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URBAN CONSUMPTION OF AGRICULTURAL LAND

Nancy Hofmann, Statistics Canada

Highlights

- **Urban uses have consumed 12 thousand square kilometres of land since 1971. One-half of this—equivalent to the size of Prince Edward Island—was "dependable" farmland (i.e. Class 1-2-3 land as classified by the *Canada Land Inventory*).**
- **The urban consumption of agricultural land is partly due to the growing urban population and it is partly due to new urban households consuming more land per dwelling.**
- **In Ontario, over 18 percent of Class 1 farmland is now being used for urban purposes.**

Introduction

Many towns that started as agricultural trading centres have become successful and growing cities. Part of their original comparative advantage was their proximity to productive and fertile agricultural land. Now their continuing expansion is consuming this high-quality agricultural land. The purpose of this paper is to explore the amount of dependable agricultural land that has been lost to urbanisation.

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Editor:
Ray D. Bollman
(ray.bollman@statcan.ca)
Tel.: (613) 951-3747
Fax: (613) 951-3868

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Note of appreciation

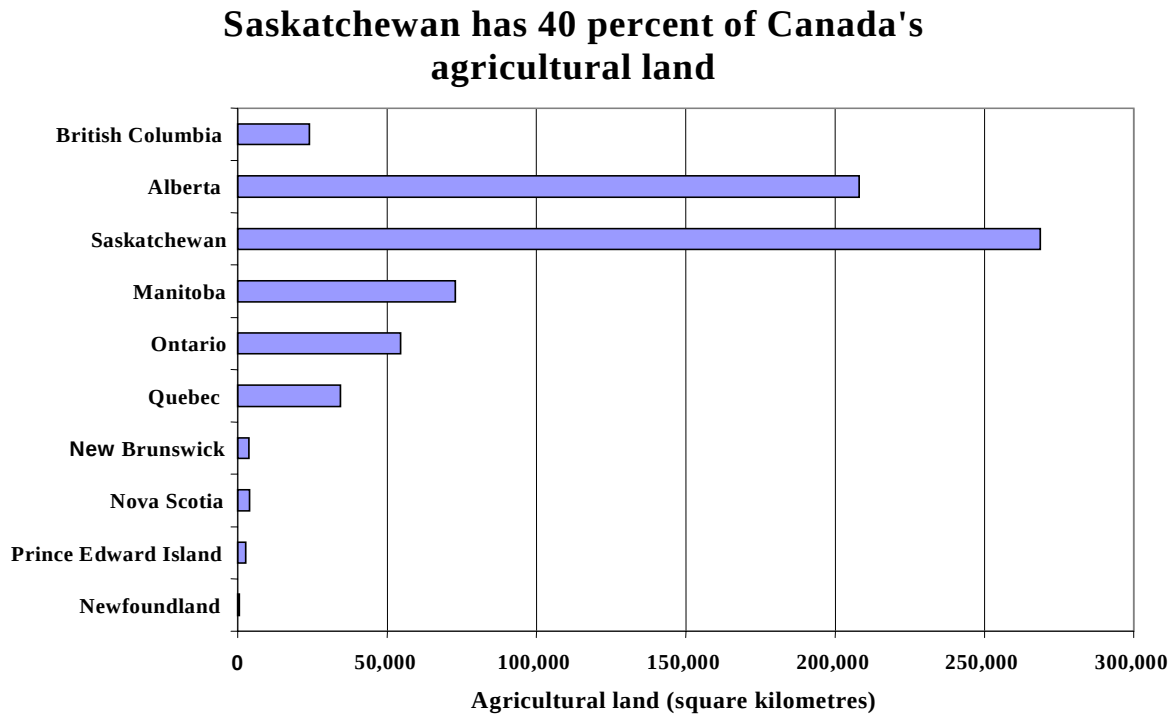
Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

The agricultural land base

In Canada, approximately 673 thousand square kilometres of land is used for agriculture. Although this figure seems large, it represents only 7 percent of Canada's overall landmass. The amount of land that is used for agriculture varies among the provinces (Figure 1). In Saskatchewan, for example, there are about 269 thousand square kilometres of agricultural land, comprising 41 percent of the province's total land area. The agricultural land in Saskatchewan also constitutes about 40 percent of Canada's total agricultural land. Although Prince Edward Island is a small province with less than 1 percent of Canada's agricultural land, almost half of the province's land is used for agriculture.

However, not all of the land used for agriculture in Canada is on high-quality agricultural land. That is, some agricultural activities occur on marginal or poorer quality land – land which may not be dependable for long-term agricultural activity.

Figure 1



Source: Statistics Canada. Environment Accounts and Statistics Division.

Dependable agricultural land

Despite Canada's size, dependable agricultural land is a scarce resource in this country. Limitations such as climate and soil quality reduce the amount of land that is dependable for agricultural activities. We define "dependable" agricultural land as land designated as Class 1, Class 2 and Class 3 by the *Canada Land Inventory* (McCuaig and Manning, 1982). These classes include all land areas that are not hampered by severe constraints for crop production. It is, in other words, our endowment of good farmland.

Only about 5 percent of our land is free from severe constraints on crop production (Table 1). Seventy-five percent of Canada's dependable agricultural land is found in Saskatchewan, Alberta and Ontario. Prince Edward Island enjoys the greatest proportion of dependable agricultural land at just over 70 percent; however, this accounts for less than 1 percent of Canada's total dependable agricultural land.

The fact that 90 percent of Canadians live in a narrow band along the southern border means that the effects of urbanisation in Canada are concentrated in this relatively small area. Since this is the same strip of land where much of the dependable agricultural land is located, one of the major effects of urbanisation is the loss of agricultural land.

Table 1. Amount of Dependable Agricultural Land, Canada and Provinces

Province / Territory	Class 1	Class 2	Class 3	Dependable land (Class 1-2-3)	Total land area	Dependable agricultural land	
						- as percent of total land within each province	- as percent of Canada's total agricultural land
	*** square kilometres ***						
Newfoundland	-	-	19	19	405,720	-	-
Prince Edward Island	-	2,616	1,415	4,031	5,660	71.2	0.9
Nova Scotia	-	1,663	9,829	11,492	55,490	20.7	2.5
New Brunswick	-	1,605	11,511	13,116	73,440	17.9	2.9
Quebec	196	9,071	12,772	22,039	1,540,680	1.4	4.8
Ontario	21,568	22,177	29,088	72,833	1,068,580	6.8	16.0
Manitoba	1,625	25,306	24,407	51,338	649,950	7.9	11.3
Saskatchewan	9,997	58,745	94,247	162,989	652,330	25.0	35.9
Alberta	7,865	38,371	61,053	107,289	661,190	16.2	23.6
British Columbia	211	2,355	6,920	9,486	947,800	1.0	2.1
Yukon	..	..	..	..	483,450	..	..
Northwest Territories	..	..	..	..	3,426,320	..	..
Canada	41,461	161,908	251,261	454,630	9,997,610	4.5	100.0

Notes:

Figures may not add up due to rounding.

The Canada Land Inventory soil capability classes:

Class 1 - Soils in this class have no significant limitations for crops.

Class 2 - Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation

Class 3 - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation

Sources:

McCuaig, J.D. and E.W. Manning (1982)

Statistics Canada. Environment Accounts and Statistics Division.

Urban land use

Canada's cities and towns expanded steadily between 1971 and 1996, consuming more than 12 thousand square kilometres in this 25-year period (Table 2). This expansion is equivalent to more than twice the land area of Prince Edward Island and represents an increase of 77 percent in urban land over the 25-year period. Much of the expansion occurred around smaller cities (cities with populations less than 100 thousand persons) where it was not un-common to record a doubling in the area of urban land. In terms of sheer size, Ontario and Quebec contain over 55 percent of Canada's urban land, and not surprisingly between 1971 and 1996, these two provinces also grew the most in terms of the absolute increase in land used for urban purposes. In fact, Ontario's urban area grew by 3,472 square kilometres – this amount is larger than the total urban area found in any province outside Quebec.

Table 2. Trend in Urban Land Use, Canada and Provinces, 1971 - 1996

Province	1971	1981	1991	1996	Percent change, 1971 to 1996
	*** square kilometres ***				
Newfoundland	455	479	622	825	81
Prince Edward Island	56	76	96	136	143
Nova Scotia	541	600	763	948	75
New Brunswick	618	599	869	1,078	74
Quebec	4,255	4,400	5,711	6,830	61
Ontario	5,545	6,019	7,593	9,017	63
Manitoba	695	749	977	1,126	62
Saskatchewan	752	884	1,131	1,312	74
Alberta	1,424	2,080	2,667	3,302	132
British Columbia	1,564	2,129	2,673	3,471	122
Yukon	..	..	..	..	..
Northwest Territories	..	..	..	..	..
Canada	15,905	18,015	23,102	28,045	76

Note:

Figures may not add up due to rounding.

Source:

Statistics Canada, Environment Accounts and Statistics Division, Ottawa.

There are various reasons for the expansion of urban areas. Two main factors impacting urban land use are:

1. a growing population; and
2. changes in the urban form (i.e. more land per urban dwelling).

Between 1971 and 1996, urban dwellers grew from 16.4 to 22.5 million persons, an increase of 37 percent. This increase in population, combined with the arrival of the baby-boomers on the housing market, increased the demand for housing. The preferences in location and type of home also changed and accelerated the expansion of urban areas.

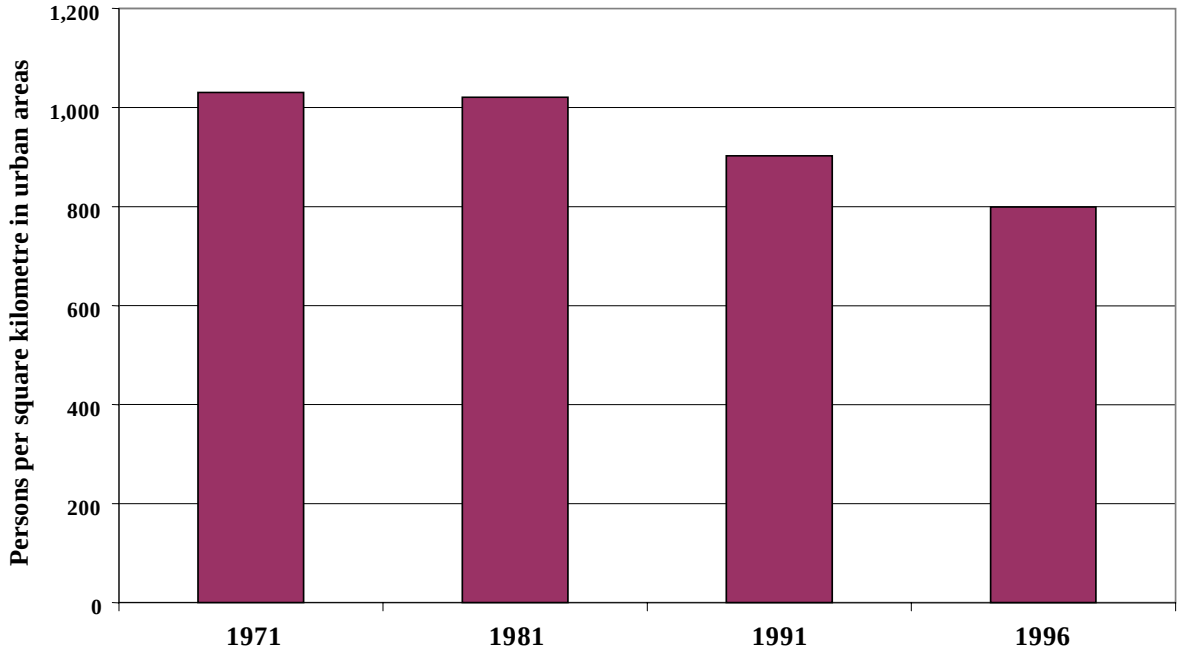
Before the introduction of automobiles, employment in urban areas was concentrated in the central core and houses were located on small lots often within walking distance to shopping, work and other amenities. By the mid-1900s, this trend began to change, largely due to the use of automobiles and the development of related infrastructure. More and more, urban dwellers started to live away from the central core and relied on their automobiles for many daily activities. By 1998, there were almost 18 million highway vehicles[1] registered in Canada (Statistics Canada, 1998). Between 1980 and 1998 alone, the number of highway vehicles registered grew by over 30 percent, or 4.2 million (Statistics Canada, 1998). A new urban form has emerged shaped by car-oriented planning (Environment Canada, 1996) and has led to what is commonly referred to as “urban sprawl”.

[1] Highway vehicles include private cars, trucks and truck cabs, buses, motorcycles, mopeds, ambulances, hearses and fire trucks.

This new urban form is dominated by single detached dwellings, which consume more land than other dwelling types such as apartments and townhouses. Almost 60 percent of all dwellings in Canada are single detached dwellings (Statistics Canada, 1997) and they are commonly located on larger and less expensive lots away from the central core where inhabitants are frequently automobile-dependent. In addition, large urban activities such as shopping malls, industrial parks and recreational facilities contribute to this urban sprawl. Overall, these large urban users of land mean that more space is needed to house a given population, resulting in a decline in population density. In 1971, the average population density in Canadian cities was 1,030 persons per square kilometre (Figure 2). This figure fell to 799 persons per square kilometre in 1996. This decline in population density is another indicator of the increasing demand for more urban land.

Figure 2

Population density is declining in urban areas

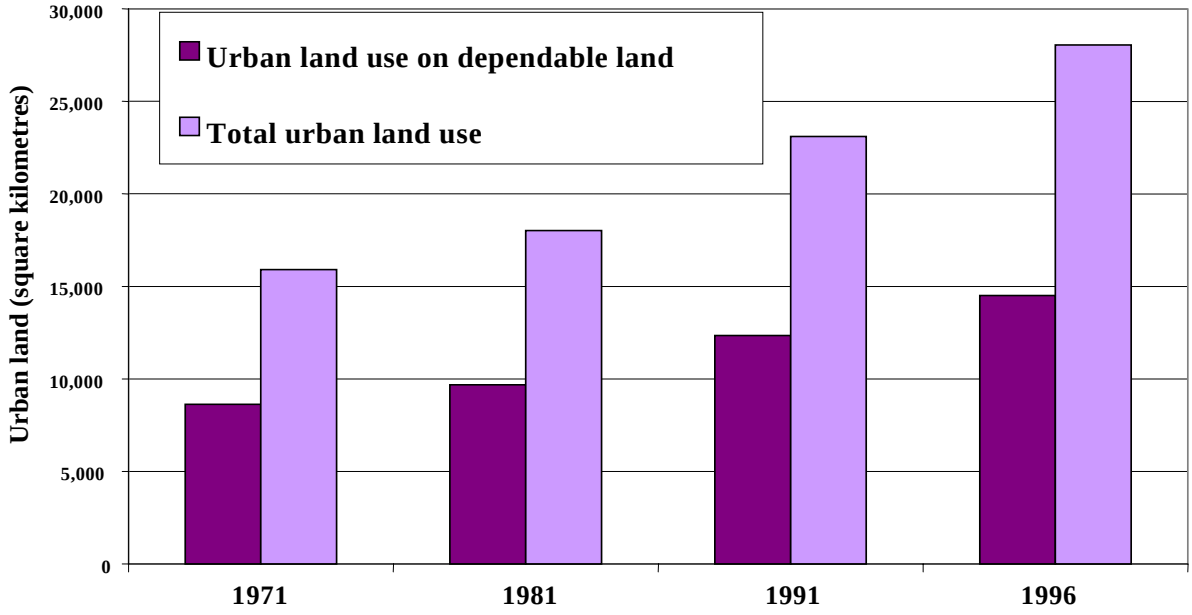


Source: Statistics Canada. Environment Accounts and Statistics Division.

Of the total amount of land converted to urban uses between 1971 and 1996, about half, or 5.9 thousand square kilometres, was dependable agricultural land (Figure 3). This loss of dependable agricultural land over 25 years is equivalent to the total land area of Prince Edward Island. By 1996, urban land in Canada occupied 3.2 percent of the dependable land in the country, as indicated by the Canada Land Inventory Class 1-2-3 land area[2].

Figure 3

Urban land is using 15 thousand square kilometres of dependable agricultural land



Source: Statistics Canada. Environment Accounts and Statistics Division.

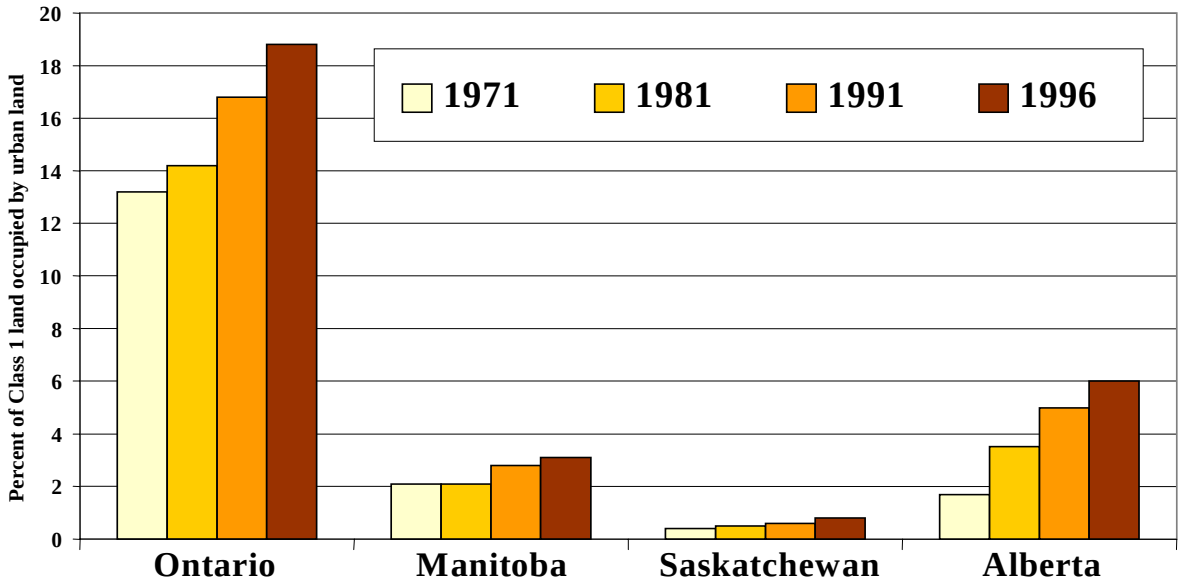
More than 52 percent of Canada's best farmland – specifically, the land classified as Class 1 by the *Canada Land Inventory* – is located in Ontario. Class 1 land is the only class of land with no significant constraints on crop production. Most of this land is in southern Ontario where population growth is the highest. Thus, one of the results of urbanisation in Ontario has been the loss of a substantial portion of the province's Class 1 farmland. In 1996, over 18 percent of Ontario's Class 1 farmland was being used for urban purposes (Figure 4). This land is, for all intents and purposes, permanently lost to agriculture.

[2] This figure does not include the amount of dependable land occupied by large urban areas prior to the development of the *Canada Land Inventory* in 1966. Neither does it include areas occupied for non-agricultural purposes outside cities, such as road and utility networks.

Outside Ontario, other provinces which have significant areas of Class 1 farmland have also experienced losses due to urbanisation. The largest losses occurred in Alberta and Manitoba – Saskatchewan still retains most of its Class 1 farmland.

Figure 4

Over 18 percent of Ontario's Class 1 land has been consumed for urban purposes



Source: Statistics Canada. Environment Accounts and Statistics Division.

Although in some regions, the loss of agricultural land to urban uses appears to be small, this measure does not take into account two important issues (Environment Canada, 1996):

1. In some regions, urbanisation of agricultural land affects specialty crops that have a limited ability to flourish in Canada. In addition, these products often represent an important resource to the local economy (e.g. the fruit belts in the Niagara and Okanagan regions). In these cases, the loss of each square kilometre is significant.

2. Cities also impact the use of surrounding land in indirect ways. For instance, golf courses, gravel pits and recreational areas are often located on agricultural land in areas adjacent to urban areas.

Thus, the effects of urban areas extend beyond their physical boundaries.

Trends in supply and demand for agricultural land

Now let us compare two trends:

1. the "supply" of dependable agricultural land available for agricultural use (which is estimated by subtracting the area of dependable agricultural land being occupied for urban and other non-agricultural uses from the total area of dependable land in the country); and

2. the "demand" for land cultivated for crops, specifically the area allocated to crops and summerfallow.

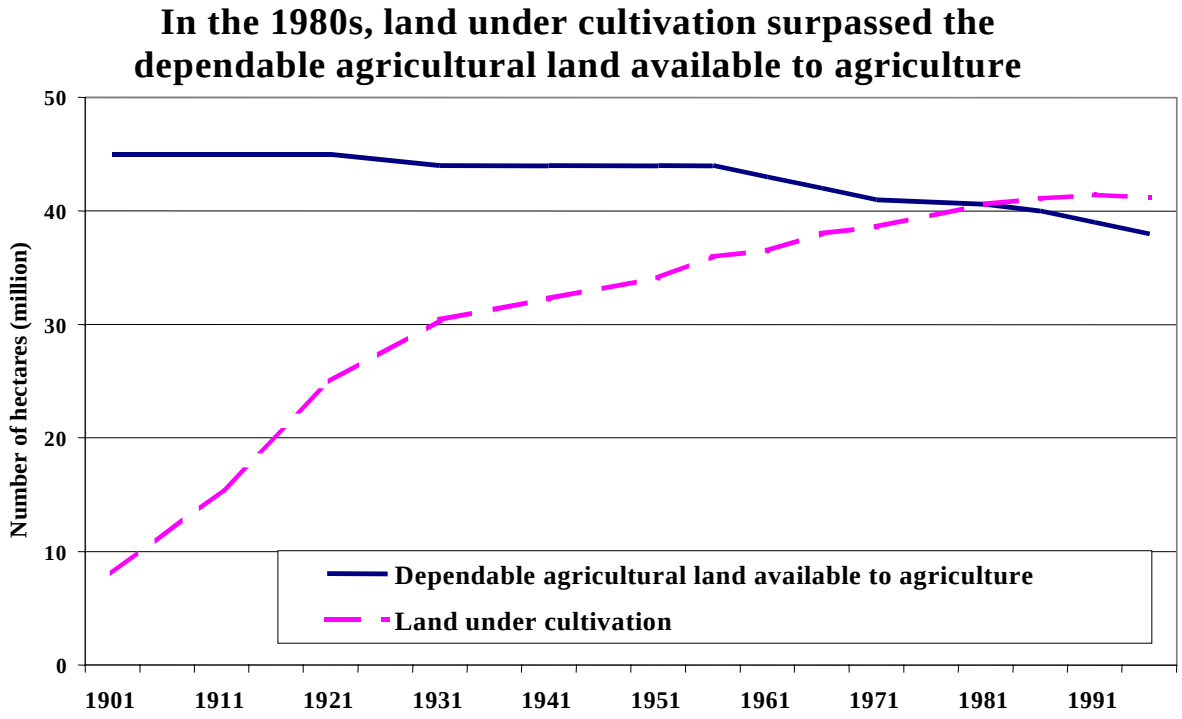
We see that land cultivated for crops increased consistently up to the 1980s as more land was brought under cultivation (Figure 5). Since the beginning of the 1980s, the total land being used for crops at the Canada level has remained essentially constant. (We acknowledge significant differences in this pattern among the provinces.)

We also see that the quantity of dependable agricultural land *that is available for agriculture* has been declining in recent decades, due to the consumption of agricultural land for urban uses and other non-agricultural uses. This land is, for all intents and purposes, lost forever from agriculture uses. Overall, the decline is about 16 percent.

Most importantly, note that in the 1980s, the land area being used for crops became greater than the area of dependable land available for crops. This indicates the degree to which Canada's cropping system has lost dependable agricultural land, and is relying on land that is not dependable (e.g. not Class 1-2-3)[3]. This means that agricultural production has become relatively more reliant on marginal land, which suffers from growing constraints and is sometimes unsuitable for stable, long-term agricultural production.

[3] We acknowledge that new technologies and better farming practices are increasing land productivity in each land class.

Figure 5



Source: Statistics Canada. Environment Accounts and Statistics Division.

Summary

Urban uses have consumed 12 thousand square kilometres of land since 1971. One-half of this – equivalent to the size of Prince Edward Island – was "dependable" farmland (i.e. Class 1-2-3 land as classified by the *Canada Land Inventory*).

The urban consumption of agricultural land is partly due to the growing urban population and it is partly due to higher land consumption by each new urban dwelling.

In Ontario, over 18 percent of Class 1 farmland is now being used for urban purposes.

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Nancy Hofmann is an analyst in the Spatial Analysis Section, Environment Accounts and Statistics Division, Statistics Canada. She can be reached at 613-951-0789 or at Nancy.Hofmann@statcan.ca. The Spatial Analysis Section primarily conducts research on environmental issues using their geographic information system. The main outputs are maps, geographically oriented data tabulations and the publication **Human Activity and the Environment** (Catalogue No. 11-509). Nancy's main responsibility is the development of environmental indicators relating to the land resource.

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