

LANDS AND INTEGRATED PROGRAMS DIRECTORATE

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THE ABANDONMENT OF FARMLAND IN NOVA SCOTIA

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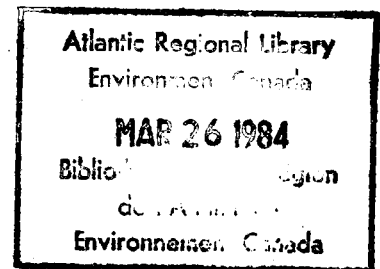
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**THE ABANDONMENT OF FARMLAND
IN NOVA SCOTIA**

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**Lands and Integrated Programs Directorate
Atlantic Region
Environment Canada**

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FOREWORD

The widespread abandonment of farmland has characterized the Province of Nova Scotia throughout much of the past century. This phenomenon can be partially ascribed to the advances made in science and technology which ushered in the age of machines. Physical and cultural features unique to the Province have, however, exerted their own influence. In combination, these factors have led to the loss of greater than 80 percent of the total area of farmland since 1891. During the same period, the number of census farms declined by approximately 90 percent. Declines experienced in the other Maritime provinces, while significant, did not match the losses present in Nova Scotia.

Objectives of this review are to:

- (a) review the agricultural settlement of Nova Scotia;
- (b) summarize recent trends in agricultural development;
- (c) relate agricultural land use to the physical environment, and;
- (d) discuss the relationships between social, economic, and physical factors as they pertain to the abandonment of farmland.

Information contained within this report was obtained from census data, government reports, and other literature. Major sources are referenced in an annotated bibliography.

AVANT-PROPOS

L'abandon massif des terres agricoles est un phénomène qui a marqué particulièrement la Nouvelle-Ecosse depuis un siècle. Cela est dû en partie aux progrès scientifiques et technologiques qui ont introduit l'ère de la mécanisation. Mais certaines caractéristiques physiques et culturelles de la province ont aussi joué un rôle. La combinaison de ces facteurs a entraîné, depuis 1891, une perte supérieure à 80 % de la superficie totale cultivée. Durant cette même période, le nombre des terres agricoles recensées a chuté d'environ 90 %. Les provinces soeurs ont aussi connu une baisse importante, mais beaucoup moins que celle de la Nouvelle-Ecosse.

Notre étude vise les objectifs suivants:

- a) étudier l'exploitation agricole en Nouvelle-Ecosse;
- b) résumer les dernières tendances dans l'exploitation agricole;
- c) établir une relation entre l'utilisation des terres agricoles et l'environnement;
- d) examiner les facteurs sociaux, économiques et physiques qui ont influé sur l'abandon des terres agricoles.

Les renseignements contenus dans ce rapport ont été tirés des recensements, des rapports gouvernementaux et d'autres documents. Les principales sources sont contenues dans une bibliographie annotée.

ACKNOWLEDGEMENTS

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CHAPTER I

The Historical Development of Agriculture in Nova Scotia

Farming was introduced to Nova Scotia in 1605 by French settlers. In that year, the first crop of wheat in North America was grown at Port Royal. Skills developed by the settlers forefathers in dyking marshlands along the Bay of Biscay were readily transferred to conditions in the Annapolis Valley. Settlement soon spread along the Bay of Fundy from Yarmouth County to Cumberland County and into New Brunswick. During the 150 years prior to expulsion by British forces, the Acadians dyked large areas of marshland, planted fruit trees and established productive farms. Though some of the produce reached Louisbourg, commercial agriculture was hindered by poor transportation.

Apart from the Acadian settlements, little other progress was made until the mid-1700's. In 1749, the present City of Halifax was founded by the British. Its purpose was primarily as a military headquarters and as such, it constituted a market for agricultural produce. The British actively encouraged colonization by loyal settlers. Between 1751 and 1753 approximately 1 615 German-Swiss immigrants settled in or near Lunenburg.

In 1755, the Acadian population of 6 000 was expelled from their land; between 1755 and 1760 their fields lay idle and dykes fell into disrepair. A small number of Acadians escaped the expulsion and established themselves in Yarmouth and Digby Counties and parts of Cape Breton. This group was later instrumental in teaching the New England Planters their methods of farming dykelands.

Efforts were made by the British to repopulate the former Acadian territory. In 1758, the Governor of Nova Scotia issued a proclamation inviting New Englanders to take up residence on the fertile lands. Approximately 4 500 settlers, the New England Planters, arrived between 1760 and 1763. Those who had experience in farming did not possess the skills and knowledge of the Acadians. Their attempts to farm the dykelands were consequently fraught with difficulties.

Immigrants from Scotland, (particularly the Highlands), Ireland and England continued to arrive in relatively small groups from 1770 to 1830. Many of the Highlanders were victims of the enclosure movement; these people concentrated in that portion of the province from Colchester County eastwards. But as was the case with the "Planters", many who settled on the land were lacking in the necessary skills and knowledge required for successful farming. Furthermore, the majority were destitute upon arrival.

The largest influx of immigrants arrived in Nova Scotia following the outbreak of the American Revolution in 1775. The Loyalist settlement program was carried out in haste and without due consideration for permanent or successful settlement. With the exception of agriculture, the economy was generally in a healthy state and many of the Loyalists were absorbed into the Regional economy.

The settlement pattern of Nova Scotia had largely been established by 1830 and until the beginning of the twentieth century immigration slowed to a trickle.

During the early 1800's forestry, shipbuilding, and trade and commerce gained in economic significance throughout the Maritimes. Opportunities present within these sectors attracted numerous members of the farm population and much land was abandoned. The abandonment of farm land during

this period was derived in large part from a general unfounded optimism in the agricultural potential of all regions during the early years of settlement. The case, in fact, was that severe to moderate physical constraints were compounded by the small size of the allotments granted, a lack of supporting infrastructure and markets, and a basic ignorance of farming methods amongst a large portion of the settlers. Beyond acquiring the essentials of life, there was little incentive to till the land. Thus, while the overall economy of the Maritime region flourished and population increased significantly during this period, it was only in Prince Edward Island, where the land was more amenable to agricultural pursuits, that development of the agricultural base occurred to any extent.

The wood, wind and water economies upon which the strength of the Maritimes had been built in the early 1800's, began to show evidence of decline by mid-century. The early 1880's saw a short period of industrial growth but it was followed by a longer period of de-industrialization. The age of sail was giving way to steam and the construction of railways effectively opened the interior of North America to settlement. The New England States also attracted many Maritimers during the late 1800's and early 1900's. As other industries lagged in Nova Scotia, agriculture again came into favor and there was a return to the land. Emphasis was placed upon the production of apples and potatoes. Markets were found for these products in the new settlements of western Canada and in Britain. Both were to be of short duration. Even while the agricultural sector was expanding, the call of the West was being heard by many.

Census data indicate that by 1891, the number of farms and area farmed had reached their peak. Subsequently, there was a reduction in the number of farms, farm population and area of improved and unimproved farm land in Nova Scotia. On the other hand, productivity increased with the adoption of scientific methods and mechanization, particularly after World War II. In Canada, as a whole, agriculture continued to expand. While World War I provided temporary relief for farmers in Nova Scotia, the cessation of the war spelled economic doom for the industry. The trends in agriculture, subsequent to 1891, will be dealt with in Chapter II.

CHAPTER II

Agricultural Trends in Nova Scotia

1891 - 1981

As discussed in Chapter I, the fortunes of the agricultural sector have fluctuated throughout history. When opportunities were present within other sectors, farming declined. Conversely, agriculture was regarded as an alternative industry when others lagged. During the second half of the nineteenth century, a number of external factors combined to produce a favorable setting for the development of agriculture in Nova Scotia. The industry reached its greatest areal extent late in the century. Census data indicate that since 1891 there has been a considerable loss of farm population and area within farms. The switch from subsistence to commercial and mechanized agriculture has resulted in greater productivity per worker, however.

A comparison of census data for the period 1891 - 1981 shows that the number and area of farms in Nova Scotia declined from a high of 60 122 farms and 2 456 601 hectares in 1891 to only 5 045 farms encompassing 466 023 hectares in 1981¹. Rural farm population dropped from 373 403

1. Direct comparison of census farms is made difficult by changes in the census definition. The Census farm was defined in 1981 as an agricultural holding with sales during the past 12 months of \$250 or more or a holding which anticipated sales of \$250 or more in 1981. In 1976 a census farm was defined as a farm, ranch or other agricultural holding of one acre or more with sales of agricultural products during the year 1975 of \$1 200 or more. From 1961 to 1971 a census farm was defined as a holding of one acre or more with sales of agricultural products during the twelve months preceeding the census of \$50 or more. The 1951 definition of a census farm was a holding on which agricultural operations were carried out. The holding may consist of a single tract of land or of a number of separate tracts held under different tenures. It must be three acres or more or from one to three acres with agricultural production in 1950 valued at \$250 or more. Previous censuses counted as farms all units one acre or more if the production in the previous year was \$50 or more. Unlike the 1951 census they counted as separate farms, parts of farms lying outside the municipality in which the farm headquarters were located, although the farm area was counted only once.

to 12 479 persons. These figures represent respectively, 83 percent and 2.1 percent of the total population. During the same period, the average area per farm increased from 41 to 91 hectares of which respectively 13.4 and 35.3 hectares were improved. Between 1891 and 1951 farm size remained relatively stable with a slight decrease being shown. Not until 1961 did the average area of improved land exceed that in 1891. Table 1 shows these relationships in greater detail.

The areas devoted to mixed grain, vegetables, and small fruits have shown significant gains since 1931. In contrast, the areas planted to tame hay, oats, potatoes, tree fruits, wheat, and barley have all dropped. Recent statistics show that livestock feed crops may be on the upswing, however. Generally, loss of these crops was greatest during the period 1941 to 1961. Loss of improved farmland has occurred to varying degrees throughout the province. Kings and Hants Counties have experienced the lowest percentage loss since World War II, while Cape Breton Island, Guysborough County, and the southern shore have shown losses of greater than 70 percent. It is interesting to note that in recent years, the area of improved land has actually increased.

Livestock on farms has fluctuated as greatly as has cropped area. The numbers of cattle, sheep, and horses have declined markedly, although the number appears to have stabilized somewhat since 1971. Hogs, on the other hand, have shown significant gains in population since 1961.

The mechanization of farm production was reflected not only in the decline of horses but also in an increase in the relative value of machinery and equipment. In 1921 only 7 percent of farm capital invested in Nova Scotia farms was assigned to machinery and equipment. By 1951 this figure had jumped to 17 percent. Table 2 gives the amount of farm capital invested in each of 1) land and buildings, 2) machinery and equipment, and 3) livestock and poultry.

Table 1

Trends In Agriculture - Nova Scotia and Canada

	1891	1911	1931	1951	1961	1971	1976	1981
Total Population:								
Nova Scotia	450 396	492 338	512 846	642 584	737 007	788 970	828 571	847 440
Canada	4 833 239	7 206 643 ¹	10 376 786 ¹	14 009 429	18 238 247	21 568 311	22 992 604	24 343 180
Percent Rural Farm²								
Nova Scotia	83	62	35	18	8	3	2	2
Canada	-	55	32	21	12	7	5	4
Number of Census Farms³								
Nova Scotia	60 122	52 491	39 444	23 515	12 518	6 008	5 434	5 045
Canada	-	682 329 ⁴	728 623	623 091	480 903	366 128	300 118	318 361
Total Area of Farms								
Nova Scotia - (ha)	2 456 601	2 125 223	1 738 021	1 282 171	901 080	536 866	492 457	466 023
Percent Improved	33	24	20	21	22	29	34	38
Canada - (ha)	-	44 023 358	65 898 068	70 314 846	69 710 624	68 546 118	67 168 202	65 888 916
Percent Improved	-	45	53	56	60	64	65	70

1. Includes data for Yukon and N.W.T.

2. Figures prior to 1931 include rural farm and non-farm populations.

3. Direct comparison is difficult due to changes in definitions of census farms.

4. For comparison with later census, deductions have been made as follows:

33 615 farms less than 1 ac. in 1901 and 30 141 in 1911. In 1911 and 1921 farms on Indian Reserves in the Prairie Provinces were not included.

Source: D.B.S. and Statistics Canada, Census of Canada - Agriculture (various dates)

Table 2

**Distribution of Farm Capital
Nova Scotia and Canada**

Farm Capital	1921	1931	1941	1951	1961	1971	1976	1981
Land and Buildings:								
Nova Scotia (%)	78	78	74	62	61	64	70	71
Canada (%)	77	77	71	58	65	70	76	79
Machinery and Equipment:								
Nova Scotia (%)	7	10	12	17	21	19	17	17
Canada (%)	10	12	14	20	20	16	16	13
Livestock and Poultry:								
Nova Scotia (%)	15	12	13	22	18	17	12	13
Canada (%)	13	10	15	21	15	13	8	7

Source: D.B.S. and Statistics Canada, Census of Canada - Agriculture (various dates)

In comparison, the value of land and buildings remained relatively low during this same period and consequently fell from 78 percent of farm capital in 1921 to 62 percent in 1951. In recent years, land values have risen substantially and this fact together with increased farm size, caused the percentage of farm capital in land and buildings to rise from 64 percent to 71 percent between 1971 and 1981. The national trends follow a similar pattern. For instance, between 1921 and 1951, the percentage of farm capital invested in machinery and equipment increased from 10 percent to 20 percent.

The mechanization of agriculture has enabled farmers to increase output substantially. From 1946 to 1966 the output per agricultural worker in Canada almost tripled. Much of the new technology which made this increase possible could not be applied with equal success in all regions, however. For instance, the new and large machinery was designed primarily for large scale agriculture in the prairies where land is level and relatively stone-free and field sizes are large. Concentration of agriculture in the more favorable physical regions was thus encouraged and the economic gap between areas of differing capability widened.

The preceding summary of agricultural trends provides an overview of the industry in the twentieth century. Briefly, the outstanding trends have been: 1) an absolute decline in the rural farm population since 1891 in Nova Scotia and since 1921 in Canada, 2) a decrease in the number of farms in Nova Scotia since 1891 and in Canada since 1941, 3) the steady loss of farmland in Nova Scotia, 4) an increase in average farm size, 5) mechanization and increased use of advanced technology, and 6) increased productivity per agricultural worker.

CHAPTER III

The Agricultural Land Resource

Capability

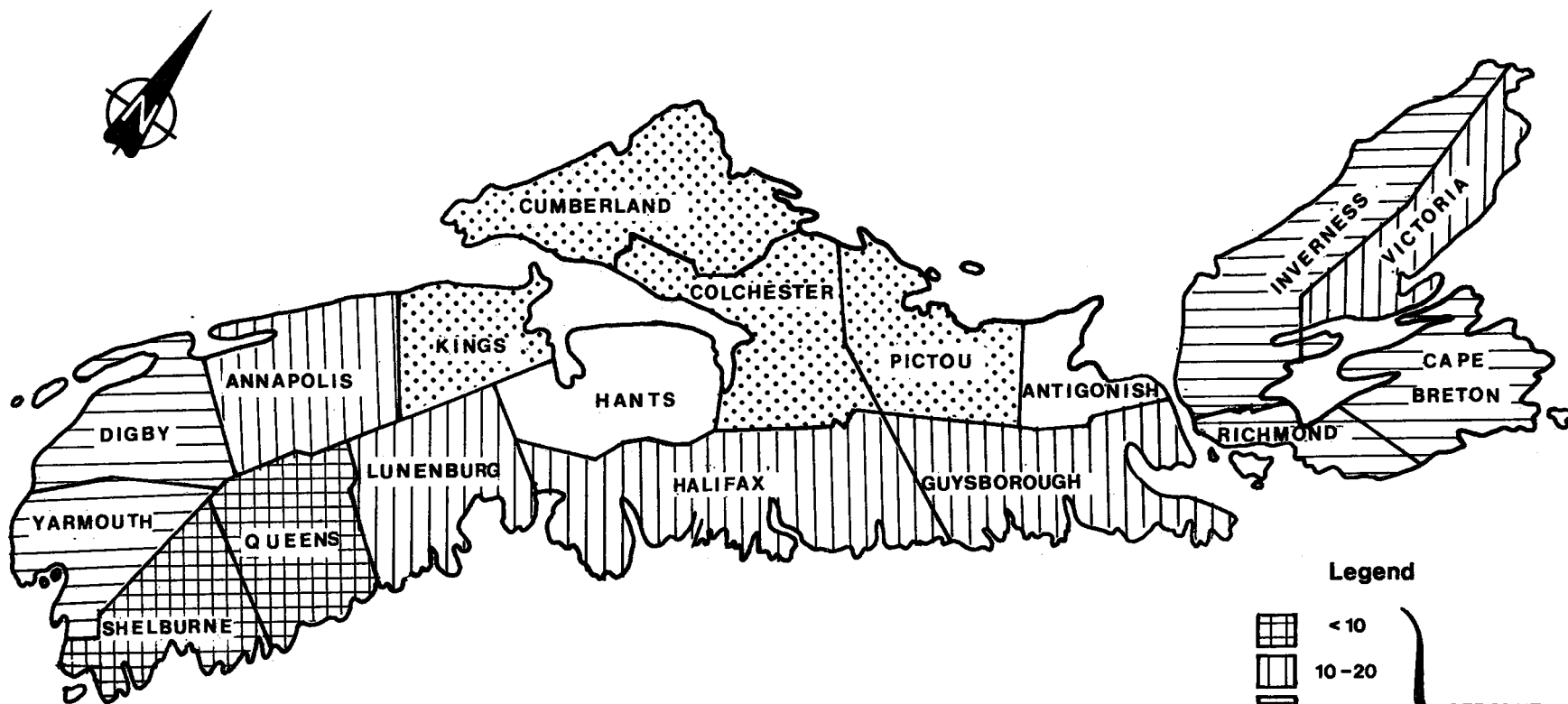
A comparison of the arable area, defined as CLI Classes 2, 3, and 4 with the area of improved farmland indicates that the extent of arable land in Nova Scotia considerably exceeds the present improved area¹. In 1981, only 3 percent of the total provincial land area was improved as compared with 30 percent which is defined as arable. Much of the improved and arable land area is situated within Kings, Hants, Cumberland, Colchester, Pictou and Antigonish Counties, as illustrated by Map 1 and Table 3. A note of caution should be introduced here, however, as the arable area over estimates the supply of land which is readily available for expansion of the improved land base.

The availability of land for agricultural development in the short-term, however, is limited by practical social, economic, and political constraints as well as by physical characteristics. In attempting to determine the potential for agricultural development, Hilchey (1970)

1. CLI Classes 2, 3, 4 land for agriculture are defined as those having some capability to produce cultivated crops, though physical limitations restrict the range of crops and make conservation measures necessary. Class 5 land is capable of supporting perennial forage crops or crops such as blueberries which do not require cultivation.

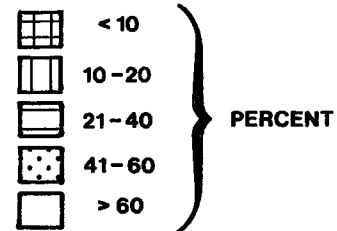
DISTRIBUTION OF ARABLE LAND BY COUNTY IN NOVA SCOTIA

MAP 1



Note: Arable Land includes CLI Classes 2, 3 & 4 for Agriculture.

Legend



Source: Lands Directorate, 1977.

Table 3

Arable, Improved, and Residual Land
by County - 1981

	Arable ha ¹	Improved ha ²	Residual ³ ha	Residual as a Percent of Arable
Nova Scotia	1 554 600	177 982	1 376 618	89
Digby	67 600	3 304	64 296	95
Queens	6 300	1 355	4 945	78
Shelburne	3 500	149	3 351	96
Yarmouth	55 700	2 718	52 982	95
Annapolis	47 400	13 874	33 526	71
Hants	185 700	17 968	167 732	90
Kings	105 100	34 933	70 167	67
Antigonish	87 900	11 542	76 358	87
Colchester	177 900	22 748	155 152	87
Cumberland	229 200	27 177	202 023	88
Pictou	141 700	16 655	125 045	88
Guysborough	64 500	1 706	62 794	97
Halifax	83 600	6 584	77 016	92
Richmond	39 800	876	38 924	98
Cape Breton	76 100	3 094	73 006	96
Inverness	113 800	5 376	108 424	95
Victoria	34 100	1 543	32 557	95

Source: Lands Directorate, 1977 and Statistics Canada, 1982.

1. Rounded to the nearest hundred ha of CLI Classes 2, 3, and 4 land.

2. Derived from 1981 Census of Agriculture.

3. "Residual" is defined here simply as the area of arable land minus the area of improved land. Some of this land may be presently used for other purposes such as industry, transportation routes or housing and may consequently not be available for agricultural use. The "residual" figures overestimate the amount of land readily available to the agricultural industry for expansion of the improved land base but do indicate, nevertheless, areas which could more likely support expansion.

identified three major land blocks: (a) multi-crop agricultural blocks, (b) limited-use blocks, and (c) non-agricultural land¹. Map 2 outlines the distribution of these blocks.

Physiography

The capability for agriculture in Nova Scotia is severely limited by physical constraints in many locations. Steep slopes, poor drainage, stoniness and bedrock at or near the surface all inhibit the use of modern farm machinery and hence, commercial agriculture. Lowland regions which offer a combination of relatively large expanses of level to undulating topography, more productive soils and generally a more favourable climate have become the focus of agricultural activity. By comparing Maps 1, 2, and 3 it can be seen that the occurrence of arable land corresponds closely with multi or limited crop regions and with the lowland regions of Nova Scotia.

Natural soil formation took place under conditions of moderate rainfall, a cool temperate continental climate, and a predominantly coniferous forest cover. Podsollic and brunisolic soils are predominant as a result.



1. Guidelines used by Hickey (1970) to categorize the three regions were:

1. Multi-crop agricultural blocks have: a) not less than 404 ha (1000 acres) of cleared and arable land, b) a significant area of cleared land suitable for production of crops other than forage, c) accessibility to local markets and/or distribution centers, and d) a high proportion of land already cleared.
2. Limited-use agricultural blocks have: a) a minimum of 202 ha (500 acres) of cleared land if separated from other blocks by more than 4.8 km (3 miles), b) CLI class 3 capability for agriculture with a minimum of inclusions of poorer land, and c) accessibility to distribution points or marketing centers.
3. Non-agricultural land does not meet the minimum requirements considered essential for development. Some thousands of acres are used for lowbush blueberries. Other areas are in various stages of agriculture, abandonment, or reforestation.

MULTI AND LIMITED CROP REGIONS OF NOVA SCOTIA



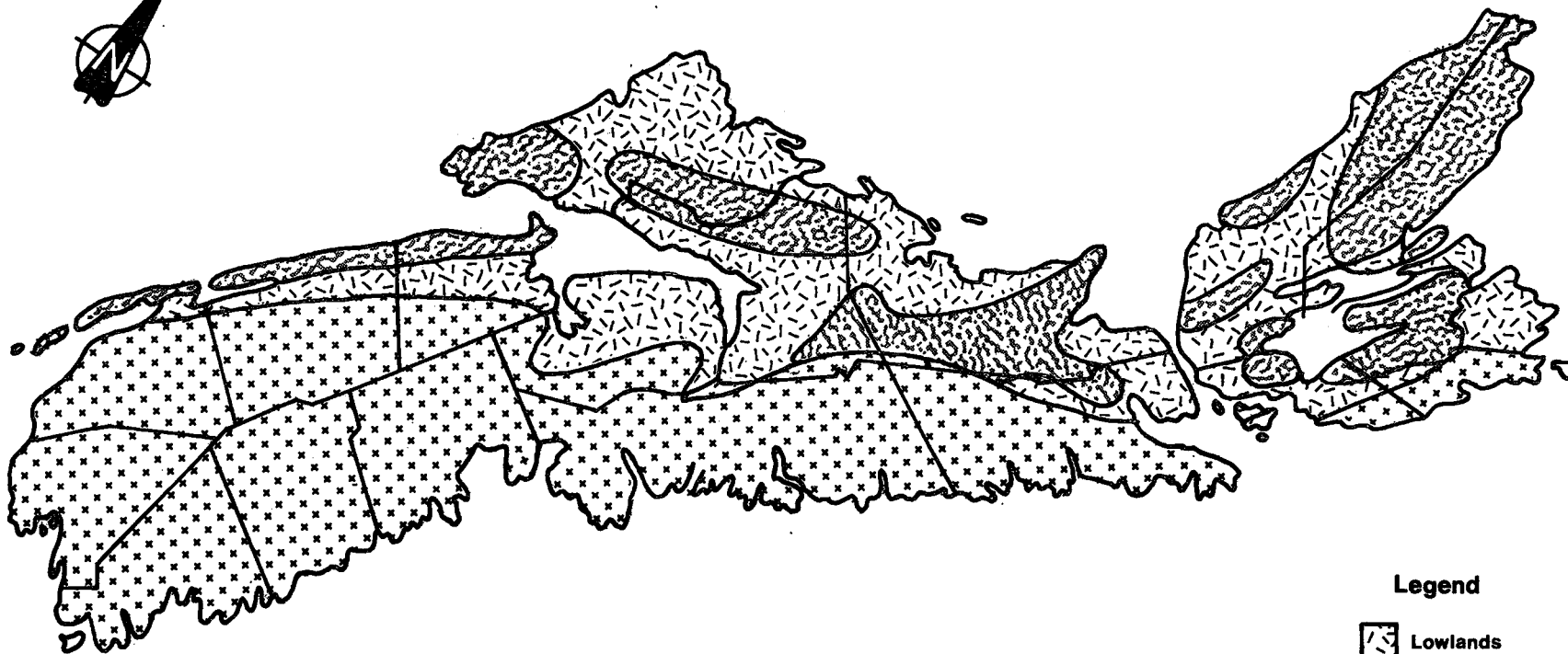
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-  Multi Crop Region
-  Limited Crop Region
-  Non Agricultural Region



Source: Hiichey in Crickmer 1981, p39.

TOPOGRAPHIC REGIONS OF NOVA SCOTIA



Legend

-  Lowlands
-  Uplands
-  Highlands



Source: Adapted from Crickmer 1981, p34.

Being acidic and generally low in natural fertility, those soils require inputs of lime, fertilizers and often organic matter. In many instances, drainage and soil structure problems must also be overcome.

The climate of Nova Scotia is a modified continental type with the ocean exerting a moderating influence. Temperatures in the spring and summer are lowered while the occurrence of fall frost is delayed. Although milder winter temperatures and cool springs favor the production of apples and some soft fruits, cooler summer temperatures reduce the rate of plant growth. The influence of the ocean is felt not only in the temperature regime but also in the number of days with fog. Along the eastern and southern shores, fog is an important climatic element. The warmer water of the Northumberland Strait results in this shore being relatively fog-free, however. Likewise, the Annapolis Valley, protected from the Bay of Fundy by the North Mountain, experiences a minimum of foggy days each year.

Precipitation is, with rare exception, ample during the growing season. In the spring and fall heavy rains may occur at critical stages for seeding and harvesting of crops. During the winter, snowfall is considerable at interior stations; along the coast, the moderating influence of the ocean results in warmer temperatures and winter precipitation is more often in the form of rain. The untimely fall rains give hay and grass an advantage over grain crops. Other crops which do well under the climatic conditions include root crops and leafy vegetables.

Table 4 provides climatic statistics for several stations in Nova Scotia.

With the exception of wetlands, flood plains and barrens much of the province is forested under natural conditions. Once cleared land is left idle, it quickly becomes overgrown with alders and spruce. After the

Table 4

Climatic Statistics for Selected Stations - Nova Scotia

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Yarmouth:													
Mean Daily Temp. (°C)	- 3	- 3	0	5	9	13	16	16	14	10	5	0	7
Days with Frost	28	27	25	12	1	0	0	0	0	2	11	24	130
Mean Total Ppn. (mm)	141	116	102	99	101	87	74	96	86	108	139	134	1283
Mean Snowfall (cm)	62	52	33	7	< 1	0	0	0	0	< 1	6	43	204
Days with Ppn.	20	16	14	13	12	11	10	9	9	10	15	18	157
Hours of Sunshine	71	94	136	173	229	209	202	201	168	146	85	58	1772
Kentville C.D.A.:													
Mean Daily Temp. (°C)	- 5	- 5	- 1	4	10	15	19	18	14	9	4	- 2	7
Days with Frost	29	27	27	18	5	*	0	0	1	7	16	27	157
Mean Total Ppn. (mm)	120	102	89	76	78	71	61	95	85	96	119	117	1110
Mean Snowfall (cm)	67	61	46	13	< 1	0	0	0	0	1	11	53	254
Days with Ppn.	17	15	13	13	13	11	10	10	11	12	16	17	158
Hours of Sunshine	73	96	129	156	205	211	249	223	175	140	76	56	1789
Halifax:													
Mean Daily Temp. (°C)	- 3	- 3	0	5	10	14	18	19	16	11	6	- 1	8
Days with Frost	28	26	26	13	1	0	0	0	0	1	9	24	128
Mean Total Ppn (mm)	133	121	103	99	106	84	93	95	97	115	144	128	1319
Mean Snowfall (cm)	53	57	39	12	1	0	0	0	0	< 1	8	40	211
Days with Ppn.	15	14	13	12	13	12	11	11	10	11	15	15	152
Hours of Sunshine	93	117	144	162	204	206	230	219	176	154	93	85	1883
Truro:													
Mean Daily Temp (°C)	- 6	- 6	- 2	3	9	13	18	17	13	8	3	- 3	6
Days with Frost	31	28	30	28	11	1	0	0	5	10	20	28	190
Mean Total Ppn (mm)	94	86	74	80	78	63	82	111	78	109	120	126	1101
Mean Snowfall (cm)	58	53	42	20	1	0	0	0	0	2	9	58	243
Days with Ppn.	16	14	13	12	13	11	11	13	11	13	15	17	159
Hours of Sunshine	85	106	126	161	203	217	225	204	152	127	76	67	1749
Sydney A:													
Mean Daily Temp (°C)	- 4	- 6	- 2	2	8	13	18	18	14	9	4	- 2	6
Days with Frost	29	28	30	23	7	*	0	0	*	4	14	27	162
Mean Total Ppn (mm)	137	119	119	95	100	81	79	100	99	112	161	140	1341
Mean Snowfall (cm)	67	63	60	26	4	0	0	0	0	1	9	58	288
Days with Ppn.	19	17	16	14	14	12	11	12	12	14	18	20	179
Hours of Sunshine	81	106	126	161	204	222	251	225	168	139	74	67	1824

Source: Environment Canada. 1975. Canadian Normals.

vegetation growth has reached the stage when it is too large to be ploughed under, the high costs associated with land clearing have deterred widespread use of reverted lands. Though government programs have been developed to assist in land clearing, priority is now given to the upgrading of cleared land as this is seen to be more cost-efficient.

Relationships Between Physical Limitations and Land Abandonment

The physical adversity which characterizes much of Nova Scotia has greatly influenced the productivity and abandonment of land. In concert with social and economic constraints, limitations of soil, climate, and topography have hindered the adoption of commercial mechanized production methods.

As was typical of eastern Canada as a whole, little attention was paid to physical qualities of the environment in the settlement process. Land grants were made in areas of low capability. Barely adequate for subsistence farming, the physical limitations and small size of the grants contributed to massive abandonment when improved economic opportunities became available elsewhere. Though many other forces have been at work in the abandonment process, evidence suggests that in the early stages of abandonment physical factors were of critical importance. (Crickmer, 1981).

Topographic irregularity has resulted in fragmentation of the agricultural industry from the provincial scale to the farm unit. Inefficiencies in the marketing, storage, and processing of crops have occurred as the infrastructure was designed to handle small volumes from scattered locations. Both quality and prices have suffered under such circumstances. The economic viability of the farmer in the smaller, more isolated farming regions has been reduced because the resource base could not support a large number of varied service and businesses. To acquire necessary goods and

goods and services, increased transportation costs were borne by the farmers and the position of agriculture became increasingly disadvantaged.

Physical limitations have also been reflected in the field patterns and farm operations. The occurrence of ridges, valleys or other topographic variations often resulted in the creation of small and discrete field units. Land surveys carried out to define the boundaries of grants often did not take the physical land surface into account and thus compounded, the situation of small and scattered fields. While these fields were suitable for animal power, the use of large machines on such small areas was difficult and inefficient. Abandonment followed as a result.

Though much of the abandoned land was of low capability, a significant area of abandoned arable land indicates the importance of other forces. Social and economic factors shall be discussed in Chapter IV.

CHAPTER IV

The Role of Social and Economic Factors in the Abandonment of Farmland

Operating in conjunction with physical constraints are a wide range of complexly interrelated socio-economic conditions. The significance of these factors in the land abandonment process is, however, even more difficult to measure than is the case with limitations imposed by soil, topography, climate, or vegetation. Like physical factors, though, the role of socio-economic factors varies according to the stage of development, location, and scale of analysis.

The following discussion is organized under six broad subject headings: a) Technological Advance, b) Urbanization and Industrialization, c) Size of Operation, d) Location of Farms and Fields, e) Demographic Structure, and f) Political Factors. Because of the interrelatedness of phenomena, there is at times an obvious overlap between subjects. No attempt has been made here to prioritize the statistical significance of any particular factor; little reference was found in the literature on such analysis. Rather, a large number of factors will be introduced as having had some influence upon the process of land abandonment in Nova Scotia.

Technological Advance

The revolution in transportation had wide ranging implications for all of modern society. The dominance of iron-hulled steamships over sailing vessels undermined the position of Maritime ports in relation to those along the St. Lawrence River. By travelling up the St. Lawrence, the steamships could better tap the expanding markets of the continental interior. The completion of the Seaway made the central parts even more accessible.

The spread of railways across Canada was instrumental in both the westward movement of Maritimers and the transport of western produce to central and eastern markets. Refrigeration enabled perishable goods, such as fresh meat, to be transported long distances as well as grain. As a region, the Maritimes became peripheral to the expanding industrial core and the western frontier.

Within the province, the construction of railways facilitated the continued development of the better quality lands while enabling farmers from marginal areas to emigrate. The apple industry of the Annapolis Valley developed rapidly once transportation improved and markets were established. In contrast, the linking of Antigonish County to the mainline provided a route of escape for many. (Gentilcore, 1956).

Improvements to the internal combustion engine brought the age of the family car and mechanized agriculture. The decline of animal power touched off a chain reaction which upset traditional land use patterns. As horses and oxen were used less and less in the woods and on the farms, the traditional market for hay diminished. Farmers on the Tantramar marshes who had developed a viable agricultural economy based on the production of hay were unable to adapt. In spite of demands for dairy, beef, and sheep farming, the loss of the primary hay market led to a general decline in the economic and social conditions in the Tantramar region.

Mechanization of farm production, largely a post World War II event in the Maritimes, was stimulated in part by rural outmigration and the high cost of dependable farm labour. Through mechanization, the level of output per worker could be raised and total production increased. Farming became more capital intensive, less labour intensive, and the trend of outmigration was fostered and perpetuated.

With the adoption of new farming methods, the remaining traditional rural

industries serving an agricultural industry based on animal power became obsolete. The loss of the rural non-farm element of population was just as significant as the out-migration of the farm population.

To obtain the greatest efficiency from expensive machinery, larger fields and farms were required. As well, machinery was more restricted in its use on steep slopes and stony thin soils, than horses or oxen. Agricultural production, therefore, became more concentrated in the better agricultural regions where arable land was most extensive. Where consolidation of arable land was frustrated due to physical limitations, chaotic land tenure, lack of capital, or other factors, the viability of commercial agriculture suffered.

Larger farms and greater volumes of output pushed the unit costs of production down. The lower unit costs of production on large farms enabled them to survive rising costs of inputs. Concomitantly, the small and marginal operators were forced to the brink of economic collapse.

Technological advance occurred in all facets of the agricultural industry. To name but a few examples, plant and animal breeding was responsible for higher quality, greater yielding crops and livestock. The use of fertilizers and pesticides and soil sampling became common practices among the more successful farmers. In the better regions, such as the Annapolis Valley, the marketing, storage and processing infrastructure became well organized. The establishment of federal research stations and the Agricultural College at Truro played very important roles in conducting research and disseminating information related to scientific farming practices and principles. But most important among the changes was the availability of a cheap energy source to power the internal combustion engines.

The full impact of the technological revolution in agriculture was delayed in the Maritimes until after World War II. This delay extended

also to the supporting infrastructure which lags even yet behind other parts of Canada. Situated peripherally to the agricultural core of Canada, steeped in tradition, and plagued by a host of social, economic, political and physical barriers, adaptation came relatively slowly. Trends based on census data for the period 1951 - 1971 show this to be a period of rapid adjustment. While changes in the definition of a census farm hamper direct comparison, it is obvious nevertheless that large commercial farms have gained ascendancy over subsistence operations.

Urbanization and Industrialization

The industrialization and growth of New England and subsequently central and western Canada created an abundance of job opportunities to which many Maritimers responded. The rural population experienced a particularly significant decline commencing just prior to the turn of the century. The urbanization and industrialization of the twentieth century acted together with technical advance to depopulate the rural areas of Nova Scotia.

Alternate economic opportunities received greatest response from young adults. A higher level of education, greater exposure to what the outside world could offer, and fewer ties to their community were general characteristics of this group. The loss of a substantial portion of the productive age group placed a heavy burden on those few who remained to support the very young and the old. It became increasingly difficult to maintain social facilities and institutions and the fiber of communities disintegrated. Older farmers typically remained on their farms until death. As age or poor health forced them to gradually reduce their work load, fields were left untended. The possibility of selling their land or passing it on to their sons or daughters was diminished by the outward movement of so many young adults. Under this scenario the appearance of the countryside gradually took on one of decline and marginality.

An inability to maintain local social facilities due to rural depopulation was accompanied by the loss of services. Without a sufficient market, shops and other businesses were forced to relocate or to close their doors forever. The economic position of remaining farmers was further disadvantaged as a result.

The growth of urban markets and a rising standard of living was associated with a change in eating habits. Supermarkets demanded large volumes of a uniformly high quality and a steady supply. Fluid milk, and fresh vegetables increased in popularity. Because of inadequate marketing, storage and processing facilities within marginal areas, these demands could seldom be met. Strong competition from large commercial operations put the small marginal farmer in an unfavorable position.

The foregoing discussion has dealt with a number of the direct and indirect effects of urbanization upon land abandonment and marginality. While it is by no means exhaustive, it, nevertheless, provides some idea of the linkages between the two phenomena.

Size of Operation

The spatial fragmentation of environmental resources was seen earlier to be an historic cause of small operations in the primary industries. The initial establishment of land grants capable only of supporting subsistence farming was a second factor in promoting small individualistic operations. These conditions acting together produced a tradition of land ownership and operation which was highly resistant to change. A somewhat chaotic pattern of land tenure remains today as a hindrance to the agricultural industry.

Marginality is often associated with small operations. The increasing advantages held by larger commercial operations over small farms led to a

rapid decline in the number of small farms. This relationship operated not only within the province but also between Nova Scotia and other agricultural regions. Thus, to be competitive with other parts of Canada, the industry has had to increase output through specialization and increased capitalization. Over-capitalization has been a very real risk amongst smaller operators.

Because of the greater difficulty experienced by small farmers in meeting demands for a uniformly high quality product and steady supply, markets have often been more uncertain and prices lower. Lower income meant a lower standard of living, reduced ability to benefit from new principles and management practices, and greater difficulty in acquiring credit. Off-farm work was often necessary to obtain cash. By reducing the amount of time which could be devoted to farm operations, the farmer who did off-farm work was less able to carry out labour intensive improvements and the farm operation suffered.

Location of Farms and Fields

Locational advantages of a maritime position, held by Nova Scotia during its early years of development when economic and political control emanated from Great Britain and France, were largely lost after Confederation. The repeal of reciprocity with the United States, the advent of rail transportation and the westward shift of national development encouraged by Federal policies of the late nineteenth and early twentieth centuries all disrupted the established trading patterns based upon shipping. In the formation of new trade linkages with the interior, the location of the province peripheral to the heartland worked to its disadvantage.

Within provincial boundaries, locational factors were also at play. Distance to urban centers determined transportation costs. The fluid

milk and market gardening operations were particularly dependent upon proximity to urban markets as a short delivery time was of the essence in maintaining quality. Goods and services were provided by the towns and cities; as well, they were often the focal point for the dissemination of information. Thus, location relative to agricultural service centers, was a significant factor in the economic viability of an agricultural region.

The adverse effects of distance can be illustrated by looking at the Northumberland Shore Multi-Crop Region outlined on Map 1. This Region possesses moderate to good capability for agriculture yet has historically been an area of low income. Situated beyond the fluid milksheds of the province's largest cities, dairymen have generally sold their milk for manufacturing purposes at lower prices than would have been received for fluid milk. Low income was also characteristic of beef and sheep farmers. Limited capital resources have hindered attempts to improve and expand operations. At the same time the industry has had to contend with a chaotic and fragmented system of land tenure, poor managerial capability, and a serious lack of supportive infrastructure including marketing, storage and processing facilities (Hilchey, 1970).

Factors of location may also be seen to operate at the level of the farm unit. The traditional system of land survey was that of long lots extending back from the edge of a river. Early settlers practiced an infield-outfield system of management. Basically, this involved the intensive use of land situated near the farmstead at the front of the lot. Access to the river and later to roads which ran adjacent to the river, dictated the construction of homes at the front of the lot. The back portion of the lot, which could even be separated from the front lot, remained undeveloped and served as a source of wood. As the farmer became less able to care for his fields, those most distant were left for pasture and eventually reverted to shrub vegetation.

Distance of fields from the farmstead has also been a factor in expansion. A study of the ARDS farm enlargement and consolidation program (Retson, 1974) indicated that preference was generally given to acquisition of properties adjoining the existing farm unit. Land located more than two kilometers away presented increasing problems of management.

"These included the operation of slow-moving vehicles on or across highways, restrictions in the use of underage drivers, increased demands on the wife to transport workers in the family car, difficulties in moving bulky loads such as forage and manure, being cut off from the ARDA farm by limited access highways, added problems of snow removal, and the combined influence of these and other factors on labor requirements and production costs." (Retson, 1974; p. 36)

Demographic Structure

While the level of education and farming skills, age, off-farm work, and geographic mobility have all been alluded to earlier, these characteristics of a population both influence marginality and abandonment and are indicators of the economic viability of the agricultural economy of a region. This section will deal more specifically with each of these factors as they relate to the process of land abandonment.

The agricultural backgrounds and experience varied greatly among the various groups which settled Nova Scotia. While the Acadians and German-Swiss developed well-organized and productive farms using skills acquired in their European homes, the Scottish Highlanders were totally unfamiliar with mixed crop and livestock farming. They considered farming to be a last resort and left the land rapidly when other opportunities arose. The resulting impact upon the landscape is still in evidence, particularly where ethnic concentrations persist.

Marginal areas are generally characterized by a low level of managerial

skills. Those who acquired a higher level of education and awareness of the outside world, often left to seek their fortune. Those remaining often did so as they lacked either the qualifications for alternative employment or incentive and motivation for self-improvement. Little interest was shown in acquiring improved farming skills or adoption of new methods.

The emigration of a large percentage of the young people from declining and marginal regions has resulted in a top-heavy age distribution. Until recently, it was the common practice for farmers to reside on their land until death. With the passing years they became less able to complete former work loads. The least productive and most distant fields were allowed to revert first; at the end perhaps only a small garden plot near the house remained in production. As there were few young farmers to take over, land was increasingly lost to agriculture. In the better regions land would more likely be worked by younger neighboring farmers.

The heavy loss from a community of members in the productive age groups, placed an increased burden on those who remained. As well, the tax burden to support social facilities and institutions was greater. Thus the economic viability of a marginal area continued its downward spiral.

To help make ends meet, many rural Maritimers have historically engaged in occupational pluralism. Since the first settlers arrived, the combination of subsistence farming with fishing, forestry, or mining has been a common practice. It was to be expected then that amongst the farmers within their productive years, off-farm employment and part-time farming would be common. There is some evidence to indicate that off-farm labour was higher within areas of marginal agriculture or in proximity to population centres. It has often happened in Nova Scotia, however, that marginal farming areas also experienced marginality in other economic activities.

Job opportunities were, therefore, scarce and underemployment existed on and off the farm.

Political Factors

From Confederation to 1930 the National Policy fostering western expansion overshadowed problems which beset the agricultural economy of the Maritimes. Despite high levels of abandonment and increasing economic and social disparities, no federal programs were developed to deal with these problems until the 1940's. In 1948, the Maritime Marshlands Rehabilitation Act (MMRA) was passed to enable the rehabilitation of dykelands around the Bay of Fundy thereby providing additional productive farmland. It represented an attempt by the Federal government to balance its support to the West through the Prairie Farm Rehabilitation Administration (PFRA). By 1960, approximately 33 200 ha of previously dyked land were protected. Despite engineering successes, the program did not attain its farm rehabilitation objectives. No further attempts were made for over a decade.

While direct government action played only a minor role prior to 1960, the agricultural economy and land abandonment have been strongly affected by indirect political factors originating both at home and abroad. Included among a very long list were: a) immigration and settlement policies of the English and Canadian governments; b) transportation policy; c) trade and tariff policies and programs; d) national defence; and, e) social assistance.

During the early years of settlement the granting of small parcels of land which were often of little or no agricultural value was made. This contributed to the subsequent abandonment of large tracts of land.

Construction of the railroads opened the way for a mass emigration from

the Maritimes to the western Canadian frontier and the industrialized core. Not only did the railway speed depopulation of the rural areas but by transporting less expensive and higher quality Western grain to the Region it caused the production of local grain to decline. Loss of markets contributed to abandonment of former grain fields.

In recent years, despite increased local grain production, there has been a substantial rise in feed freight assisted shipments of grain. The increasing costs of transportation together with the erosion of feed freight assistance have placed an increasing financial burden upon poultry, dairy, and livestock producers. The resultant declining competitive position of Nova Scotia agriculture relative to that of other regions in Canada is cause for concern.

The impact upon land use by trade conditions is well illustrated by the history of the apple industry. With improved transportation and development of the British apple market, the commercial apple industry flourished. Expansion was most rapid from 1911 to 1934; in 1930, approximately 12 000 ha. were devoted to apple orchards in the Annapolis Valley. The onslaught of World War II severely curtailed overseas shipments; increased foreign and domestic competition served to further reduce the quantities exported. The inability to find sufficient new markets resulted in the start of a tree removal program. While some of the orchard land was converted to other crops, derelict orchards may still be found.

The first and second World Wars took a heavy toll on the population of the Maritimes. In addition to the enlisted who died in battle, the huge labour market in central Canada attracted even more people to the industrial core and other urban centers.

Commencing in 1952 with the inauguration of the Canada old-age pension, the federal government introduced and extended a variety of major

national social programs. Pensions enabled elderly (and often marginal) farmers to retire. If land was not acquired by other farmers it was abandoned. The introduction of unemployment insurance benefits for fishermen eroded the traditional fishing-farming economy in some coastal regions and more subsistence farms were consequently abandoned.

The decade of the sixties was a period when considerable effort was made by the federal government to achieve social and economic equalization between have and have not provinces.

In 1961 parliament passed the Agricultural and Rural Development Act (ARDA). Joint federal-provincial General Development Agreements were established under this Act. Attempts were made to rehabilitate agriculture through various programs. The Canada Land Inventory, a research program which was to determine the inherent physical characteristics of land for agriculture and other uses, was initiated under ARDA.

The Department of Regional Economic Expansion, created in 1969, took over ARDA and subsequently was responsible for negotiating further general development agreements and related federal-provincial sub-agreements.

Under the Canada-Nova Scotia Agricultural Sub-Agreements financial assistance has been provided to bona fide farmers for land clearing and improvement, construction of buildings, improvement of storage and marketing facilities and land consolidation. It is at least partly due to the assistance offered under these Sub-Agreements that the recent increase in improved farmland has occurred.

In 1982 Agriculture Canada assumed the responsibility for delivery of assistance programs from DREE. The "Canada/Nova Scotia Agriculture and Food Industry Development Agreement 1982-1987" makes provision for programs valued at 23.3 million dollars which have as their objectives:

- "(a) to encourage the growth of agricultural production and food processing to the extent of identified and mutually agreed domestic and export market opportunities in horticulture, livestock feeds and livestock;
- "(b) to increase the efficiency of firms in the production, processing and marketing sectors of the province's agri-food industry; and
- "(c) to expand income and employment particularly in the rural areas of the province."

(Agriculture Canada, 1982; p.3)

The Province of Nova Scotia has, for the same time period, allocated 25 million dollars to assist the industry. Objectives of the Province are to improve 50 000 hectares of cleared farmland and to strategically expand the land resource base by clearing 10 000 hectares. Projects to be funded include main outlet drainage, on-farm surface ditching, on-farm underdrainage, land forming, land clearing, construction of soil conservation works, land banking and development, land consolidation, improved land accessibility, environmental assessment, engineering design, and benefit-cost feasibility studies.

CHAPTER V

Summary and Conclusions

The development of agriculture in Nova Scotia had its beginnings in the Annapolis Valley, a region which has continued until the present to be the most highly productive agricultural region in the Province.

Throughout much of history, farming operations were primarily subsistence in nature. In comparison with the modern situation, farms and fields were small, a larger mix of crops and livestock was produced, the industry was more widely dispersed across the province and income from sales of agricultural products was minimal. Until well into the twentieth century, the main source of power was supplied by animals and human labour.

In the latter part of the nineteenth century a faltering economy in the Maritimes coupled with rapid industrialization in New England resulted in an exodus from Nova Scotia to the "Boston States". Those who left in search of improved economic opportunities were generally the young, strong, and better educated elements of society. As time went on the destination of Maritimers shifted to central Canada and recently has shifted again to the West. But, out-migration continues.

Out-migration affected the agricultural industry directly through the loss of farm labour and abandonment of farms and indirectly through the loss of local markets for agricultural products and services. It was not just farmers who left the Province but many others too. Entire rural communities disappeared as the primary basis upon which they were founded faltered and farmland was lost to the encroaching forest.

Though poor quality land was among the first to be abandoned, social and

economic factors have been equal to or of greater importance than physical factors in determining the pattern of land abandonment.

The position of agriculture in Nova Scotia continued to decline both in an absolute sense and relative to that of Canada until after World War II. Though abandonment continued through the 1950's at a rapid rate, countervailing trends began to appear as the entire industry experienced a restructuring.

The rate of increase in mean farm size and area of improved land per farm accelerated. Modernization of agricultural methods allowed productivity to rise. The increased capitalization of agriculture favoured farmers who were situated in regions possessing a concentration of moderate to high capability land. Those remaining in regions having poor capability or where productive land was found only in small isolated pockets were placed at a further disadvantage. Commercial agriculture was thus concentrated into the lowlands, particularly Kings, Cumberland, Colchester, Hants, and Pictou Counties.

Data from the Census of Canada indicate that during the period 1891 - 1981, the total area of farms in Nova Scotia declined from 2 456 601 ha to 466 023 ha or by 81 percent. The most rapid rates of loss were seen in the last decade of the nineteenth century, a period of deindustrialization in the Maritimes, and in the decade of the 1950's when the forces of mechanization were brought to bear upon the industry. From 1891 to 1971, the area of improved farmland dropped from 805 454 to 155 287 ha or by 81 percent as well. Again the period 1891 - 1901 showed the greatest loss. Significantly, since 1971 a modest increase in the area of improved land has occurred. Though caution must be exercised in the direct comparison of data between census years, the trends are clearly evident.

Reasons for the massive abandonment of farmland during much of the past century are numerous and complexly interrelated. At the provincial level, economic factors are likely the most important determinant. To understand why the agricultural industry suffered such a set back, the problem must be viewed in the context of what was happening to the provincial economy as a whole. The fact that massive out-migration occurred from all sectors of the population illustrates the weakness of the provincial economic structure. The pattern of abandonment within the province was influenced by economic factors but also by local physical constraints such as, location, stoniness, slope, drainage or soil structure, and by social variables such as age, education, and participation in off-farm labour.

Following a century of continued abandonment of both improved and unimproved farmland throughout Nova Scotia and a declining economic position for the agricultural industry generally, the winds of change appear to have finally shifted to a more favourable direction. Census data for 1971, 1976, and 1981 offer evidence that the general health of the agricultural industry is improving. The area of improved land has shown increases for both intercensal periods. Central to this transformation is an increase in the productivity per farm worker brought about through the application of improved technology, sound management practices and the economies of scale associated with larger units of production. Acceptance of new innovations by the agricultural community has been facilitated and encouraged by both the Provincial and Federal governments, educational institutions such as the Nova Scotia Agricultural College at Truro, private companies serving the needs of farmers, the media and significantly, by successful farmers in the agricultural communities. Despite current economic problems resulting from the more rapid rise in the cost of inputs as compared with the price received for farm products, there is greater cause for optimism now than at any other time in the past century.

ANNOTATED BIBLIOGRAPHY

Arbour, J. H. 1981. Residual Arable Land in the Maritime Provinces.
Environment Canada, Lands Directorate, Atlantic Region.

CLI capability for agriculture in the Maritimes is compared with land use derived from the Census of Agriculture using the overlay capabilities of the Canada Land Data System (CLDS). The high level of residual arable land in the Maritimes is related to physical limitations, particularly adverse soil conditions. However, other factors of change are also of importance in determining the extent of undeveloped potential agricultural land.

Balcom, A.G. 1928. "Agriculture in Nova Scotia Since 1870." The Dalhousie Review. V. 8: pp. 29 - 43.

This paper tests the validity of the conclusion reached in the report of the Royal Commission on Maritime Claims; that is: the primary cause of the troubles experienced in rural areas is due to a pessimistic outlook for agriculture in the province resulting from the economic stagnation of agriculture.

It is stressed that decreasing rural population, farm abandonment and importation of large quantities of agricultural products should not be equated with economic failure. Rather, the average annual real income should be used as an indicator. Along with this should be quality and quantity of product output.

Beattie, Kathleen G., Wayne K. Bond and Edward W. Manning. 1981. The Agricultural Use of Marginal Lands A Review and Bibliography.
Environment Canada, Lands Directorate. Working Paper No. 13.
Ottawa.

This paper defines and discusses the agricultural frontier or margin in Canada. The physical, social and economic factors which promote abandonment of land in the retreating margins and settlement of new land in the advancing frontiers are reviewed. The role of government programs as a factor of change is discussed as well. A comprehensive annotated bibliography of Canadian sources forms a major portion of the report.

Carr, D.W. December 1967. Maritime Agriculture A Comparative Regional Analysis - The Agricultural Potential. Prepared for the Atlantic Development Board. Ottawa.

This report provides a comprehensive review of the physical and cultural geography of the Maritimes as they relate to agriculture in the Region. It also deals with economic considerations such as capital and financing, markets and marketing, and profitability of enterprise types. Factors contributing to the decline of the industry are examined.

The broad objective of the study is to appraise the potential for agriculture in the Maritimes.

Chapman, L.J. and D.M. Brown. 1966. The Canada Land Inventory The Climates of Canada for Agriculture. Report No. 3. Department of Forestry and Rural Development. Canada.

This report describes an analysis and classification of climate for agriculture. Climatic information is provided to assist in the understanding of land productivity as related to the development of Canada's resources. The analysis is a reconnaissance approach. The Atlantic Region is treated very briefly.

Comeau, M.A. November 1977. Facts From the Canada Land Inventory, Land Capability for Agriculture in Nova Scotia, A County Breakdown. Fisheries and Environment Canada, Lands Directorate, Atlantic Region.

This report presents information collected by the Canada Land Inventory in tabular form. Agricultural classes are broken down by acres, percentage of the province, and percentage of the county. The characteristics of each class and sub-class are defined.

Cornwall, Brooke. 1956. "A Land Use Reconnaissance of the Annapolis Valley, Nova Scotia" Geographical Bulletin. No. 9. pp 23 - 51.

Land use and the physical and human factors that reflect the land use pattern were examined for the region extending from Wolfville to Annapolis Royal and from the foot of South Mountain to the Bay of Fundy.

Four representative sample areas were selected for detailed analysis of land use.

Crickmer, Robin E. 1981. An Investigation of the Role of Physical Factors in the Process of Farm Land Abandonment in Nova Scotia 1953 - 1974. St. Mary's University. Halifax.

This study addresses the abandonment of farm land in Nova Scotia generally and specifically the importance of physical factors in the process of abandonment of four selected areas of the province. In addition to soil capability, slope and elevation, distance to the nearest urban center, road quality, and population density are considered.

The following observations are made: 1) complex relationships between abandonment and physical factors make generalizations difficult; 2) poor soil, relief and distance to an urban center affect abandonment but are not the major determinants; 3) the size of the initial farming area significantly affects the rate of abandonment; 4) physical factors are more important in the early stages of land abandonment; 5) physical factors appear to operate at a regional scale but less so at a local level.

Dominion Bureau of Statistics. Census of Canada - Agriculture - Nova Scotia and Canada. 1961; 1951; 1941; 1931; 1921; 1911; 1901; 1891; 1881. Ottawa.

Selected agricultural data is given in the early years but direct comparison with recent censuses is difficult.

Dominion Bureau of Statistics. 1948. The Maritime Provinces in Their Relation to the National Economy of Canada. Ottawa.

This analysis deals with economic and social trends in the Maritimes during the period 1871 - 1941 as determined largely from Census Data. Population migration is related to agricultural decline and development. Other aspects of agriculture which are analysed include farm number and size, capital, income, and land use. Other industries are treated individually as well.

Environment Canada, Atmospheric Environment. 1975. Canadian Normals, V. I Temperature; V. II Precipitation. Downsview, Ontario.

Climatic data are presented for stations across Canada.

Gentilcore, R.L. 1952. "Land Use and the Dairy Industry in Antigonish County, N. S.". The Canadian Geographer. No. 2. pp 43 - 50.

The industrialization of Canada and the westward movement of the population center has resulted in a series of hardships on the primary producers in the Maritimes. Land use and trends in agriculture since 1871 reflect the rising importance of the continental interior.

Antigonish County is representative of many of the land use problems in the Maritimes. Physical and human factors of change are discussed as they relate to agricultural trends.

Gentilcore, R. Louis. 1956. "The Agricultural Background of Settlement in Eastern Nova Scotia" Annals of the Association of American Geographers. V.46. pp. 378 - 404.

The history of settlement of Antigonish County is traced. Antigonish County exemplifies a region of marginal agriculture. Associated problems include a high degree of subsistence and part-time farming, farm abandonment, a large requirement for inputs from outside the region, and an unfavorable situation with respect to markets.

Hart, John Fraser. September 1968. "Loss and Abandonment of Cleared Farm Land in the Eastern United States". Annals of the Association of American Geographers. V. 58, No. 3. pp 417 - 440.

The loss and abandonment of cleared agricultural land in 31 states of the eastern United States has been widespread. No single statistical indicator explains the complex patterns of loss and abandonment. Factors examined included a) urban expansion, b) strip mining, c) loss of a locally dominant crop, d) the Soil Bank program, e) land acquisition by forest industry companies and f) physical hindrances. Physical factors have been the most important in the East, as a whole.

Hilchey, John D. 1970. The Canada Land Inventory, Soil Capability Analysis for Agriculture in Nova Scotia. Report No. 8. Department of Regional Economic Expansion. Ottawa.

This report deals with the location, extent and projected use of soils of Nova Scotia suitable for agriculture. A technique of land blocking

was used to delineate specific areas of soils for agricultural use. Physical constraints affecting the agricultural use of soils are discussed.

Levitt, Kari. 1961. "Population Migration in the Atlantic Provinces" In Canadian Political Science Assoc., Conference on Statistics 1961. Wm. C. Hodd and John A. Sawyer (eds.). U. of Toronto Press. Toronto.

This paper examines census of population data to determine net population movements in the Atlantic Provinces. Information is provided which contributes to an understanding of the chronically slower rate of economic development in the Atlantic Provinces. Much of the data refers to the period 1941 to 1956 although some dates back to 1921.

It is concluded that out-migration from the poorer areas of the region has proceeded at very high rates and the pattern of out-migration generally conforms to economic incentives. In addition, even the heavy exodus will not prevent a growing surplus of manpower in the near future. Lower labor force participation rates, higher unemployment rates and the waste of manpower in low-productivity subsistence occupations will be a continuing feature.

MacPherson, Alan (ed.). 1972. The Atlantic Provinces. University of Toronto Press. Toronto.

The physical and human resources of the Atlantic Region are dealt with in some detail. Of particular relevance is Chapter 3, "Resource Utilization: Change and Adaptation: by W. A. Black and J. W. Maxwell. Trends in agriculture since World War II are dealt with and factors of change discussed in light of established trends.

Morse, Norman H. 1960. "Agriculture in the Maritime Provinces." Dalhousie Review. V. 39. pp. 471 - 484.

Agriculture in the Atlantic Region has been characterized by chronically low incomes. Present problems of the industry are complex as are the long-term changes. The paper traces long-term movements in order to indicate the locational advantages of different branches of farming

in the Maritimes. The relative significance of land, labour and enterprise as factors affecting the development of agriculture are also examined.

Nicholson, Norman L. 1955. "Rural Settlement and Land Use in the New Glasgow Region." Geographical Bulletin. No. 7. pp.38 - 64.

Early agricultural settlement patterns in the New Glasgow Region have readjusted to more closely reflect the geographical features (soil, topography) of the landscape. The traditions of the European settlers, also an important determinant of the early settlement patterns, have also changed.

In areas of good soil and favorable topography farm enlargement has often occurred. Farms which were abandoned in the less productive regions were seldom bought by neighbouring farmers and idle or reverting land is more common.

Nowland, John L. 1975. The Agricultural Productivity of the Soils of the Atlantic Provinces. Monograph No. 12, Agriculture Canada. Ottawa.

This brief report outlines the extent of the agricultural land base, describes some of the physical and socio-economic factors inhibiting its full use and expresses gross potential productivity in terms of the possible increase in agricultural production for the Atlantic Provinces. The CLI is used as a basis for information.

It is concluded that considerable reserves of agricultural productivity exist. Production can be raised by removal of socio-economic barriers and by land clearing.

Pepin, Pierre-Yves. March 1968. Life and Poverty in the Maritimes. ARDA Project No. 15002, Department of Forestry and Rural Development. Ottawa.

Six counties are selected - Inverness, Digby, Yarmouth, Kings, Kent, and Charlotte as study areas. Interviews carried out with residents of these areas form the basis for discussion although there is a brief account of historical development and biophysical setting for each study area.

Following the study area descriptions, an overview of the primary industries, agriculture, fishing, and lumbering is given. Poverty and emigration are examined.

Raymond, C.W. and J. A. Rayburn. 1963. "Land Abandonment in Prince Edward Island," Geographical Bulletin. No. 19. pp.78 - 86.

Between 1935 and 1958, a large amount of land in P. E. I. was removed from agricultural production. The process of abandonment and recent developments on marginal land are discussed.

Retson, G.C. Oct. 1974. "Farm Adjustments Associated with the ARDA Farm Enlargement and Consolidation Program in N. S." Canadian Farm Economics. V. 9., No. 5, pp. 29 - 38.

This paper researches the ARDA Farm Enlargement and Consolidation Program during the period 1965 - 1971. The program's basic purpose was to increase farm income and viability through farm enlargement.

Study farmers who acquired an average of 74.8 ha. of land on a rental basis emphasized the advantages of securing land without borrowing and associated benefits, including increased employment, income, farm viability, retention of sons in agriculture, and the overall effect of putting unproductive land back into farm production.

Saunders, S.A. 1939. Studies in the Economy of the Maritime Provinces. Studies of the Institute of Public Affairs at Dalhousie University. MacMillan Co. of Canada Ltd., Toronto.

The economic history of the Atlantic Provinces is traced with special attention being given to the impact of the reciprocity treaty of 1854, and the National Policy of westward expansion. The basic economic problems of the major activities are examined; the agricultural industry is dealt with in considerable detail.

Shortt, Adam and Arthur G. Doughty 1914. Canada and its Provinces; Atlantic Provinces. V. 14. Glasgow, Brook and Co., Toronto.

This volume describes the history and development of the Maritimes from 1867 to 1912. The fishery, forest industry, agriculture, and mining are dealt with individually.

Statistics Canada. Census of Canada - Agriculture; Nova Scotia and Canada. 1981; 1976; 1971; 1966. Ottawa.

Data is presented by Province and County related to agriculture; historical figures are given in selected cases.

Troughton, M.J. August 1981. The Policy and Legislative Response to Loss of Agricultural Land in Canada. Paper presented at the 1981 Annual Meeting, Canadian Association of Geographers. Corner Brook, Newfoundland.

This paper examines the policy and legislative responses within Canada to land abandonment, to conversion to other uses, and to alienation or purchase by a foreign (out-of-province) interest.

Between 1867 - 1930, the Federal concern was to develop the West; little attention was paid to the failure of earlier settlement programs in Eastern Canada. Except for the establishment of MMRA in 1948, no effort was made in the Maritimes until the 1960's.

Wilman, M. August 1967. "Changes in Farm Size and Numbers in Canada to 1966." Canadian Farm Economics. V. 2. pp. 21 - 28.

This article describes changes in size and number of all census farms and commercial farms from 1871 - 1966; the period 1961 - 1966 is dealt with in greater detail by Province.

