



Catalogue no. 21-004-XIE

May 2005

The urban-rural clash: Environmental management systems on Canadian farms

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As cities expand and people move into predominantly rural areas, agricultural interests inevitably clash with urban sensibilities. For example:

- Residents downwind from hog operations may be appalled by the smell of pig manure.
- People who live next door to a vineyard are angry when the grape grower installs noise-makers to frighten off birds that can decimate his crop.
- And then, there are the ongoing concerns over agricultural run-off

associated with pesticides and fertilizers.

These issues are not lost on farmers. Most are ready to move quickly on measures to protect the environment on their farms. One of the ways in which they do this is to adopt environmentally friendly production practices.

Farmers can adapt to operating in a relatively, densely-populated region by putting into place what is known as an “environmental management system” (EMS).

Vista on the Agri-Food Industry and the Farm Community contains articles highlighting statistical insights on themes relating to agriculture, food and environmental issues.

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Vista on the Agri-Food Industry and Farm Community

ISSN 1481-899X

VISTA is a newsletter published by the Agriculture Division of Statistics Canada and distributed to users of agriculture, food and rural statistics.

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Specific inquiries about this product and related statistics or services should be directed to:

Toll free telephone number: 1 800 465-1991

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Agriculture Division
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12th floor, Jean Talon Building,
Ottawa, Ontario
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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.

Special thanks to: John Flanders and Josée Bourdeau.

Symbols	
The following standard symbols are used in Statistics Canada publications :	
.	not available for any reference period
-	not available for a specific reference period
...	not applicable
P	preliminary
r	revised
x	confidential
A	excellent
B	very good
C	good
D	acceptable
E	use with caution
F	too unreliable to be published

An EMS is simply a plan that documents a farm's activities that affect environmental performance. An EMS does not generally measure the actual impact of these practices on environmental quality. However, in their most formal sense, they can expedite adoption of advanced techniques, farm practices and production systems that are environmentally safe.

They can involve a third party certifying organization; they can be developed by trade associations; or they can be adopted by the farmer individually. In Quebec, which is in the forefront of the EMS strategy in Canada, they help the farm owner qualify for ISO 14001 certification, an internationally recognized environmental accreditation.

The rural-urban conflict over land use will likely intensify as more and more city dwellers move into the suburbs and beyond. To determine how farmers have reacted, this study investigated the extent to which farming practices have adjusted to the presence of urbanization in Canada.

It did so by comparing the adoption rates for environmental management systems among farmers close to urbanized areas to those in more rural, isolated regions.

The findings supported its main hypothesis: Farmers who selected more environmentally friendly farm management practices to overcome social and regulatory pressures from adjacent communities were, on average, located closer to urban areas than those who did not.

Why adopt an EMS?

A number of factors likely contribute to a farmer's decision to adopt environmentally friendly production practices. For example,

farmers may act in response to their own respect for the environment, concerns about due diligence, new municipal regulations, or from social pressures.

These direct and indirect pressures to adjust management practices may increase the costs for farms located in the urban areas. As a result, regional competitive advantages may be affected and thereby, force changes in the location of agriculture production.

An EMS could improve a farm's bottom line through several avenues. Farmers might save money directly by conserving inputs and reduce waste. But there might be indirect savings to be made by a thorough evaluation of management practices. An EMS might also lower liability risks, and subsequently lower premiums charged by insurance companies, or interest rates charged by financial institutions.

Farmers might also increase revenues either by obtaining a premium for their product, or by increasing sales if the EMS represents a credible signal to customers that a farm is "environmentally friendly". A farmer may also be motivated by a moral concern for environmental quality. He can use an EMS as a guide to reducing the ecological impact of his operations.

However, the major reason that farms in urban areas voluntarily adopt an EMS involves social and regulatory pressures. An EMS might allow a farmer to improve his public image with the community. It can also be used as evidence of due diligence, often the only acceptable defense in a legal challenge stemming from an environmental accident.

Aside from being socially responsible citizens, farmers may be pushed through public pressure to adopt an EMS as a measure of their commitment to a systematic approach to environmental improvement. Pressures from customers, shareholders, trade associations and

community groups have all been found to increase EMS use. These pressures are likely to grow.

Public pressure may eventually result in direct environmental regulations. The threat of mandatory regulation has been shown theoretically to increase the effort of voluntary abatement. The threat of liability was found to be directly related to the adoption of voluntary management programs, such as the 33/50 program in the United States.

A Canadian agricultural example is the Ontario Environmental Farm Plan. This is a voluntary EMS developed by farm organizations in the early 1990s in response to potentially tough regulations promised by the newly-elected NDP government. Although it may not prevent environmental legislation, an EMS may at least influence the type and severity of legislation.

Finally, an EMS may not be voluntary. For example, nutrient management plans were required in many Ontario municipalities before building permits were issued for new or expanded livestock facilities. Ontario is currently undergoing a transition from local regulation of livestock facilities to a provincial system that supersedes local by-laws and requires a nutrient management plan.

How this study was conducted

For the purposes of this study, eight EMSs were considered: whole farm environmental plan; manure management plan; fertilizer management plan; pesticide management plan; water management plan; wildlife conservation plan; grazing management plan, and nutrient management plan.

The information on the use of farm environmental plans was obtained from the

Farm Environmental Management Survey (FEMS) conducted in 2001 by Statistics Canada and sponsored in part by Agriculture and Agri-Food Canada.

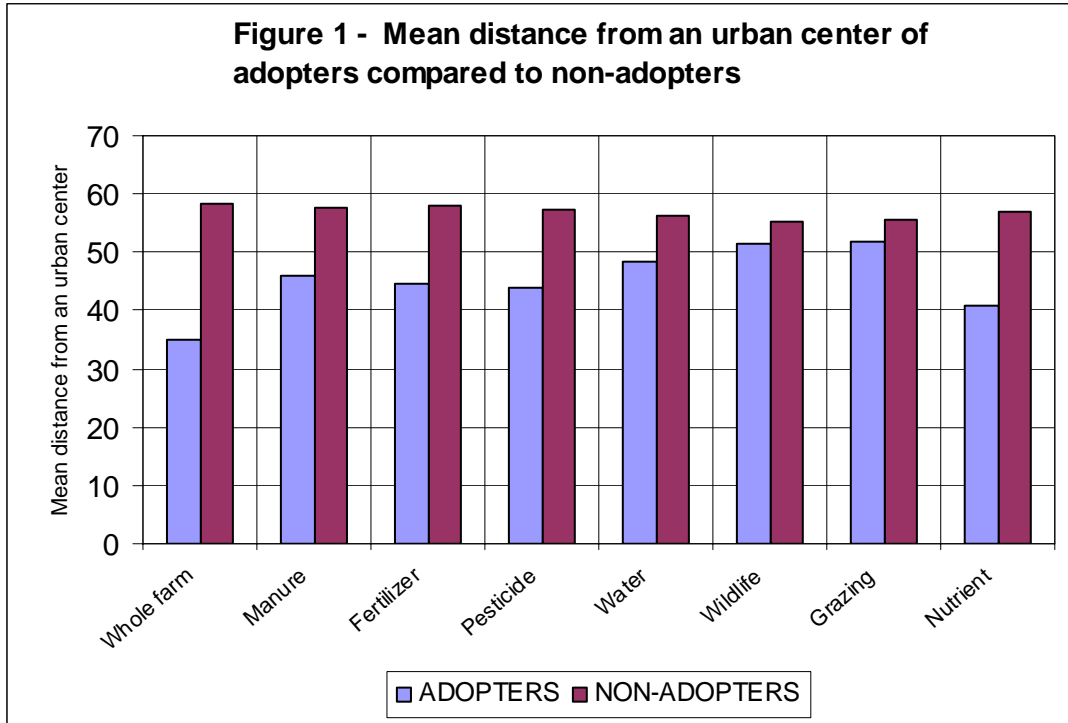
More than 21,000 farmers were surveyed. Of the three-quarters, or 16,000 who responded, 2,250 raised only livestock, 5,425 grew only crops, and 8,378 had both. The survey gathered information on the use of a variety of farm management practices, including adopting the eight environmental management systems.

The degree of urbanization was captured by two variables: the distance of the farm operation to an urban centre, and population density. Distance was measured “as the crow flies” from the geographical center of each dissemination area to the geographical center of the nearest census metropolitan area or census agglomeration.

Thus, a different distance value can be assigned to each farm observation, according to the dissemination area in which the farm is located. Population density was measured as the number of people per square kilometer of a dissemination area in which the farming operation was located.

The mean values for the two urbanization variables were calculated for each of the eight EMSs stratified by farms that adopted one, and those that did not. The results are illustrated in Figure 1 with distance as the urbanization measure, and in Figure 2 with population density.

The graphs are presented only for mixed farms, but the results are similar for exclusively crop and livestock farms. As expected, the distance to an urban centre is smaller for farms that adopted an EMS than for non-adopters (Figure 1).



The average distance for adopters was smallest for whole farm and nutrient management plans, and greatest for wildlife conservation and grazing management plans. The two former plans represent the most comprehensive coverage of agri-environmental practices. Thus, they are more likely to be used in the most intensive urban areas as measured by the relatively short distance to a census metropolitan area (CMA).

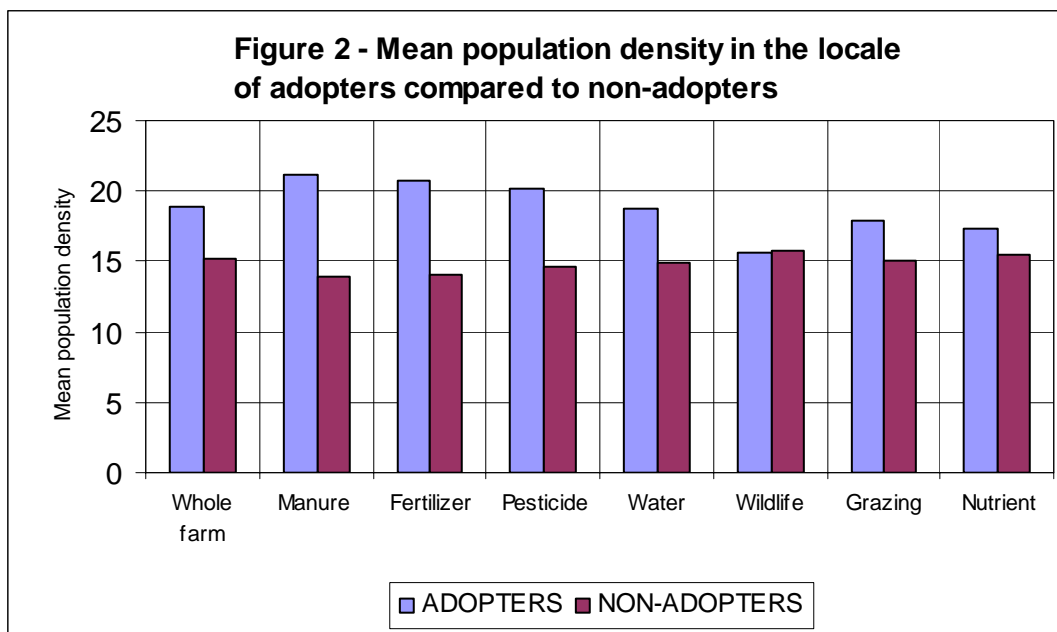
In contrast, farms concerned with grazing and wildlife habitat are likely to be operating large areas and, thus, are likely to be further from a CMA.

The impact of population density on the adoption rate of EMSs is similar to that found

using the distance measure for urbanization (Figure 2). Farms that adopted EMSs are more likely to be located in regions with a higher population density than non-adopters.

For example, the average population density of the region for farms adopting a manure management system was about 22 people per square kilometer, as opposed to around 14 per square km for farms not adopting.

The result is consistent with the hypothesis that farmers operating in the urban milieu are more likely to use an EMS as a means to deal with direct social pressure or indirect regulatory pressures from non-farm neighbours.



EMSs most frequent for managing fertilizers, pesticides

The most common EMSs used by all farmers were fertilizer and pesticide management plans. These have been enacted by 27% of all farmers growing cash crops alone.

Around the same proportion of mixed farms had a fertilizer management system. However, there was a decline in the use of pesticide management plans by those farmers with both crops and livestock compared with those specializing in crop production. The correlation coefficient between these two EMSs was 0.8, which indicates that the same farmers are likely to adopt both plans.

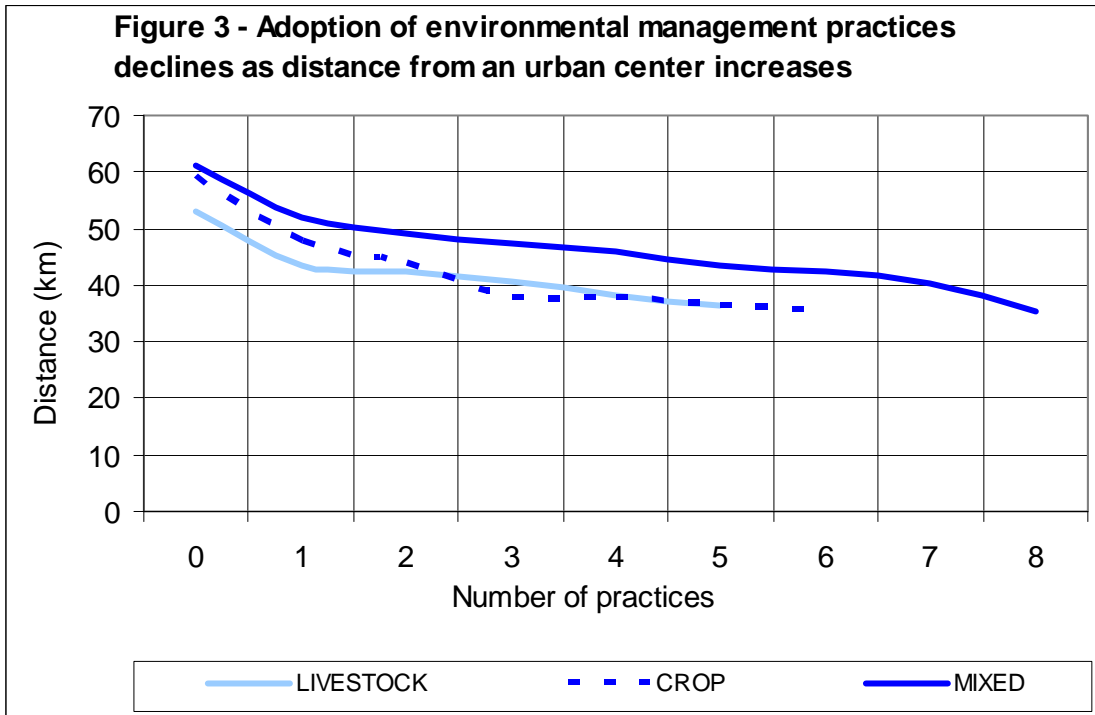
Mixed farms had the highest adoption rates in general across the eight EMSs, while livestock only farms had the lowest. For example, over one-quarter of livestock farms that also grew crops had a manure management plan in place,

compared with 15% of livestock-only operations.

Virtually the same adoption rates across the farm types were evident for grazing management plans. A whole farm environmental plan was the most comprehensive of the possible EMSs options, but it was the least likely to be adopted.

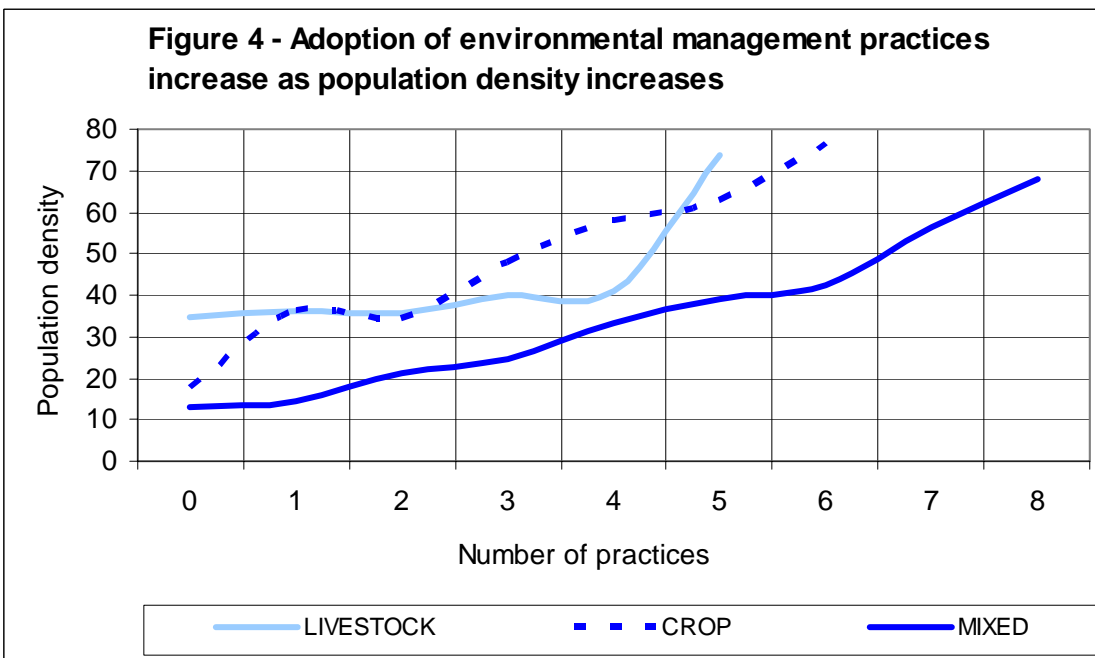
A significant number of farmers may adopt more than one EMS. For example, 37% of mixed farms had more than one EMS in place. The mean values for urbanization were calculated for all farms on the basis of the number of EMSs adopted. The results are plotted in Figure 3 for the measure of distance, and in Figure 4 for population density.

The number of EMSs adopted increases with the degree of urbanization. For example, the average distance to a census metropolitan area for non-adopters of an EMS by mixed farms was about 60 km. But this fell to 40 km for those farms adopting seven plans (Figure 3).



Similarly, the average population density for mixed farms adopting only one EMS was about 15 people per square km. It rose to more than 55 people per square km on average for those

adopting seven plans (Figure 4). Mixed farms on average tended to operate in less urbanized environments than specialized crop or livestock farms.



Policy implications

A growing portion of Canada's farmland is virtually next door to rapidly expanding urban areas. This presents a policy dilemma, in that farmers' preferences for land use are likely to conflict with the preferences and concerns of nearby urban residents.

The results of this study provide insight into what is going on. However, additional research is needed to better understand the impact of urbanization.

First, future studies need to examine the urbanization effect while simultaneously accounting for other variables – for example, farm size – that may influence the decision of farmers to adopt environmental management systems. Such information will enable analysts to better isolate the influence of urbanization on farm management decisions.

Second, future studies need to assess empirically how urbanization influences decisions at the farm level.

For example, do urban concerns manifest themselves in stricter regulations at the municipal level? Do increasing numbers of residential neighbors increase the likelihood of legal conflict? Does this, in turn, heighten farmers' wishes to pursue activities enabling them to appeal to due diligence? Are farmers voluntarily responding to concerns voiced by urban neighbours?

Answers to these questions will illuminate important issues, such as the appropriate role of governance in arbitrating conflicts that may emerge between municipalities and/or farmers and urban residents.

Farm level practices will in all likelihood continue to be scrutinized by their urban residents. Policy makers will face the difficult challenge of advising governments on how best to respond to the changing needs of farmers and city dwellers.

Recognizing, as this study does, that the degree of urbanization may already be precipitating changes in farm management practices provides an initial starting place for future inquiry.