shift of agricultural activity toward the more productive lands of the province.

Hypotheses and Capital/Economic and Community Infrastructure Variables

Overall it has been shown that the hypotheses as stated in Chapter 2 have indeed been confirmed with some exceptions. The general hypothesis of relative agricultural decline has been confirmed by the majority of the variables in this section. The agriculture of Manitoulin Island has declined partly because of its poor physical base in favour of southwestern Ontario. The variables that do not support this general hypothesis relate to the dairy industry. There has not been relative decline in the dairy industry of the Island precisely because of the stability provided by the OMMB which minimizes the risk for dairy farmers in this physically limited land.

Conclusion to Analysis of Agro-Economic Variables

An investigation of changes in agricultural viability of Manitoulin Island was undertaken in this chapter using the land, labour, and capital/economic and community infrastructure variables as listed in Chapter 2. The findings of this chapter point to both an absolute and relative decline of Manitoulin Island agriculture especially compared to southwestern Ontario but also eastern Ontario, as even that region was initially considered to have agricultural traits similar to the Island. Trends in the great majority of variables used support this. The general hypotheses of absolute decline of the Island, and the relative decline and shifting of agricultural activity toward the better lands of the province have proven to be reasonable. The findings of this chapter support the work done by Bowler (1986: 17) in a

study of the European Community where it was found that "productive resources and the output of particular products have become confined to fewer but larger farm businesses, or to fewer regions or countries in the EC".

CHAPTER 4

PATTERNS OF AGRICULTURAL CHANGE ON MANITOULIN ISLAND

4.1 Description of Manitoulin Island

This study uses differing scales of investigation - from Census Divisions at the provincial level to the Census Consolidated Subdivisions at the Island level - to trace the nature of agricultural change on Manitoulin Island (Map 4.1.1). The literature search did not reveal any existing studies investigating a range of scales similar to those used in this study. However, expectations are that the direction of change at the provincial level (retrenchment in marginal areas) will be identifiable within Manitoulin Island itself, implying a concentration of agricultural activity on the better lands of the Island. Before an analysis of patterns of agricultural change within the Island, it is useful to examine differences in physical attributes and socio-economic infrastructure across the Island.

The climate of Manitoulin Island differs from that of the mainland, largely because of the moderating influence of Lake Huron and the North Channel. The Island has a slight winter maximum and summer minimum in precipitation. The light rainfall in spring is desirable because it allows the land to dry up and be cultivated, while the summer months are dry resulting in a higher drought frequency (relative to the whole year) (Hoffman and Wicklund, 1959: 17). Summer pastures as a result tend to wither and the carrying capacity of the natural pasture is considerably diminished. The climate of Manitoulin Island is in brief one of moderately cold, snowy winters with late springs, dry and sunny summers and clear autumn skies (Hoffman and Wicklund, 1959: 17).

Source: Statistics Canada, 1986.

MANITOULIN ISLAND

LOCATION OF CENSUS CONSOLIDATED SUBDIVISIONS^S

^S Census Consolidated Subdivisions (CCS) consist of either one or more of the original townships. The combination of two or more townships to form one CCS was undertaken to protect the confidentiality of farm operators.

* Indian Reserve, no commercial agriculture.

There are, however, local variations in the climate of the Island. The western half of Manitoulin Island has a slightly lower average winter temperature according to records for the meteorological stations located on the Island (Hoffman and Wicklund, 1959). This difference is further demonstrated by the 2.5 Agroclimatic Resources Index (ACRI) isopleth which divides the Island into two (Map 2.2.1). The eastern third of the Island has an ACRI greater than 2.5, while the western two-thirds is below 2.5, indicating the greater potential productivity of the former (Williams, 1975).

The internal physical differences encountered over the length of the Island are striking even to the casual observer. The key physiographic feature controlling agriculture on Manitoulin Island is the depth of surficial materials (Chapter 2). Large parts of the Island consist of scoured rock plains that are flat and covered with only a few inches of soil. In general the western half of the Island contains large areas essentially devoid of soil, and the frequent swamps clearly indicate drainage problems. The eastern areas of the Island have soils deep enough for agriculture.

The use of the Canada Land Inventory (CLI) classification of soil capability for agriculture illustrates the distribution of classes 1-3 soils on the Island. Map 4.1.2 indicates the percentage of classes 1-3 soils in each Census Consolidated Subdivision on the Island. It can be seen that the southcentral and southeastern portions of the Island have soils that are potentially more useful for agriculture according to the CLI.

Manitoulin Island is still very much a rural area; its two small towns, Gore Bay and Little Current, together contain about 2,400 people as of 1986 (Census of Population, 1986). There are also two small unincorporated villages and about ten rural hamlets (Chapman and Putnam, 1984).

Sources of Data: Report No. 8. Ministry of Agriculture and Food, Hoffman and Noble, 1975.
Base Map, Statistics Canada, 1986.

MANITOULIN ISLAND

PERCENTAGE OF THE TOTAL AREA OF C.C.S. CLASSES 1-3 CANADA LAND INVENTORY

Percent of Total Area

* Indian Reserve, no commercial agriculture.

Although the Island is well serviced by roads, transportation to the mainland is a weak link in the agricultural system. The only road connecting Little Current to the trans-Canada highway on the mainland remains rough and winding. Prior to the 1950s, connection to the mainland was by ferry at Little Current. Since then transportation to the Island has been significantly improved by a swing bridge built as a replacement for this ferry (Wightman, 1982). The ferry connecting South Baymouth on the southeast corner of the Island to Tobermory on the Bruce Peninsula can be used to ship agricultural produce and supplies to and from the Island. Although this ferry helps alleviate congestion on the highway to the Island, its service is seasonal, and is congested by vacationers during the summer months.

4.2 Spatial Units, Hypotheses and Data

A selection of the agro-economic variables used in Chapter 3 to assess the agricultural change on Manitoulin Island relative to other Counties of Ontario was used to find patterns of change within the Island itself (Table 4.2.1). The rationale for employing these variables was that they were key ones for distinguishing increasing agricultural marginality in Chapter 3 and would thus help identify a core/marginal dichotomy on the Island. It is hypothesized that the marginal lands of Manitoulin Island will have lost agricultural output both in absolute and relative terms to the higher capability areas.

Table 4.2.1 Selected Agro-Economic Variables

average farm size
change in the density of farms
total acres improved land per CCS
percentage change in total farmland improved
percentage increase in total farmland rented
percentage increase in days worked off-farm per farmer
percentage increase in full-time farmers
percentage of total value of Island agricultural land and buildings per CCS
percentage of total value of Island livestock per CCS
percentage of total value of Island agricultural machinery per CCS

Source: Beattie et al., (1981: 33) Environment Canada (1972)

The spatial unit used in this analysis is the Census Consolidated Subdivision (CCS). Census Consolidated Subdivisions consist of both individual townships, and aggregates of townships that have been grouped to meet confidentiality requirements in the publication of Census data. Data for 1951 were available by individual township on the Island, whereas in the 1986 Census some townships had been aggregated into Census Consolidated Subdivisions. One further aggregation made by the author was necessitated by a boundary change between Assiginack and Howland townships that took place between 1951 and 1986. These two townships therefore were combined and named Assiginack-Howland (Map 4.1.1). The Indian Reserve on the eastern peninsula of Manitoulin Island is one CCS that has not been included in this study of agricultural patterns because it lacked commercial agriculture (Statistics Canada, 1951, 1986). All boundaries used in this analysis are identical in 1951 and 1986 including the amalgamation of Assiginack and Howland. For each year of analysis data were assembled on the basis of these spatial units.

4.3 Cartographic Analysis of Patterns

As established in Chapter 3 larger farms are generally expected when marginal physical conditions prevail because more land is needed to ensure a workable amount of arable land is included on the farm (Beattie et al., 1981; Troughton, 1977). Within Manitoulin Island the largest farms are found to coincide with the harsher climate and inferior soil conditions of the western areas of the Island (Map 4.3.1). The largest percentage increases in farm size have also been observed on the western half of the Island from 1951 to 1986 (Map 4.3.1). This in fact mirrors the greater growth in the size of Manitoulin Island farms compared to those of southwestern Ontario.

A measure of farm viability is the density of farms on the landscape (per CCS) expressed as farms per unit area. Within any given region a relatively higher density of working farms can be found on the most productive farmland. Farm densities have declined throughout Manitoulin Island during the 1951-1986 period. In 1951 farms appeared to be well spread out over the Island with the exception of the western most CCS which had a low farm density (Map 4.3.2). By 1986 there appeared to be a greater gap in the density of farms per CCS with much higher farm density in the east half of the Island. Agricultural activity became more localized (concentrated) on the eastern half of the Island over the study period. The greater decline in the density of farms on the western half of the Island supports the hypothesis that decline of agricultural activity has a tendency to occur on the more marginal and isolated areas of Manitoulin Island.

Sources of Data: Statistics Canada, 1951, 1986.

MANITOULIN ISLAND

AVERAGE FARM SIZES IN ACRES PER CCS 1951-1986

Percentage increases in farm size from 1951-1986
have been indicated in brackets { }.

* Indian Reserve, no commercial agriculture.

Sources of Data: Statistics Canada, 1951, 1986.

MANITOULIN ISLAND

CHANGE IN THE DENSITY OF FARMS PER CCS 1951-1986^S

^S Density of Farms per Census Consolidated Subdivision calculated by dividing the total number of farms by the total area of each CCS in square miles. Density given in farms per square mile.

* Indian Reserve, no commercial agriculture.

Another measure of agricultural health is the concentration of total area of improved farmland, a measure that incorporates land quality (Ilbery, 1985: 102). Map 4.3.3 shows the total area of improved farmland per CCS over the study period. It can be seen from Map 4.3.3 that many Census Consolidated Subdivisions on the Island experienced an absolute decline in the area of improved farmland. It is significant that the eastern half of the Island maintained or even increased its relative share of (percentage of the total improved acres on the Island) improved farmland over 1951-1986.

The percentage change in improved farmland is an important indicator of agricultural health on the Island and all CCSs showed an increase in percentage of improved farmland except Assiginack-Howland (Map 4.3.4). This decline in percentage improved land for this one CCS is surprising because this section of the Island has the best climate for agriculture in addition to maintaining the greatest density of farms over the 1951-1986 period (Map 4.3.2). It could be that more unimproved land was taken into the farms of Assiginack-Howland with the expectation that in the near future it would be improved. It must also be remembered that Assiginack-Howland has only 12 percent of its land in CLI classes 1-3 so a decline in percentage improved farmland might not be completely unexpected (Map 4.1.2). The changes in density of farms per CCS and the concentration of improved farmland on the Island indicate that marginal lands of Manitoulin Island lost agricultural activity in both absolute and relative terms to the higher capability areas.

As discussed in Chapter 3 the increase in rented farmland has been connected with expanding agriculture and a greater desire to utilize modern machinery to the fullest (Ilbery, 1985). Increases in rented farmland

commonly occur when a farmer, willing to expand the farm, is unable to do so by purchasing the needed land (Troughton, 1982). Often this rented land is not contiguous with his own, resulting in fragmentation of the farm. Increases in rented farmland therefore is more likely to be found in areas of relatively healthy agriculture. A greater incidence of rented farmland has been shown to occur in areas of higher capability farmland, e.g. southwestern Ontario had a higher percentage increase of rented farmland than either Manitoulin Island or eastern Ontario (Figure 3.2.6). Similarly, the eastern and central parts of the Island had the greatest relative increase in rented farmland with some of their CCSs experiencing double or triple the percentage increase occurring in the physically poorer western third of the Island, which is less desirable for agriculture (Map 4.3.5).

Sources of Data: Statistics Canada, 1951, 1986.

MANITOULIN ISLAND

PERCENTAGE CHANGE IN TOTAL IMPROVED FARMLAND PER CCS 1951-1986

* Indian Reserve, no commercial agriculture.

Map 4.3.4

Sources of Data: Statistics Canada, 1951, 1986.

MANITOULIN ISLAND

PERCENTAGE INCREASE IN TOTAL FARMLAND RENTED PER CCS 1951-1986

Percent Increase

* Indian Reserve, no commercial agriculture.

Map 4.3.5

The variables of days worked off-farm and the percentage of full-time farmers are important in determining intra-Island differences in labour patterns that may exist between more marginal and isolated areas and the "core" areas of agriculture. There is need and opportunity associated with the above mentioned variables and they do not necessarily coincide. Those farmers most in need of off-farm work to supplement inadequate income tend to work relatively isolated marginal land located in areas with fewer opportunities for off-farm employment. In the case of Manitoulin Island the eastern half had the greatest percentage increase in days worked off-farm per farmer per CCS, possibly indicating more opportunity than in the west to find work. The western half of the Island is much further from the bridge connection to the mainland at Little Current and so remains outside reasonable commuting distance to the relatively greater employment opportunities available on the mainland (Map 4.3.6). Non-farm employment can be secured in places such as the Inco quarry operations or the pulp and paper mill which are roughly 10 and 30 miles from the Island respectively.

The farmers that took part in the author's survey were distributed between what are believed to be "core" and "marginal" areas of Manitoulin but the small survey size did not allow for the analysis of differences in their responses. The author's survey of Island farmers indicated that a third of off-farm work opportunities were initiated by local and provincial governments in employment such as road maintenance, which was centred toward the more agriculturally productive and populated eastern half of Manitoulin.

Sources of Data: Statistics Canada, 1951, 1986.

MANITOULIN ISLAND

PERCENTAGE INCREASE IN DAYS WORKED OFF-FARM PER FARMER BY CCS 1951-1986

Percent increase

228-344

152-227

76-151

0-75

* Indian Reserve, no commercial agriculture.

Map 4.3.6

Map 4.3.7

The percentage of farmers able to continue farming on a full-time basis at an acceptable standard of living can help measure internal differences in the agricultural health of a region. On Manitoulin Island the greatest increase (found) in the percentage of farmers occupied full-time as farmers was in the eastern half of the Island (Map 4.3.7). This concentration of full-time farmers toward the eastern half of the Island coincides both with the greater soil capability for agriculture of this part of the Island, and the greatest percentage increase in total rented farmland. (It is not by accident that full-time farming is related to higher levels of rented farmland). The case was previously made (Chapter 3) that only those farmers prosperous and forward looking enough would have need to expand production through renting farmland. The connection of greater percentage increases of both full-time farming and rented farmland on the eastern half of the Island is helpful in defining marginal and "core" areas of Manitoulin Island. The lower percentage increase in full-time farmers in the western half of the Island is possibly the result of problems in providing farmers with an adequate living due in part to the combination of relatively poor physical conditions and difficult access to mainland markets.

The author's survey indicated that farmers generally considered the western half of Manitoulin Island to be relatively disadvantaged as extra transportation charges are levied on goods shipped in and out of the west (over and above the high costs paid by eastern Island farmers). Even though there was a lower percentage growth in full-time farmers in the western part of the Island there was a lower percentage increase in days worked off-farm as well (Map 4.3.6). This supports the hypothesis of uneven decline in farming on the Island itself, and that agricultural decline within the Island

was predicted to have followed a pattern similar to that observed at the county level (Chapter 3). Agricultural patterns found on the island apparently represent a change of scale but not of processes.

A relationship was found between the greatest increases in farmland values and the location of the best farmland in the province (Chapter 3). The comparison of capital values of land and buildings, livestock, and machinery per CCS on Manitoulin Island for 1951 and 1986 re-inforces the patterns already found. Similarly, not all areas of Manitoulin Island shared equally in the change in the value of agricultural land and buildings from 1951-1986 (Map 4.3.8). The eastern half of the Island underwent a larger positive increase in the value of agricultural land and buildings. The land is more accessible and of higher quality than land in the west, indicating the willingness of farmers to invest in it.

The author's survey demonstrated that the increasing concentration in the value of agricultural land and buildings on the eastern half of the Island results from greater potential capability to produce agricultural commodities while the closer proximity to the bridge at Little Current and mainland markets reduces transportation costs. Farm operators indicated the greater concentration is partly due to the loss of marginal farms in the west and partly due to values rising more in the east, which spring from competition between farm and non-farm uses of farmland.

The change in percentage value of Island livestock per CCS was found to exhibit patterns similar to those for the value of land and buildings. Those CCSs managing to increase their share of the total value of livestock became relatively more important to Island agriculture. The eastern half of the Island especially Central Unorganized and Assiginack-Howland CCSs had an increasing share of Island livestock over the study period (Map 4.3.9).

Map 4.3.8

Sources of Data: Statistics Canada, 1951, 1986.

MANITOULIN ISLAND **CHANGE IN THE VALUE OF LIVESTOCK PER CCS** **AS A PERCENTAGE OF ISLAND TOTAL** **1951-1986**

Change in Percent

* Indian Reserve, no commercial agriculture.

Sources of Data: Statistics Canada, 1951, 1986.

MANITOULIN ISLAND

CHANGE IN THE VALUE OF MACHINERY PER CCS
AS A PERCENTAGE OF ISLAND TOTAL
1951-1986

Change in Percent

* Indian Reserve, no commercial agriculture.

Map 4.3.10

Prosperous farmland is usually associated with relatively high levels of mechanization, and relatively low levels are found in areas of stagnating agriculture (Beattie et al., 1981). Manitoulin Island had a lower investment in machinery per acre of farmland than either southwestern Ontario or the province (Figure 3.4.3). The value of Island agricultural machinery reflected patterns similar to those found to exist for the value of land and buildings, and livestock (Map 4.3.10). The total value of the Island's agricultural machinery had undergone a relative shift toward the eastern half of the Island and it is thought that farm failures on the western half of the Island help explain this shift. It is difficult to determine whether this is the result of more farms surviving in the eastern half of the Island in addition to intensification.

Even in a generally marginal agricultural area such as Manitoulin Island a core and margin can be distinguished which supports the hypothesis of unequal decline of intra-Island agriculture. Similarly at the county level a core and margin were identified lending further evidence for the concept of agricultural decline as a process separate from the scale of investigation. Bowler's (1986: 17) study of agriculture in the European Community makes reference to the processes of intensification and concentration which refers to rising levels of inputs to each unit of farmland, and "productive resources and the output of particular products becoming confined to fewer regions or countries" respectively. The localization of agricultural resources found to be independent of the scale of observation by this study are supported by Bowler's (1986) findings.

This chapter has shown evidence that there is reason to believe intensification and concentration are taking place on Manitoulin Island

although at a different scale than in Bowler's (1986) study. Most of the variables employed in this chapter point to a shift of agricultural activity toward the higher capability lands of eastern and southcentral parts of the Island.

CHAPTER 5

SUMMARY AND CONCLUSIONS

The overall aim of this study was to gauge the direction and degree of agricultural change between 1951 and 1986 on Manitoulin Island both in absolute terms and relative to other selected areas of the province, namely southwestern Ontario and eastern Ontario. An integrated view was used to assess this change which consisted of physical, social, economic, and spatial measurements. The integrated approach is based on integration of types of variables and techniques of analysis. The integrated approach used in this study is felt to result in a more balanced appreciation of a region's agricultural problems and potential. The author favours the use of a broadscale approach to the study of agricultural problems, as agriculture by nature is a complex interaction of human and physical variables.

The literature suggested that Manitoulin Island would be in a process of decline due to its poor physical base alone. As marginalization is a relative term, studying the nature of this change and comparing the results with other counties of the province has made it possible to determine whether or not Manitoulin Island's agriculture decline represented a core/marginal model. The decline of agricultural activity on Manitoulin Island itself was accomplished by applying the same concepts *i.e.*, marginal decline and greater localization in the core areas but at a different scale.

Although not completely unexpected, this study has clearly shown that Manitoulin Island has experienced absolute agricultural decline, and relative decline compared with southwestern Ontario and to a lesser degree eastern Ontario for 1951-1986. As Manitoulin Island is physically marginal,

and relatively isolated, its absolute agricultural decline is not without precedent. The Island without a doubt belongs to the retreating margins of agriculture which Troughton (1977) described as a "zone of marginal rural settlement." The Gaspé peninsula likewise also belongs to this "zone of marginality", as it shares many agro-economic characteristics with Manitoulin Island (Lamoureux, 1985). Thus it would be interesting to determine whether all agricultural regions located within this zone share similar trends of absolute decline found to exist by Lamoureux (1985) and this study of Manitoulin.

In the same light the relative decline of the Island compared to southwestern Ontario is to be expected as the latter belongs to the "core" of provincial agriculture. This core agricultural region benefits from superior climate and higher capability land in addition to better agro-economic resources than are available in such marginal areas as Manitoulin Island. The core is often envisioned as being stable, where agricultural activity is the foremost economic activity (McCuaig and Manning, 1982: 65). This contrasts with the declining nature of agriculture observable on the retreating margins which "exhibit the characteristics of becoming progressively poorer" (Beattie et al., 1981: 6).

The second major objective of this study was to determine whether or not trends of retrenchment in marginal agricultural areas at the county level exist within the Island itself. Indeed, as predicted, agricultural change within the Island has not taken place equally in all respects or areas. Agricultural trends suggested that the eastern sections of the Island were found to differ from those in the west to a substantial degree. The eastern half of the Island underwent agricultural growth such as improving or increasing the characteristics of its farmland, labour and capital values

relative to the western sections of the Island. It is believed that this difference represents the core/marginal model found at the county level and although the scale of investigation changes the processes do not.

The effectiveness of selected agro-economic variables in measuring trends toward marginality in this study varied substantially. A good indicator of marginality is one where ambiguity is kept to a minimum, while a poor indicator gives confusing signals which heighten the difficulty in assessing trends of increasing marginality. Fragmentation was a particularly intractable variable with which to measure increasing marginality, especially as the Census of Agriculture does not collect this information. It was through indirect means that questions of fragmentation had to be addressed. Ilbery (1985: 115) mentions "that in order to expand his business, a farmer is often forced to purchase or rent isolated parcels of land at considerable distances from the main farmstead." Thus the analysis of agro-economic variables in chapter 3 used the level of rented farmland as an indirect measurement of fragmentation. An increase in rented farmland was taken to mean increased fragmentation which has been related to expanding agricultural activity synonymous with healthy agriculture. But it must also be kept in mind that the level of fragmentation is also found to increase in physically marginal areas which tend to have rather discontinuous soil patterns, and farm expansion occurs in a fragmented manner as farmers attempt to collect or assemble enough workable farmland.

A discussion of those variables which proved to be particularly useful as unambiguous indicators of marginality follows. Farm size is one of the better indicators of marginality when applied to a regional situation, because it is the average change in size that is important and not how any single farm has changed. It was shown that farm sizes are larger and tend to

increase in average size faster in a marginal situation, because more land is needed when quality is low. Farm size is therefore related to the quality of soil, and the Canada Land Inventory soil classes can be used to confirm this variable by indicating where soils of low capability are located and hence where one would expect the greatest increases in farm sizes to occur.

The percentage of improved farmland is one of the most useful indicators of marginality as only the best lands are worth the time and expense of improving. Gains in improved land indicate an intensification of farmland usually associated with the higher capability lands found in the core areas of provincial agriculture. An absolute or relative decrease in the percentage of improved farmland over time indicates increasing marginality.

The age of farmers is another indicator of marginality that has proved to be useful. Even though there is a tendency for the average age of farmers to increase in Ontario, it is possible to distinguish marginality on the basis of age. A higher percentage of older farmers is expected in declining agricultural regions due to the failure to attract or keep young potential farmers who envision better prospects in off-farm work.

The percentage of full-time farmers is a particularly useful indicator of marginality. Any region unable to provide the bulk of its farmers with full-time employment in agriculture should be suspected of declining agricultural fortunes. Marginal farmland often cannot provide the farmer with an acceptable standard of living which encourages part-time farming out of necessity. The higher percentage of full-time farmers in core agricultural areas is a reflection that land quality and climate give these farmers an added advantage unavailable to farmers on the margins. The trend in Ontario is toward part-time farming, which historically has been greatest in marginal regions (Troughton, 1977).

Productivity is another important and useful indicator of marginality which Ilbery (1985: 104) describes as "simply the net return to the farmer's labour." In this study productivity was measured by the percentage of provincial gross returns per farm and per acre of farmland. As farming is primarily an economic activity the return on investment is an important indicator of agricultural health. It would be expected that in a marginal situation the return on investment would lag behind the core agricultural regions which enjoy advantages that are known not to exist in marginal areas. This return on investment must also be tempered by the inevitable expenses incurred in generating this return. The agricultural returns in the regions of this study are very nearly equal to the expenses, a fact which highlights the general unprofitability of farming in Ontario.

The direction of change in percentage contribution to total provincial agricultural income can reveal much about the state of a region's agriculture. The failure to maintain a region's percentage contribution to total provincial agricultural income over time raises suspicions about its relative decline.

The levels of capitalization in mechanization, land and buildings, and livestock are particularly revealing of a region's agricultural situation. A lack of capitalization has been part of the reason marginality is perpetuated in certain areas. It should also be recognized that marginal areas do not have the same rate of mechanization simply because it is known that the physical and economic advantages found in core areas do not occur.

The above variables are felt to be particularly good indicators of marginality, but this is not to mean those left out are ineffectual. Those variables not highlighted above can usually be combined with or supported by other variables and information, fragmentation being a particularly good example of this. Even though these variables are not as straightforward in

measuring the possible marginal character of an area they nevertheless provide useful depth to a study. This means that when they are combined with the above variables they introduce "real world" complexity which leads to the limitations of this study

This study is limited by the choice of variables which admittedly could have been much more expansive. There are a great many measurements of marginality in agriculture that could have been used but for the sake of brevity were left out. This does not mean that the variables and methods chosen for this study were particularly sacred or ideal, but rather were an attempt to examine agricultural changes in a small and somewhat isolated region. The use of other variables and methods might have proven to be superior to the integrated approach used in this study. The attempt to integrate various related but somewhat disparate indicators of marginality in this study has itself proven to be unwieldy. The other major limitation of this study is the rather superficial examination of each of the different variables. This study had problems with scale of analysis: such as too much detail of necessity limits the coverage, while on the other hand a broad coverage limits the detail that may be shown.

Although there was not the time and space in a study such as this for in-depth analysis of variables, it is felt that too much generalizing occurred in the attempt to keep the length of this study within reason. It would perhaps be more useful to limit study length by focusing on specific goals rather than trying to cover a great many aspects of marginality in one study. This study could be used as a preliminary to focus on specific areas of interest such as the problem of expanding farmer education in remote areas or the relationship between age of farmer and changing productivity.

Even though the results of this study were not unexpected, it would also be interesting to determine in future research whether the changes found in this study, namely the shift of agricultural activity toward the better lands at the Census Division (county) and the Census Consolidated Subdivision (township) level, could be identified at the provincial, national and international level. Future research into the level of agricultural shift at the national level is supported by the work of Bowler's (1986) in his study of agricultural concentration in the European Community.

APPENDIX 1**Agricultural
Services 1951****Gore Bay**

agricultural office
Cooperatives (2)
dairy

Kemptville

agricultural school
animal hospital
auctioneer
cannery (large)
cattle breeders Ont.
cheese merchant
chick supply
creamery
crops branch
dairy
dairy grading
Dep. of agriculture
drover (5)
drover (cattle)
egg grading station
egg producers coop.
farm equip. & service
farm supply & garage
feed and grist mill
feed and mixing
feed, farm equip.
Nursery Forest
Nursery
livestock transport
Milch cow dealer
nursary and poultry
poultry supply
tractors and auto
United Farm Coop.
veterinarian

Elmira

auctioneers (4)
blacksmith
chemicals
chick hatcheries (5)
chick hatchery &
creamery
dairies (5)
dead animals

drainage tiles (2)
drover
farm equipment (3)
farm implements (2)
farm supplies (2)
feed and coal
feed mills (5)
feed stores (2)
fertilizers (4)
flax mills (2)
Flour milling Co.
grain and feed
harnesses
livestock dealers (5)
mill
poultry dealers (2)
turnip wazer
veterinarians (2)

**Agricultural
Services 1985****Gore Bay**

farm equipment
livestock coop.

Kemptville

agricultural college
agricultural
agricultural supply
animal hospitals (2)
auction gallery
auctioneers (2)
biotech products
breeders
cooperative
dairy herd
dairy products
dead animal collector
drovers (3)
feed plant coop
harvest store
Holstein association
horse trailer rental
milk company
pork producers
marketing board
stables
tractor and truck
veterinarian

veterinary clinic
veterinary clinic
(large animal)

Elmira

agricultural drainage
(2)
agricultural services
agricultural silos
agricultural society
agricultural
feeds & fertilizers
artificial
insemination breeder
chemicals (3)
chick hatcheries (2)
dairies (3)
disabled livestock
drainage tiles
drover
farm drainage
farm equip. dealers
farm gate newspaper
farm machinery
farm services
farm suppliers (3)
feed and supply
feed mills (3)
feed, fertilizer & seed
harness supplies
livestock transport
poultry farm
veterinarian
veterinarians clinics
(2)
veterinary hospital

Sources of Data: The
Bell Telephone
Company of Canada,
1951, 1986.

APPENDIX 2

Semi Agricultural
Services 1951Gore Bay

battery service
electric
garages (5)
general stores (2)
hardware stores (3)
plumber

Kemptville

auto sales (large)
auto sales and oil
concrete
contractor, elec. (2)
contractors, gen. (2)
electrical repair
garage (13)
general store (10)
hardware
lumber
mason
plumbing & electrical
plumbing & heating
plumbing, heat &
appliances
transport (2)
trucking (7)

Elmira

Aluminum Co.
auto electric
Beaver Lumber
coal
contractor, building
contractors, cement
contractors, elec. (2)
contractors, gen. (4)
electric repairs (2)
electrician
garage & transport
garage supply
garages (15)
general stores (7)
gravel dealers (2)
hardware stores (3)
home products
Link Belt Co.
machine shops (3)

motor and supply (4)
plumbers (3)
truckers (4)
welding
well drilling
woodworkers (4)

Semi-Agricultural
Services 1985Gore Bay

auto body & supply
auto sales (2)
building supply
contractors general
electric
garages (3)
general store
hardware
heating (2)
plumbing & heating
septic & trucking
transport (large)
truck and trailer
welding and repair

Kemptville

auto and small
auto and truck rental
auto sales (10)
auto supplies (2)
building materials (4)
Canadian Tire
cement (2)
concrete
contractor, electrical
(2)
contractor, general
(10)
contractor, heating
electric (2)
electric, plumbing
& heating
electrical motors
engine repair
engines (2)
equipment
equipment exchange
equipment rental
equipment sales
equipment supply
excavating (2)

garages (3)
general stores (5)
grinding
hardware stores (3)
mechanical service
plastic supply
plumbing (4)
steel products
supply store
tires
transport (6)
truck service
welding and metal

Elmira

auctioneer
auto body shops (4)
auto care products (2)
auto electric
auto glass
auto parts
auto sales (6)
auto service (2)
auto supplies
building store
Canadian Tire
carpentry
cement & ready mix
cement castings
cement dealers (2)
CN Transport
concrete & rental
concrete and mix
contractor general
contractor, building
contractor, drainage
(2)
contractor, masonry
(2)
disposal trucking
electric (6)
electrical sales
electrical services
electrical supply
equipment dealers (2)
equipment rentals (2)
excavating (3)
fuel & supply (2)
garages (7)
general store (5)
gravel & excavation
hardware (4)
insulation

lumber (Beaver)
 lumber (Fairways)
 machine and tool
 machine industries
 machine works
 machinery (2)
 machinery
 metal fabrication
 metal manufacturer
 metal shop
 metals
 millwright
 plumbing
 plumbing & heating
 plumbing &
 maintenance
 pumps
 seed dealers (2)
 service centre
 services (auto)
 tool and machine
 tower builder
 transport (12)
 trenching &
 excavation (3)
 truck services (2)
 trucking & cement
 Uniroyal Chemicals
 vacuum pumps
 welding (5)
 welding and repair
 welding supply (2)
 well digging & septic
 systems
 well drilling
 wood products
 woodworkers (2)

Sources of Data: The
 Bell Telephone
 Company of Canada,
 1951, 1986.

APPENDIX 3**Credit and
Financial Services
1951****Gore Bay
Bank of Montreal
insurance****Kemptville
Bank of Nova Scotia
insurance (4)****Elmira
Bank Dominion
Bank of Nova Scotia
Bank Royal
insurance agents (7)****Credit and
Financial Services
1985****Gore Bay
Bank of Montreal
bookkeeper
credit union
insurance (2)****Kemptville
accountants (3)
Bank of Nova Scotia
Canadian Imperial
Bank
credit bureau
financial
insurance (9)
planning consultant
stockbrokers (2)****Elmira
accountant (9)
Booth and associates
Chamber of
Commerce****credit bureau
credit corporation
credit union
(Mennonite)
financial services
insurance (16)
investment (2)
Royal Bank
stock brokers
Toronto Dominion
Bank
Trust Companies (5)****Sources of Data: The
Bell Telephone
Company of Canada,
1951, 1986.**

APPENDIX 4**Social and
Community
Services 1951****Gore Bay**

airport (Gore Bay)
 Anglican Rectory
 auto sales
 Bakery
 Church (United)
 curling rink
 dentist
 Department of
 Department of
 Transport
 doctor
 drug stores (2)
 frozen foods
 grocery stores (2)
 hairdressers (2)
 high school
 hotels (2)
 judge
 lawyers (2)
 LCBO
 meat market
 memorial centre
 merchant
 oil depots (2)
 Ontario Paper Co.
 OPP
 optometrist
 radio service
 Recorder newspaper
 Recording Office
 Registry Office
 restaurant
 sheriff
 skating arena
 taxi
 tearoom
 tourist inn

Kemptville

bakeries (3)
 Bell Telephone
 bowling club
 business forms
 cleaner
 cleaner (rug)

clothing
 dentist (2)
 department store (2)
 doctor (2)
 drugstores (2)
 fuel dealers (2)
 funeral services
 furniture and
 golf club
 grocer (3)
 hairdresser (3)
 high school
 home delivery
 hospital (private)
 hotels (2)
 hydro commission
 jewellers (2)
 Lands and Forest rep.
 laundry
 lawyer
 locksmith
 market (fruit)
 meat market
 monuments and
 engraving
 nursing home
 O.P.P.
 oil products
 painter
 printer
 real estate
 Red Cross
 restaurant
 surgeon
 taxi (5)
 technician
 tourist lodges (2)

Elmira

barber
 Bell Telephone Co.
 bike shop
 book store
 Bootee Co. (2)
 Bread Co.
 Brewer's Retail Store
 butchers (2)
 carpenters (2)
 chiropractor
 cider mill
 clothing store
 coffee shops (3)
 decorators

dentists (2)
 District High School
 doctors (8)
 dressmaker
 drug stores (2)
 electrical appliances
 Elmira Signet,
 newspaper
 entertainment
 Felt Co. (2)
 fire hall
 Florist and Garden
 funeral services
 Furniture Co.
 garden centre
 greenhouse
 grocers (9)
 hairdressers (3)
 hotels (7)
 jeweller
 laundries (2)
 Liquor Control Board
 Ontario
 Lutheran Church
 meat markets (2)
 merchants, general
 oil dealers (3)
 optometrist
 painters (3)
 photographer
 printer
 private hospital
 public school
 public utilities
 commission
 radio repair
 real estate broker
 sand dealers (2)
 sawmill
 Shirt and Overall Co.
 shoe stores (3)
 shoemakers (5)
 sign makers (3)
 Simpson Robert Co.
 Snyders Co.
 taxi companies (3)
 theatre

**Social and
Community
Services 1985**

Gore Bay

airport (Gore Bay)
 ambulance
 antiques
 barrister
 bed and breakfast
 Bell Canada
 boats
 bus lines
 Canada Post
 Canadian Cancer
 Church (Anglican)
 Church (Pentacostal)
 Church (United)
 clothing store
 CNCP
 telecommunications
 country club
 dentist
 doctor (2)
 drugs
 electronics
 family services
 farm resort (tourist)
 fire emergency
 food store
 funeral home (2)
 furniture
 gift shop
 glass
 grocer (2)
 hairdressers (2)
 health centre (2)
 hospital (small)
 human rights
 Imperial oil
 landscaping
 lawyers (5)
 LCBO
 marine goods
 meat
 meat markets (2)
 music and crafts
 newspapers (2)
 nursing home
 OPP
 optometrist
 pantry
 park
 planning board
 printing
 public library
 public school

pulp and paper

RCMP
 real estate (3)
 resort
 resort cottages
 restaurants (2)
 clergy (2)
 Royal Canadian
 satellite TV systems
 school for retarded
 Sears Canada
 (catalogue)
 second hand store
 tent and trailer park
 tourist association
 tourist lodges (7)
 tourist resort
 tours
 trailer park
 TV repair
 variety store
 warehouse
 women's crisis centre
 workman's
 compensation board
 yacht charters (2)

Kemptville

aerial photography
 ambulance
 antiques (2)
 appliances (2)
 auto body shops (4)
 auto care
 auto glass (2)
 auto rental
 auto wash
 auto wreckers
 Bahai faith
 bakeries (2)
 barber
 bargain centre
 barrister (3)
 boat works
 book store
 bowling lanes (2)
 Brewer's Retail Store
 bus lines
 business anonymous
 (14)
 business equipment
 business forms
 butcher

cabinets (2)

cable TV
 Canada Post
 Canadian National
 Canadian Pacific
 carpet service (3)
 cement association
 children's centre
 children's telephone
 chiropractic centre
 chiropractors (2)
 Church (Anglican)
 Church
 Church (Reform)
 Church (United)
 church (Catholic)
 cleaners
 clothing
 clothing stores (3)
 CNCP
 telecommunications
 communications
 community centre
 community hospital
 community programs
 conservation
 consultants
 contractor, cleaning
 contractor, dry wall
 convenience store
 County Board of
 Education
 dentists (2)
 department store
 district hospital
 doctors (14)
 drugstores (5)
 dry cleaners
 elevators
 fabric
 family services
 fire hall
 fish store
 floor consultant
 florist
 flowers and gifts (2)
 food processor
 formal cloths
 fuels (6)
 funeral homes (3)
 furniture (2)
 furniture and
 furniture
 garden store

gas bar and market
 gifts
 golf
 grocer (3)
 hairdresser (10)
 health council
 health unit
 heart and stroke
 foundation
 heating
 high school
 hobby ceramics
 hotels (8)
 Human Rights
 Commission
 ice
 Industries
 iron and metals
 jeweller
 kennels (4)
 kitchen shop
 laboratory
 land surveyors (5)
 lawyers (2)
 LCBO
 leasing
 Liberal Association
 Limestone
 makeup
 masonic centre
 meat market
 medical centre
 mental health
 association
 motel
 motorcycles
 mufflers (2)
 newspapers (2)
 nursing homes (3)
 oil
 Ontario Hydro
 OPP
 optometrist
 personnel
 pet foods
 photography
 piano shop
 piano tuner
 pianos
 pipes (2)
 placement centre
 police
 printing and
 propane

public library
 public schools (3)
 quarry
 real estate (6)
 Red Cross
 rental service
 repair
 restaurants (9)
 restorations
 reverend
 Royal Canadian
 Salvation Army
 sand and gravel (2)
 sanitation
 sawmill equipment
 school (Catholic)
 Sears Canada Limited
 septic service
 ship stores
 shopping centre
 signs
 snack bar
 sod farms (2)
 sports stores (2)
 stationary store
 stereo
 taxi
 towing
 toy store
 trailer park
 travel agents (3)
 TV and stereo shop
 TV repair
 Victorian Order
 video sound
 water conditioning
 water distillation
 water refiners
 woodcraft store
 wool store
 workman's
 compensation board

Elmira

addiction research
 Adult Training Centre
 advertising
 Air Canada
 airlines
 airways, local (2)
 alarm systems
 alloys (metals)

aluminium
 ambulance (2)
 appliance stores (2)
 arena
 art galleries (2)
 association for
 auto rental (Hertz)
 bag and burlap
 bakery
 barber
 barristers (4)
 Bell Canada
 bible chapel
 Bibles
 bike and sports
 book and gift store
 booth and associates
 bowling lanes
 Brewers Retail Store
 broom store
 bus lines
 business equipment
 business products
 businesses
 anonymous (21)
 CAA
 cabinets
 cable TV (2)
 camp ground
 Canada Post
 CanLabs
 carpet care
 carpet outlet (2)
 carriage supply
 catholic school
 cellular phones
 cheese store
 chiropractors (4)
 Christian school
 Church (Catholic)
 Church (Mennonite)
 Church (Missionary)
 Church (Pentacostal)
 Church
 Church (United)
 Church, (Lutheran)
 clothing stores (4)
 CNX
 coffee supplies
 communications
 community
 computer services
 control equipment
 convenience stores

cookware store
 county board of
 education
 courier
 courier services
 CP Airlines, sales
 CP Transport
 CSIC
 curling club
 custom flooring
 customizing
 data services
 day care centre
 decorating
 dentists (9)
 dentures
 department store
 (Eaton's)
 diet store
 discount store
 disposal
 distributors (2)
 doctors (11)
 drapery
 driver dispatch
 driving school
 drugstores (3)
 dry cleaners
 dust control
 earrings
 Electrolux
 electrolysis
 electronic service
 electronics
 energy products
 engineering Ltd.
 excavating (3)
 facit Canada
 federal pioneer
 fire department
 fitness centre
 flooring
 flour mill
 flowers
 flowers and gifts
 flying club
 foundary
 Fried Chicken
 funeral services
 furniture (3)
 furniture
 gas appliances
 general hospital
 gift shops (2)

golf club
 Granada TV
 gravel
 grocer
 hairdresser (8)
 health clinic
 health food
 hearing aids
 heart & stroke found.
 herb store
 hobby store
 home products (2)
 hotel
 human rights
 commission
 Hunt Corporation
 hybrid
 industrial supply
 industries
 information centre
 interfaith
 counselling (2)
 jewellers (2)
 jingle factory
 Jehovah's Witnesses
 K Mart Store (2)
 kennels
 laboratories
 land surveyor
 landscaping
 lawn care (2)
 lawnmower service
 lawyer (9)
 LCBO
 maintainance service
 management (2)
 manufacturing (5)
 maple syrup
 markets
 marriage counsellor
 massage clinic
 meat and food store
 meat markets (3)
 medical gases (2)
 medical group
 medical labs
 memorial stones (2)
 mental health
 association
 merchants (9)
 mobile home
 monuments
 motor hotel
 mover

MPP
 muffler centres (3)
 music centre
 newspaper (3)
 nursery school
 nursing homes (3)
 Oil (Imperial)
 oil burner service
 Ontario Hydro
 OPP
 optician
 optometrist (2)
 organ service
 paging
 paint store
 painter (3)
 pastry and donuts
 Petro-Canada
 photographers (4)
 piano shop
 pizza
 pollution plant
 polymer co.
 printing
 production
 professionals (3)
 propane dealers (2)
 public schools (4)
 publishing (2)
 raceway
 Radio Stations (2)
 RCMP
 real estate (5)
 Regional Library
 regional health unit
 regional police
 restaurant (pizza, ice
 cream parlour)
 restaurants (8)
 retarded school
 reverends (8)
 road conditions
 rod and gun club
 roofing
 Royal Canadian
 Salvation Army
 Scholarship Fund
 Sears Canada Ltd
 secondary school
 security
 security systems (2)
 senior citizen centre
 separate school
 separate school board

sewing machines (2)
 shoe store
 shoemaker
 shoemaking
 signs dealers (2)
 social services
 sports store
 stationers
 stereo store
 stores (3)
 store (Stedmans)
 stove works
 stoves
 swimming pools
 taxis (3)
 technical products
 technical services
 telecommunications
 telephone store
 textiles
 tile yard
 transport (home)
 travel agencies (3)
 travel bureau
 Tupperware
 TV repairs
 United Steel Workers
 upholstery
 vacuums cleaners (2)
 vending machines
 Victorian Order
 video outlet
 wagons (2)
 waste disposal
 water conditioning
 water systems
 waterbeds
 weight clinic
 Weston Bakery
 windows
 woodworking and
 worker's
 compensation board

Sources of Data: The
 Bell Telephone
 Company of Canada,
 1951, 1986.

APPENDIX 5-Sample of Telephone Survey

SURVEY QUESTIONNAIRE #_____

Farm Size

1. What kind of farm would you describe yours as being (eg. dairy, beef)? _____

2. How many acres is your farm? _____

3. How long have you farmed at this location? _____

4. What year did you get into farming? _____

Improved Farmland

5. How many acres of your farm are improved land? _____

Fragmentation

6. Do you rent or own farmland that is not attached to your main farm? _____

If yes. a. How many acres are rented? _____

b. How many acres are owned? _____

c. How many pieces of farmland do you work? _____

7. How many miles from the main farm is this rented/owned land? _____

8. How many years have you farmed this separate piece of land? _____

Part-Time/Full-Time (For 1988)

9 a. Do you hire off-farm labour to work on your farm? _____

b. If yes, how many labourers would you hire? _____

c. How many weeks a year would hire these labourers? _____

10 a. Do you work off-farm for any period of the year? _____

b. If yes, how long would you work off-farm? _____

c. Is this off-farm work agricultural or non-agricultural? _____

Education

11. Where did you receive your schooling?

a) primary _____

b) secondary _____

c) university, college, or agricultural college _____

12. In what were you educated? _____

Agricultural Services

13. How far do you have to travel to buy the following agricultural supplies?

a. Fertilizers?_____

b. Farm equipment?_____

c. Feed and Seed ?_____

Other (specify)?_____

14. Did you have to travel further last year to purchase agricultural supplies than you did 5-10 years ago?_____

15. Do you feel that the agricultural services you need to run your farm have changed in the last 5-10 years?_____

Social and Community Services

16. How close are you to the nearest hospital?_____

17. How close is your family doctor?_____

18. Do you feel that your family has access to adequate medical services?

19. If you had to buy new furniture or appliances how far would you have to travel?_____

Does this store have what you need?_____

20. When you want to buy groceries how far do you have to travel?_____

Credit and Financial

21. How far away is your bank?_____

22. Are you satisfied with the range of services offered by your bank? _____

Transportation and Marketing of Agricultural Products

23. Where do you sell the products of your farm?_____

24. How far away is this market?_____

25. How do you arrange to have the products of your farm transported to market?_____

26. Are you satisfied with the transportation and marketing available to your farm?_____

APPENDIX 6 - Tabulated Results of Survey Questions

(sample size of 30 farmers)

Farm Size

1. Farm Types - Beef Cattle (20), Dairy Mixed (4), Mixed (5), Other (1)

2. How many acres is you farm?

#2

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
1067.167	1111.861	202.997	1236235.661	104.188	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	# Missing:
200	6000	5800	32015	70016175	0
Median:	Mode:				
725	•				

3. How long have you farmed at this location? (in years)

#3

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
25.233	12.91	2.357	166.668	51.162	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	# Missing:
6	60	54	757	23935	0
Median:	Mode:				
21	20				

4. What year did you get into farming?

#4

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
1963.1	12.13	2.215	147.128	.618	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	# Missing:
1938	1982	44	58893	115617115	0
Median:	Mode:				
1967	1969				

Improved Farmland**5. How many acres of your farm are improved land?**

*5

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
241.8	183.403	33.485	33636.51	75.849	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
70	750	680	7254	2729476	0
Median:	Mode:				
174.5	100				

Fragmentation**6a. How many acres are rented?**

*6a

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
882.917	1188.468	343.081	1412456.629	134.607	12
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
150	4000	3850	10595	24891525	18
Median:	Mode:				
322.5	200				

6b. How many acres are owned?

*6b

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
405	378.55	104.991	143300	93.469	13
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
100	1410	1310	5265	3851925	17
Median:	Mode:				
220	200				

6c. How many pieces of farmland do you work?

*6c

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
2.304	1.329	.277	1.767	57.683	23
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
1	5	4	53	161	7
Median:	Mode:				
2	1				

7. How many miles from the main farm is this rented/owned land?

*7

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
6.267	5.674	1.183	32.199	90.257	23
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	# Missing:
.5	25	24.5	144.6	1617.48	7
Median:	Mode:				
5	9				

8. How many years have you farmed this separate piece(s) of land?

*8

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
16.196	12.835	2.676	164.744	79.251	23
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	# Missing:
3	50	47	372.5	9657.25	7
Median:	Mode:				
10	10				

Part-Time/Full-Time (For 1988)

9a. Do you hire off-farm labour to work on your farm?

-(17) farmers hire off-farm labour, and (13) do not.

9b. If yes, how many labourers would you hire?

-Of the 17 farmers who hired off-farm labour only 1-2 men were hired.

9c. How many days a year would you hire these labourers?

-Those men were hired for typically one week/year.

10a. Do you work off-farm for any period of the year?

-(13) farmers work off-farm, and (17) do not.

10b. If yes, how long have you worked off-farm? (in years)

10b

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
20.623	16.92	4.884	286.293	82.044	12
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
.1	40	39.9	247.48	8253.082	18
Median:	Mode:				
20	40				

10c. Is this off-farm work agricultural or non-agricultural?

-(11) farmers worked non-agricultural, (1) agricultural, (1) both.

Education

11. Where did you receive your schooling?

- a. primary school - (23) on-Island, (7) off-Island.
- b. secondary school - (16) on-Island, (5) off-Island.
- c. university, college, other post-secondary - (6) off-Island.

12. Of the (6) farmers who received a post-secondary education, 2 had college or university training in fields related to agriculture, 4 had trades school and non-university training.

Agricultural Services13. How far do you have to travel to buy the following agricultural supplies
a. Fertilizers? (in miles)

*13a

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
13.083	9.071	1.656	82.277	69.33	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
1.5	30	28.5	392.5	7521.25	0
Median:	Mode:				
10.5	•				

b. Farm equipment? (in miles)

*13b

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
83.133	112.5	20.54	12656.189	135.324	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
2	350	348	2494	574364	0
Median:	Mode:				
30	30				

c. Feed and Seed? (in miles)

*13c

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
61.625	110.456	22.547	12200.592	179.239	24
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
1	400	399	1479	371757	6
Median:	Mode:				
15.5	•				

14. Did you travel further last year to purchase agricultural supplies than you did 5-10 years ago? Yes (17), No (13)

15. Do you feel that the agricultural services you need to run your farm have changed in the last 5-10 years? Yes (26), No (4)

Social and Community Services**16. How close is your nearest hospital? (in miles)**

*16

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
18.95	12.203	2.228	148.903	64.393	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
1.5	50	48.5	568.5	15091.25	0
Median:	Mode:				
18	10				

17. How close is your family doctor? (in miles)

*17

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
14.15	11.327	2.068	128.296	80.048	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
1.5	50	48.5	424.5	9727.25	0
Median:	Mode:				
11	10				

18. Do you feel that your family has access to adequate medical services?
Yes (22), No (8)

19a. If you had to buy new furniture or appliances how far would you have to travel? (in miles)

*19a

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
26.75	33.089	6.041	1094.875	123.697	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
.5	140	139.5	802.5	53218.25	0
Median:	Mode:				
15	15				

19b. Does this store have what you need?
Yes (20), No (10)

20. When you want to buy groceries how far do you have to travel?(in miles)

*20

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
16.567	15.054	2.748	226.616	90.868	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
1.5	75	73.5	497	14805.5	0
Median:	Mode:				
14.5	15				

Credit and Financial**21. How far away is your bank? (in miles)**

*21

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
15.217	16.293	2.975	265.477	107.077	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
1	80	79	456.5	14645.25	0
Median:	Mode:				
12	15				

22. Are you satisfied with the range of services offered by your bank?
 Yes (16), No (14)

Transportation and Marketing of Agricultural Products**23. Where do you sell the products of your farm?**

-Most farmers sold varying quantities of cattle in Little Current, Grey and Bruce Counties, southwestern Ontario, and the Toronto area.

24. How far in this market? (in miles)

*24

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
278.333	142.498	26.016	20305.747	51.197	30
Minimum:	Maximum:	Range:	Sum:	Sum Squared:	* Missing:
10	400	390	8350	2912950	0
Median:	Mode:				
355	400				

25. How do you arrange to have the products of your farm transported to market?

-Farmers directly involved in organizing transportation of cattle (10)

-Others involved in organizing transportation of cattle for farmers (20)

26. Are you satisfied with the transportation and marketing available to your farm? Yes (19), No (11)

REFERENCES

- Beattie, Kathleen G., Wayne K. Bond and Edward W. Manning. (1981). The Agricultural Use of Marginal Lands: A Review and Bibliography. Working Paper No. 13, Ottawa: Lands Directorate, Environment Canada.
- Beaujeu-Garnier, J. (1978). Geography of Population. New York: Longman Incorporated.
- Bradley, L. F. and Andrée Beaulieu. (1973). Social and Geographical Aspects of Agricultural Land Use in Prince Edward Island. Geographical Paper No. 54, Ottawa: Lands Directorate, Environment Canada.
- Bowler, I. R. (1986). "Intensification, Concentration and Specification in Agriculture: The Case of the European Community," Geography, Vol. 71, Part 1 No. 310, January, pp. 14-24.
- Bray, Matt and Ernie Epp. (1984). A Vast and Magnificent Land. Toronto: Ontario Ministry of Northern Affairs.
- Buttle, Frederick H., and Howard Newby. (1980). ed(s). The Rural Sociology of the Advanced Societies. Montclair, New Jersey: Allanheld, Osman & Co. Publishers, Inc.
- [Canada 1:50,000.] Surveys and Mapping Branch, Department of Energy, Mines and Resources. 1: 50,000. Ottawa: Department of EMR. 1976-41 G/9, G/10, G/15, G/16, 41H/11-12, H/13: Ottawa. Ed. 2, 1976.
- [Canada Land Inventory.] Department of Regional Economic Expansion. 1:250,000. Ottawa: Queen's Printer for Canada, 1970. 41G: Manitoulin, 1970.
- Carlisle, W. (1983). 'Farm lay-outs in Manitoba', Canadian Geographer, 27, pp. 17-34.
- Census of Agriculture, 1951, 1961, 1971, 1981, 1986.
- Census of Population, 1951, 1961, 1971, 1981, 1986.

- Chapman, L. J. and Brown, D. M. (1966). The Climates of Canada for Agriculture. The Canada Land Inventory, Report No. 3. Ottawa: Canada Department of Forestry and Rural Development.
- Chapman, L. J. and D. F. Putnam. (1966). The Physiography of Southern Ontario. 2nd ed. Toronto: Ontario Ministry of Natural Resources.
- (1984). The Physiography of Southern Ontario. Toronto: Ontario Ministry of Natural Resources.
- Chisholm, Michael. (1969). Rural Settlement and Land Use. London: Hutchinson University Library.
- Clark, G. (1979). "Farm Amalgamation in Scotland," Scottish Geographic Magazine, Vol. 95, pp. 93-107.
- Crickmer, R. E. (1978). The Role of Physical Factors in the Process of Farmland Abandonment in Nova Scotia, 1953-1974. Atlantic Regional Geographical Series, No. 2. Halifax: Saint Mary's University.
- Dawson, C. A. (1934). The Settlement of the Peace River Country. Toronto: The Macmillan Company of Canada Limited.
- (1936). Group Settlement, Ethnic Communities in Western Canada. Toronto: The Macmillan Company of Canada Limited.
- and Eva R. Young. (1940). Pioneering in the Prairie Provinces: The Social Side of the Settlement Process. Toronto: The Macmillan Company of Canada Limited.
- Dean, W. G. (1969). Editor. Economic Atlas of Ontario. Toronto: Department of Geography, University of Toronto Press.
- Environment Canada, Land Inventory. (1972). The Canada Land Inventory. Report No. 2. Ottawa: Department of the Environment.
- Francis, R. J. (1970). "The significance of Usage of the Term Marginal in Fringe Settlement Studies," Geographica, Edited by H. D. Foster. pp. 23-40. Western Geographical Series. Vol. 2. University of Victoria, Victoria.
- Fox, M. F. (1985). "Some Agents of Change in Canadian Agriculture," Our Geographic Mosaic. Ottawa: Carleton University Press Inc.

- Gasson, R. M. (1973). "Goals and Values of Farmers," Journal of Agricultural Economics, XXIV, pp. 279-88.
- Gentilcore, R. L. (1972). "Settlement," Studies in Canadian Geography: Ontario. Toronto: University of Toronto Press. pp. 23-44.
- Gillespie, J. E., and N. R. Richards. (1954). Soil Survey of Grey County. Report No. 17 of the Ontario Soil Survey. Guelph: Experimental Farms Service, Canada Department of Agriculture.
- , R. E. Wicklund and N. R. Richards. (1962). Soil Survey of Hastings County. Report No. 27 of the Ontario Soil Survey. Guelph: Research Branch, Canada Department of Agriculture.
- , R. E. Wicklund and B. C. Matthews. (1964). Soil Survey of Renfrew County. Report No. 37 of the Ontario Soil Survey. Guelph: Research Branch, Canada Department of Agriculture.
- , R. E. Wicklund and M. H. Miller. (1968). The Soils of Leeds County. Report No. 41 of the Ontario Soil Survey. Guelph: Research Branch, Canada Department of Agriculture.
- Glazebrook, G. P. deT. (1964). A History of Transportation in Canada. Vol. II. Carleton Library, No. 12. Toronto: McClelland and Stewart Limited.
- Goodall, Brian. (1987). Dictionary of Human Geography. Middlesex: Penguin Books Limited.
- Grigg, David. (1965). "The Logic of Regional Systems," Annals, Association of American Geographers, Vol. 55, pp. 465-491.
- , (1982). The Dynamics of Agricultural Change. New York: St. Martin's Press.
- Haggett, Richard, and Iain Meyer. (1980). Agriculture, Geography: Theory in Practice. London: Harper and Row, Publishers.
- Hammond, Robert and Patrick McCullagh. (1978). Quantitative Techniques in Geography: An Introduction. 2nd ed. Oxford: Clarendon Press.
- Hare, F. Kenneth and Morley K. Thomas. (1979). Climate Canada. 2nd ed. Toronto: John Wiley and Sons Canada Limited.

- Haring, L. Lloyd, and John F. Loundsbury. (1983). Introduction to Scientific Geographic Research. 3rd ed. Dubuque, Iowa: W. M. C. Brown Company Publishers.
- Hinman, C. Wiley. (1986). "Potential New Crops," Scientific American. Vol. 255, No. 1. July, pp. 33-37.
- Hoffman, D. W. and N. R. Richards. (1954). Soil Survey of Bruce County. Report No. 16 of the Ontario Soil Survey. Guelph: Experimental Farm Service, Canada Department of Agriculture.
- , and R. E. Wicklund. (1959). Soil Survey of Manitoulin Island. Report No. 26 of the Ontario Soil Survey. Guelph: Research Branch, Canada Department of Agriculture.
- , and Henry F. Noble. (1975). Acreages of Soil Capability Classes for Agriculture in Ontario. Report No. 8. Toronto: Ontario Ministry of Agriculture and Food.
- Hurd, Lorne W. J. (1982). The Canadian System of Milk Marketing. An address to the July 28, 1982 Milk Marketing Seminar. Sponsored by Michigan State University.
- Ilbery, Brian W. (1985). Agricultural Geography. Oxford: Oxford University Press.
- Jones, Emrys and John Eyles. (1979). An Introduction to Social Geography. Oxford: Oxford University Press.
- Jones, Robert Leslie. (1946). History of Agriculture in Ontario 1613-1880. Toronto: The University of Toronto Press.
- Judges, Brian E. (1988). Livestock Marketing on Manitoulin Island. Guelph: Argue and Associates.
- Kelly, Raymond. (1978). "The Impact of Nineteenth Century Agricultural Settlement on the Land," Perspectives on Landscape and Settlement in Nineteenth Century Ontario. The Carleton Library, No. 91. Toronto: The Macmillan Company of Canada Limited.

- Lamoureux, Diane. (1985). The Abandonment of Agricultural Land in Gaspé, Québec: The Causes and the Impact on Land Use. Working Paper No. 29, Ottawa: Lands Directorate, Environment Canada.
- Lappé, Francis Moore and Joseph Collins. (1984). Food First. New York: Ballentine Books.
- MacDonald, J. (1988). Ontario Milk Marketing Statistical Handbook, 1986-1987. 3rd ed. Mississauga: Economic Services, The Ontario Milk Marketing Board.
- MacDougall, E. Bruce. (1970). "An Analysis of Recent Changes in the Number of Farms in the North Part of Central Ontario," The Canadian Geographer, Vol. 14, (Summer), pp. 125-138.
- Mackintosh, W. A. (1934). Prairie Settlement. The Geographical Setting. Toronto: The Macmillan Company of Canada Limited.
- McCann, L. D. (1982). ed. Heartland and Hinterland. Scarborough: Prentice Hall Canada Inc.
- McCuaig, J. D., and E. W. Manning. (1982). Agricultural Land-Use Change in Canada: Process and Consequences. Land Use in Canada Series, No. 21. Ottawa: Lands Directorate, Environment Canada.
- McDermott, George L. (1961). "Frontiers of Settlement in the Great Clay Belt, Ontario and Quebec," Annals, Association of American Geographers, Vol. 51 (September), pp. 261-273.
- McIlwraith, Thomas P. (1978). "Transportation in the Landscape of Early Upper Canada," Perspectives on Landscape and Settlement in Nineteenth Century Ontario. Carleton Library No. 91. Toronto: McClelland and Stewart Limited.
- McRay, J. D. (1980). The Influence of Exurbanite Settlement on Rural Areas: A Review of Canadian Literature. Working Paper No. 3. Ottawa: Lands Directorate, Environment Canada.
- Mandale, Maurice. (1984). Marginal Land Utilization and Potential Kent County, New Brunswick. Working Paper No. 31, Ottawa: Lands Directorate, Environment Canada.

- Mangelsdorf, Paul C. (1986). "The Origin of Corn," Scientific American, 255 (1), pp. 80-86.
- Manning, E. W., J. D. McCuaig, and E. A. Lacoste. (1979). The Changing Value of Canada's Farmland: 1961-1971. Land Use in Canada Series, No. 17. Ottawa: Lands Directorate, Environment Canada.
- Matthews, B. C. and N. R. Richards. (1957). Soil Survey of Lambton County. Report No. 22 of the Ontario Soil Survey. Guelph: Experimental Farm Service, Canada Department of Agriculture.
- Miller, M. H. and D. W. Hoffman. (1970). "The Challenge of the Land, Physical Resource Aspects," in D. Elrick, Environmental Change, Focus on Ontario (Toronto): pp. 9-30.
- Ministry of Agriculture and Food. (1987). Agricultural Statistics for Ontario 1986. Publication 20. Prepared by the Statistical Services Unit, Economic and Policy Coordination Branch.
- Morgan, W. B. and R. J. C. Munton. (1971). Agricultural Geography. London: Methuen and Company, Limited.
- Morton, Arthur S. (1938). History of Prairie Settlement. Toronto: The Macmillan Company of Canada Limited.
- Myrdal, Gunnar. (1957). Economic Theory and Underdeveloped Regions. London: London University Press.
- Nesbitt, C. J. (1976). "The Need to Retain Foodland on Manitoulin." Typescript submitted by the Ontario Ministry of Agriculture and Food to the Manitoulin Planning Board, Gore Bay, 5 April 1976.
- Ontario Economic Council. (1966). People and Land in Transition: Opportunities for Resource Development on Rural Ontario's Marginal and Abandoned Acres. Toronto: Ontario Economic Council.

- Ontario Milk Marketing Board (1988a). "Transportation Activities & Policies." Mississauga: Ontario Milk Marketing Board, Resource Insights, June.
- , (1988b) "Organization Activities & Policies," Mississauga: Ontario Milk Marketing Board, Resources Insights, June.
- , (1988c) "Statistics Activities & Policies," Mississauga: Ontario Milk Marketing Board, Resources Insights, June.
- Parson, Helen E. (1977). "An Investigation of the Changing Rural Economy of Gatineau County, Québec," Canadian Geographer, Vol. 21, No. 1, pp. 22-31.
- Putnam, Donald F. and Robert G. Putnam. (1979). Canada: A Regional Analysis. Toronto: J. M. Dent and Sons Limited.
- , (1979). "An Analysis of Farmland Abandonment Trends: A Study of Central Ontario," Ontario Geography, No. 14, pp. 41-57.
- Ray, D. M. (1972). "The Economy," Studies in Canadian Geography: Ontario. Toronto: University of Toronto Press. pp. 45-63.
- Raymond, C. W. and J. A. Rayburn. (1963). "Land Abandonment in Prince Edward Island," Geographical Bulletin, No. 19, pp. 78-86.
- Reaman, G. Elmore. (1970). A History of Agriculture in Ontario. Toronto: Saunders Limited.
- Reeds, L. G. (1972). "The Environment," Studies in Canadian Geography: Ontario. Toronto: University of Toronto Press.
- Ricour-Singh, F. (1981). "The Urban-Rural and Farm-Non-Farm Dichotomies: Are They Obsolete?" Canadian Statistical Review, Vol. 56, No. 2, pp. vi-x. Ottawa: Statistics Canada.
- Simpson-Lewis, Wendy, et al. (1979). Canada's Special Resource Lands, Map Folio No. 4. Lands Directorate, Environment Canada. Ottawa: Supply and Services Canada.
- Sheskin, Ira M. (1985). Survey Research For Geographers. Washington, D.C.: Association of American Geographers.

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ELECTRONICS

- Smith, Keith. (1975). Principles of Applied Climatology. London: McGraw-Hill Book Company (UK) Limited.
- Spelt, Jacob. (1967). Canada a Geographical Interpretation. Toronto: Methuen Publications.
- Statistics Canada. (1972). 1971 Census of Agriculture: Ontario. Ottawa: Statistics Canada.
- Statistics Canada. (1982). 1981 Census of Agriculture: Ontario. Ottawa: Statistics Canada.
- Statistics Canada. (1986). Census of Agriculture, User Services. Reprint of Census Consolidated Subdivision Statistics for the District of Manitoulin, 1951 and 1986. Ottawa: Statistics Canada.
- Stock, G. E. (1976). "Off-Farm Work by Small Scale Farmers in Ontario." Part-time Farming: Problem or Resource in Rural Development. Edited by A. M. Fuller, and J. A. Mage. pp. 68-82. Norwich, England: Geo Abstracts.
- Symons, Leslie. (1972). Agricultural Geography. Bell's Advanced Economic Geographies. London: G. Bell & Sons, Limited.
- Trewartha, Glenn T. and Lyle H. Horn. (1980). An Introduction to Climate. 5th ed. New York: McGraw-Hill, Inc.
- Troughton, M. J. (1977). "Persistent Problems of Rural Development in 'Marginal Areas' of Canada," Rural Development in Highlands and High-Latitude Zones. Oulu Finland: University of Oulu.
- (1982). Canadian Agriculture. Geography of World Agriculture No.10, Research Institute of Geography, Hungarian Academy of Sciences. Budapest: Akademiai Kiado.
- Whittow, John. (1984). Dictionary of Physical Geography. Middlesex: Penguin Books Limited.

Wicklund, R. E. and B. C. Matthews. (1963). The Soil Survey of Lincoln County. Report No. 34 of the Ontario Soil Survey. Guelph: Research Branch, Canada Department of Agriculture.

-----and N. R. Richards. (1961). The Soil Survey of Oxford County. Report No. 28 of the Ontario Soil Survey. Guelph: Research Branch, Canada Department of Agriculture.

Wightman, W. R., (1982). Forever on the Fringe. Toronto: University of Toronto Press.

Williams, G. D. V. (1975). An Agroclimatic Resource Index for Canada and Its Use in Describing Agricultural Land Losses. Prepared for the Science Council of Canada. Ottawa: Agriculture Canada.

Wolpert, J. (1964). 'Decision-making process in a spatial context'. Annals of the Association of American Geographers, 54, pp. 537-58.

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