

# AGRICULTURE

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4.1 Overview and Recommendations .....143  
4.2 Manure and Fertilizer Management.....149  
4.3 Soil Erosion.....157  
4.4 Environmental Impacts of Agricultural Policies and Programs .....163  
4.5 Working Toward Environmentally Sustainable Agriculture .....171





# AGRICULTURE

## 4.1 Overview and Recommendations



Source: Bruce Litteljohn

**4.1.1** The Great Lakes and St. Lawrence River basin is home to most of Canada's prime farmland. The favourable climate permits intensive agriculture—corn, soybeans, tobacco, and tomatoes dominate crop production. Animal production includes dairy, hog, poultry, and beef operations.

**4.1.2** Farming practices affect the environment in several ways. Farmers must cope with possible direct effects on their own land, such as loss of soil and contamination of well water. Their neighbours may be affected by water pollution or loss of wildlife habitat. The main water pollutants from farming are nitrogen and phosphorus from manure and fertilizer, sediment, bacteria from manure, and pesticides. Somewhere between 5 and 20 percent of the water used in the basin goes to agriculture, mainly for irrigation and the watering of livestock. Other impacts, such as greenhouse gas emissions and residues of some pesticides, show up in ecosystems around the Earth.

**4.1.3** The agriculture industry has evolved dramatically from its early days as a supplier of food for nearby settlers to its current role as a highly dynamic global player. Today, the agriculture sector is poised for substantial growth. The federal government supports a target to increase Canada's share of world agricultural exports to 4 percent by 2005, an increase of more than 40 percent from 1986. This will put significant pressure on the soil and water in the basin and increase the already strong trend toward more intensive farming.

**4.1.4** Farms in the basin are close to both rural and urban population centres. This increases the risk of negative effects on the environment and human health, and gives rise to concerns about the dust, noise, and odours of farming. Public concern has become an important driving force for government and the industry to improve environmental management in agriculture.

**4.1.5** The proximity of farmland to cities has also led to the withdrawal of agricultural land from production. In Canada, the supply of dependable agricultural land declined by 16 percent between 1901 and 1996. A disproportionate share of this loss was around the urban centres of southern Ontario, an area that boasts more than half of Canada's best farmland. Further losses are inevitable as urban areas continue to expand.

### The federal role and mandate

**4.1.6** Under the Canadian Constitution, both the federal and provincial legislatures may enact laws related to agriculture. The federal government has exercised this authority mainly in international trade, as well as national co-ordination and leadership in developing strategies, programs, and standards. But it also overlaps somewhat with the provinces' initiatives in research,

transfer of technology to farmers, financial incentives, promotion of best practices, and income support for farmers. Agreements can be negotiated to define the respective responsibilities in a particular program.

**4.1.7** The regulation of farm practices has so far been primarily a provincial and municipal activity; the federal government plays an active role mainly in regulating pesticides. The other regulatory tools the federal government can use include the provisions to protect fish habitat under the *Fisheries Act* and those for control of toxic substances under the *Canadian Environmental Protection Act*. Some controls on agricultural activities (for example, separation distances to wells and restrictions on manure spreading) have been imposed by provincial regulations and municipal bylaws.

**4.1.8** Three federal departments play important roles in agriculture: Agriculture and Agri-Food Canada, Environment Canada, and Health Canada's Pest Management Regulatory Agency. Agriculture and Agri-Food Canada has funded research, provided funds to environmental programs, and led policy development. Through the Great Lakes 2000 Cleanup Fund, Environment Canada has funded projects to reduce agricultural sources of water pollution, among other sources.

**4.1.9** Depending on the issue, the federal government may work with several other players: provincial governments, municipal governments, universities, producer organizations, and farmers themselves. The federal and provincial governments have clearly separate responsibilities in some areas, such as international agreements, but share them in others.

#### What we audited

**4.1.10** We examined the impacts of manure and fertilizer on soil and water (Subsection 4.2) and how the federal government contributes to managing soil erosion (Subsection 4.3). We then looked at how well Agriculture and Agri-Food Canada assesses the environmental impacts of its policies and programs that support economic goals but that may have unintended consequences for the environment (Subsection 4.4). Next, we looked at how effectively the federal government works toward achieving environmentally sustainable agriculture in the basin (Subsection 4.5).

**4.1.11** We examined the different roles of the federal government—promoting stewardship, establishing regulations, conducting and co-ordinating research, and monitoring the state of the basin. We looked at how well it has established its own roles and responsibilities and helped to define those of other players.

#### What we found

**4.1.12 Overall.** The federal government is attempting to manage the environmental impacts of agriculture. It is confronting long-standing problems and must also respond to new demands. It has laid part of a foundation for effective management, such as the clear priority it assigns to improving the environmental sustainability of agriculture, but it has left some critical gaps. It has not sorted out who is going to do what. Information is out-of-date. Some action plans have not been developed. Results of key programs are not measured. And federal programs and policies are not working well together.

**4.1.13** These are important gaps. Some of agriculture's impacts are growing and damaging the basin's environment. Effective management is needed to reverse the trends.

**4.1.14 Manure and fertilizer management.** Livestock operations in Ontario and Quebec generate enough manure to equal the sewage from over 100 million people. And the problem of how to manage it safely is getting worse. The misuse of manure and fertilizer on farmland has damaged the ecosystem of the basin.

**4.1.15** Despite the efforts of Agriculture and Agri-Food Canada, Environment Canada, the provinces, and agricultural organizations over the last decade, nutrients are accumulating in soil on farms in the basin. Their environmental impacts are increasing. Roughly 70 percent of Ontario and Quebec farmland had much higher nitrogen levels in 1996 than in 1981. On more than 30 percent of farmland, the levels of residual nitrogen pose a risk of water contamination.

**4.1.16** Many producers need to improve their farming practices. Agriculture and Agri-Food Canada and Environment Canada have offered financial incentives and promoted good practices to encourage good management of manure. The federal government has not determined what effect these measures have had on the quality of the environment. There are federal objectives for controlling nitrogen and phosphorus but not bacteria. There is no plan that sets out clear responsibilities for achieving the objectives. It is time for the federal government to rethink its approach, recognizing that this is a long-term problem.

**4.1.17** Agriculture and Agri-Food Canada has supported several initiatives for research and technology transfer, including the Hog Environmental Management Strategy. It is not clear yet whether this mix of initiatives will produce the strategic, well-co-ordinated research effort that is needed.

**4.1.18 Soil erosion.** Close to half of Ontario's agricultural soil is at risk of washing away faster than new soil can form. More than 10 years of federal and provincial government intervention have slowed soil erosion somewhat, but at a rate that could take 90 years to bring soil loss down to sustainable levels. Agriculture and Agri-Food Canada has identified overall objectives for reducing soil erosion, but it has no action plan detailing how it expects to achieve them.

**4.1.19** Baseline soil information is essential to good land-management decisions, but the present data are becoming more outdated and less useful as time passes. Today, little or no new soil data are being collected. The federal and provincial governments have no formal mechanism for co-ordinating data management.

**4.1.20 Assessing the environmental impacts of policies and programs.** Agriculture and Agri-Food Canada spends far more money on agricultural programs in the basin such as crop insurance and disaster assistance than it spends directly to reduce the impacts of agriculture on the environment. Faced with potentially conflicting goals, the Department needs to carefully

and explicitly consider the environmental implications of its policies and programs. The Department has failed to fully meet its commitments to evaluate the environmental consequences of existing and planned policies and programs.

**4.1.21** In 1996, the federal government made a commitment to Parliament to have departments assess the environmental impacts of their existing tax measures, grants, and subsidies. Agriculture and Agri-Food Canada has made limited progress in the study of its existing measures, and has not completed it. Nor has it reported on the status of this review.

**4.1.22** In 1990, Cabinet directed federal departments to assess the environmental impacts of their new policies and programs. Agriculture and Agri-Food Canada has no systematic, formal process to conduct the assessments. As a result, the Minister cannot be assured that the Department is complying with the Cabinet directive.

**4.1.23** The *Farm Income Protection Act* requires Agriculture and Agri-Food Canada to carry out environmental assessments of its income support programs for farmers, which include the most costly programs in the basin. Several major programs are excluded from the requirements, but there are gaps nonetheless in the Department's compliance with the requirements. The Department does not attempt to monitor the actual impacts of its policies on the environment to determine whether its predictions in its assessments have been accurate.

**4.1.24** Agriculture and Agri-Food Canada does research to increase animal and crop production. But it has not evaluated its research enough to know the impact on environmental sustainability. The information used to select individual research projects does not have enough details on the potential environmental effects. We also found that evaluations of some of the Department's broad research areas applicable in the basin did not take account of the possible environmental effects. Evaluations of the research centres focus on the economic impacts of research and whether the needs of the agriculture industry have been met.

**4.1.25 Working toward environmentally sustainable agriculture.** Farming practices in the Great Lakes and St. Lawrence River basin are having effects on the environment that cannot be sustained. While some impacts such as soil erosion are improving slowly, others such as water contamination and loss of wildlife habitat are getting worse. In addition to soil erosion and pollution from manure and fertilizer, the federal government must manage issues such as the risks in using pesticides, the loss of biodiversity, and greenhouse gas emissions.

**4.1.26** The federal government has used financial incentives and promoted good farming practices to influence the way farmers manage the environmental impacts of their operations. It has met with some success—practices such as conservation tillage that reduce soil erosion and can benefit farmers economically are now widely used. But it has not evaluated the

impact of its environmental programs on the quality of the environment in enough detail to say whether the programs are making sufficient progress.

**4.1.27** The federal government shares responsibility with the provinces for achieving sustainable agriculture and, increasingly, with private industry. There is no up-to-date framework of roles and responsibilities for use in working with the provinces to set and achieve environmental objectives for agriculture in the basin. Agriculture and Agri-Food Canada has not integrated its policies and programs in the basin effectively with those of its federal and provincial partners.

**4.1.28** Over the last decade, funding for agricultural environmental programs has dropped, and the focus has changed to educating the public and supporting voluntary groups. It is not clear who is responsible for what long-term outcomes.

**4.1.29** Agriculture and Agri-Food Canada needs to improve the way it sets priorities in agricultural research, one of its prime tools. It also needs to do a better job of directing program funds to where they will do the most good. The Department could make its policies and programs more effective by coupling them—for example, linking income support programs to environmental programs.

**4.1.30** The Department has developed agri-environmental indicators that are an impressive synthesis of several years' work; they play a key part in managing environmental issues. At the end of our audit, the Department had not allocated the resources and expertise needed to sustain this reporting framework.

**4.1.31** The federal government has not said how it will achieve sustainable agriculture in the basin. It has identified some measurable objectives for the sector, with clear deadlines, but has not said how its own activities will contribute to those objectives.

### What we recommend

**4.1.32** Our findings show that the federal government, with those who share responsibility, must take greater action to make agriculture environmentally sustainable in the basin. Better evaluation, clearer roles, targeted action, and clearer and measurable commitments are needed.

**4.1.33** Agriculture and Agri-Food Canada and Environment Canada should evaluate the impact of their agri-environmental programs on the basin's environment, particularly in areas where environmental damage is increasing or progress is slow. They should use this information to re-evaluate the current mix of policies and programs, including whether activities should be more integrated with the basin ecosystem initiatives.

**4.1.34** Agriculture and Agri-Food Canada should ensure that clear roles and responsibilities are established, and measurable commitments and clear action plans spelled out, for achieving environmentally sustainable agriculture in the basin. It should involve Environment Canada and the provincial governments in doing this.

**4.1.35** Agriculture and Agri-Food Canada should ensure that adequate information, including agri-environmental indicators and soil data, is available to guide action and measure progress toward sustainable agriculture in the basin.

**4.1.36** Agriculture and Agri-Food Canada should ensure that its research priorities correspond to its environmental objectives and support the development of its policies. It should also ensure that its environmental objectives are considered in selecting and evaluating its research.

**4.1.37** Agriculture and Agri-Food Canada should periodically review the environmental impacts of federal–provincial income support programs and conduct environmental assessments before putting new programs into effect.

(See Summary for departmental responses.)

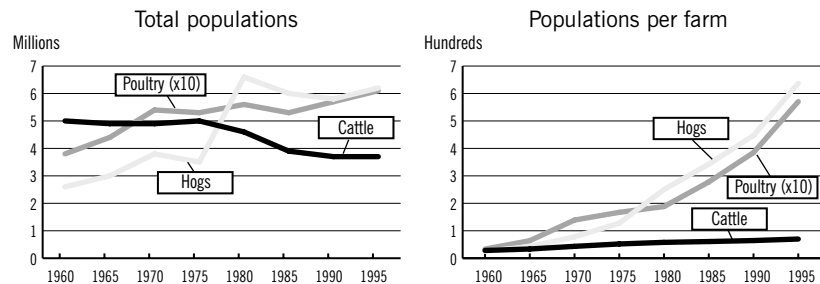


## 4.2 Manure and Fertilizer Management

### The issue

**4.2.1** Livestock operations in Ontario and Quebec generate enough manure to equal the sewage from over 100 million people. And the problem of how to manage it safely is getting worse. While the number of cattle is slowly decreasing, hog and poultry numbers are growing, particularly the number of animals on each farm (Exhibit 4.1).

**Exhibit 4.1** Farm animal populations in Ontario and Quebec



Source: Statistics Canada



**4.2.2** Manure and commercial fertilizer spread on agricultural land provide valuable plant nutrients, especially nitrogen and phosphorus. If they are stored or used in the wrong way, however, or if more is applied than the plants and land can absorb, nutrient levels build up in the soil and can contaminate groundwater or surface water. Inorganic nitrogen, phosphorus, and bacteria are the primary pollutants from manure. Between 1988 and 1998, a total of 274 manure spills were reported in Ontario. Fifty-three of these spills resulted in fish kills, primarily due to the ammonia in liquid manure. Bacteria in manure are believed to be the source of the water contamination in Walkerton, Ontario that caused seven deaths and made 2,000 people sick.

**4.2.3** At the mouth of the Yamaska River in Quebec, concentrations of phosphorus and inorganic nitrogen are higher than in any other tributary of the St. Lawrence River. The main cause is the growth in livestock production in the watershed—30 percent over the last 20 years. And the Yamaska River is not an isolated case. Many of the basin's rivers in southwestern Ontario and Quebec have concentrations of phosphorus higher than amounts set as provincial objectives for water quality. Seven of the eight watersheds in Canada with the highest counts of coliform and fecal coliform bacteria are in the basin.

### The federal role

**4.2.4** Agriculture and Agri-Food Canada has focussed on conducting research on nutrient management and promoting good farming practices in the basin. Environment Canada has funded projects in several watersheds to reduce water pollution from manure and fertilizer. Under the Great Lakes Water Quality Agreement with the U.S., Canada has committed to reducing phosphorus levels in the Great Lakes.

**4.2.5** Both Ontario and Quebec have guidelines and, in some cases, legislation and regulations to control the storage and use of manure and fertilizer. Ontario has not regulated these activities, but recently proposed legislation on nutrient management. Municipalities control building permits, zoning provisions, and distances between buildings. Some municipalities have gone further and require farmers to prepare nutrient management plans or attend mandatory public meetings.

### Our audit question

**4.2.6** How well has the federal government contributed to managing the problems of soil and water contamination caused by spreading manure and fertilizer?

### The story

#### A growing problem for human health and the environment

**4.2.7** In the 1970s, scientists recognized the problem of soil and water contamination by agricultural operations around the Great Lakes. They documented the causes and the problem areas, pointing to the need to control nutrient runoff from farms in order to achieve the objectives of the Great Lakes Water Quality Agreement.

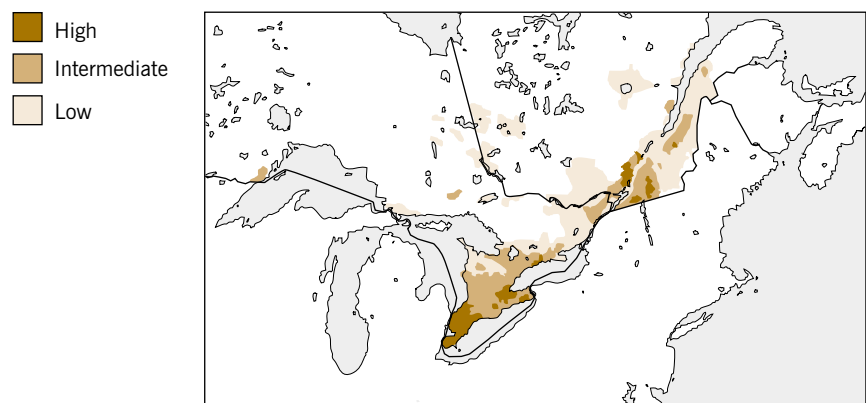
**4.2.8** The increasing use of mineral fertilizer in the past to boost crop production has contributed to the contamination. Crop production in Canada has doubled in the last 50 years, on roughly the same amount of cropland. Fertilizer sales in Ontario and Quebec grew from 1.01 million tonnes in 1968 to a peak of 1.66 million in 1985, dropping to 1.26 million tonnes in 1998.

**4.2.9** A more recent cause has been the increasing concentration of livestock production. Much of the manure these animals generate is spread on agricultural land. Manure can have a greater impact on downstream water than fertilizer because manure is applied in a higher concentration to a smaller area.

**4.2.10** The result is that inorganic nitrogen is accumulating on farmland in the basin. Roughly 70 percent of Ontario and Quebec farmland had much higher nitrogen levels in 1996 than in 1981—and much of it above levels that cause groundwater and surface water contamination (Exhibit 4.2). Runoff from the soil has also increased nitrogen levels in the water on up to 77 percent of the basin's farmland, and downstream.

**4.2.11** A survey of Ontario wells in 1992 found that the water in 14 percent of them had nitrate levels above the drinking water standard. High nitrogen levels in drinking water can cause “blue baby” syndrome, or methemoglobinemia, in bottle-fed infants and in young animals. Over many years, adults who drink nitrate-contaminated water can develop kidney or spleen problems.

**4.2.12** Also of concern, 34 percent of the surveyed wells had coliform bacterial counts above the acceptable level. Surveys of rural wells in Quebec told a similar story. The growing rural population off farms compounds the potential health impacts of this contamination.

**Exhibit 4.2 Risk of water contamination by nitrogen on farmland**

Source: Agriculture and Agri-Food Canada

**4.2.13** The misuse of manure and fertilizer on farmland has damaged the ecosystem in the basin. Long-term exposure to high levels of inorganic nitrogen has contributed to the decline of amphibians in southern Ontario. And manure is a major source of greenhouse gas emissions.

**The government has assessed ecosystem limits and identified objectives**

**4.2.14** Responding to a 1995 report of the Standing Committee on Environment and Sustainable Development, a working group of people from federal science departments began a detailed scientific assessment of the impact of nutrients on the Canadian environment. It described the impacts of agricultural sources of nutrients. The assessment and related work provide a base for understanding how an increase in nutrient releases affects the basin's ecosystem.

**4.2.15** Clear and measurable objectives are essential to managing performance. In its report on agri-environmental indicators in 2000, Agriculture and Agri-Food Canada presents performance objectives for nitrogen control. They include preventing a net increase in nitrogen on Canadian farmland over time, and ensuring that there is little or no risk of water contamination by nitrogen on any Canadian farmland. These objectives are not being met.

**4.2.16** In its sustainable development strategy released in 2001, the Department has included a similar objective for phosphorus control. This objective has not been linked to the phosphorus control objectives of the Great Lakes Water Quality Agreement. The Department has not said who is responsible for meeting the objectives for nitrogen and phosphorus control. Nor has it published a performance objective or target for controlling bacterial contaminants from manure.

**Many farmers are not using best practices**

**4.2.17** To reduce soil and water contamination, many farmers will have to improve the way they manage manure and fertilizer. The federal government

**Did you know?**

- Number of Canadians it would take to produce sewage equal to the manure from livestock in Ontario and Quebec: **over 100 million**
- Percentage increase in cows per farm between 1961 and 1996: **147**  
percentage increase in hogs: **2,451**  
percentage increase in poultry: **1,610**
- Number of Canadians who died after contamination of drinking water in Walkerton, Ontario: **7**  
number made ill: **over 2,000**
- Percentage of basin farmland that had much higher nitrogen levels in 1996 than in 1981: **70**
- Amount Environment Canada spent from 1990 to 1999 to reduce water pollution from rural sources in Ontario: **\$4.6 million**
- Amount Agriculture and Agri-Food Canada spent in the basin from 1997 to 1999 under its National Soil and Water Conservation Program: **\$2.5 million**
- Number of departmental nitrogen control objectives that are being met: **0**  
number of phosphorus control objectives met: **0**

has tried to influence farmers' behaviour by offering financial incentives and promoting good farming practices. It has also made limited use of regulations.

**4.2.18 Legislation and regulation.** No federal legislation or regulations explicitly prohibit pollution by agricultural nutrients. To a limited extent, the government has enforced general federal regulations under the *Fisheries Act* in response to impacts of manure disposal in Ontario. Ontario farmers can be held liable and fined under two provincial laws—the *Ontario Water Resources Act* and the *Environmental Protection Act*. Quebec uses its own legislation and regulations.

**4.2.19** The *Canadian Environmental Protection Act* specifically regulates phosphorus only in laundry detergents. Yet agriculture fertilizers account for 80 to 85 percent of all phosphorus used.

**4.2.20** The scientific assessment of nutrients was not completed in time for Parliament to use it in considering new restrictions on nutrients when it reviewed the *Canadian Environmental Protection Act*. At the conclusion of our audit, the assessment had not yet been released. It may provide a basis for the government to control nutrients.

**4.2.21 Financial incentives.** The federal and provincial governments have offered farmers a series of incentives to improve the way they use fertilizer and manure. From 1990 to 1994, for example, qualified farmers were eligible to be paid the cost of building manure holding facilities. One project funded under the National Soil and Water Conservation Program paid Ontario farmers in the Grand River watershed to adopt practices that would reduce phosphorus levels in the water—at the time, higher than the provincial water quality objective almost everywhere in the watershed. In 1999, program managers approved 83 projects whose costs totalled roughly \$900,000. (The total federal contribution through this program from 1997 to 1999 was \$2.5 million.)

**4.2.22** The ecosystem programs in the basin have paid relatively little attention to manure problems. Over the last decade, Environment Canada provided \$4.6 million for a variety of farm projects around the Great Lakes to reduce water pollution, mainly due to phosphorus. In Quebec, the federal agriculture component of St. Lawrence Vision 2000 does not explicitly consider manure; however, a few small watershed management projects were funded under the program's community interaction component.

**4.2.23 Promoting best management practices.** In the early 1990s, Agriculture and Agri-Food Canada, provincial agriculture ministries, and farm organizations worked together on guides to best management practices. Environment Canada has also funded pamphlets telling farmers how, for example, to minimize the impact of manure on fish habitat. Other efforts have included demonstration projects, farm tours, and recognition programs.

**4.2.24** Has this combination of financial incentives and promotion of best management practices worked? In individual programs, it is hard to say. Environment Canada and Agriculture and Agri-Food Canada have kept information on their program activities such as numbers of people attending

workshops and numbers of pamphlets distributed. But they have not evaluated the programs' impacts on the environment. Surveys have shown that some farmers are unaware of how their activities affect water quality. A 1995 survey by Statistics Canada and Agriculture and Agri-Food Canada found that many farmers were still not using best practices (Exhibit 4.3). Some were not even complying with legal requirements to manage the inorganic nitrogen and phosphorus sources on their farms.

**Exhibit 4.3 Many farms do not use best practices in manure and nutrient management**

Best practices	Farm practices (1995)
Earthen storage for liquid manure should be used only when adequate sealing is ensured.	About 31 percent of farms that stored liquid manure used unlined lagoons.
Rain and snowmelt runoff from solid manure piles should be contained.	About 60 percent stored solid manure without roofs or containment.
Manure should be applied when the vigorous growth of crops can best use nutrients, buffer vegetation has grown, and drier soils can absorb liquid manure—not in late fall and winter.	Of the total amount of manure used, 5 percent is applied in the winter, 35 percent in the spring, 20 percent in the summer, and 40 percent in the fall.
Good decisions on nutrient use cannot be made without knowing the supply of nutrients in the soils. At a minimum, sandy soils should be tested every two years, and each field should be tested every three years.	Thirty-three percent of soil area for crops is not tested. Thirty percent of the remainder is tested every year, 50 percent every two to three years, 12 percent every four to five years, and 4 percent every six years or longer.
Adjusting the amount of commercial fertilizer to offset the nutrients present in manure is a good financial practice and prevents nutrient overloading.	Ninety-five percent of farms attempt to reduce the amount of fertilizer to offset the nutrients in manure.
Separating liquid manure from domestic water, rivers, and lakes by less than 30 metres is an extremely poor farming practice.	Four percent of liquid manure (at a minimum) is stored less than 15 metres from the nearest watercourse and less than 30 metres from wells used for domestic purposes.

Source: Statistics Canada and Agriculture and Agri-Food Canada

**Steps toward a strategic approach to research on manure**

**4.2.25** Scientists at Agriculture and Agri-Food Canada research centres in the basin have contributed to more than 40 publications on nutrient management. The publications cover animal nutrition; manure storage; manure and fertilizer spreading; and nutrient impacts on soil, water, and air. In the last decade, the research gradually shifted from measuring and reporting concentrations of nutrients on farms to estimating the potential impacts of nitrogen and phosphorus on other parts of the ecosystem. That

research provides a scientific foundation for new farm management practices and can help farmers learn about new technologies (see Exhibit 4.4).

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#### **Exhibit 4.4 Using the Web to spread information about manure**

Farmers can use the national Web site, ManureNet, to help them manage animal waste (<http://res2.agr.ca/initiatives/manurenet>). They will find acts, regulations, guidelines, provincial codes of practice, literature directed to farmers, and an inventory of research projects.

ManureNet has been largely the work of one federal employee. It is funded by a program that requires matching funds from industry—a stipulation meant to ensure that Agriculture and Agri-Food Canada spends its funds on what the industry wants most. ManureNet has not been successful in leveraging financial support from industry; it was due to run out of money after March 2001.

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**4.2.26** In 1997, the hog industry asked the Department to review its manure management activities to ensure that they complemented regulation with research, technology transfer, community education, and technical services. A joint review by the Department and the national hog industry recommended a long-term strategic approach to setting priorities in these areas.

**4.2.27** A strategic approach is now even more important: over the last five years, Agriculture and Agri-Food Canada has used other organizations to decide who gets federal funds for research on manure and nutrients. Three separate industry-led committees are allocating federal funds to research and awareness projects in the basin. Universities are also using federal money for research on managing manure and its environmental impacts.

**4.2.28** Recognizing that the pork industry was facing significant obstacles to growth because of its impact on the environment, Agriculture and Agri-Food Canada began the Hog Environmental Management Strategy in 1998. This was intended to support better co-ordination of research and technology development and to find effective, affordable solutions.

**4.2.29** A successor program, the Livestock Environmental Initiative, was announced at the end of 1999. It provides \$1 million for research and development of technologies and environmentally sound practices that are technically ready to use. This one-year program was supposed to be matched by industry funding. Priorities included waste and manure management and control of greenhouse gases.

**4.2.30** It is too early to say what impact these initiatives have had. We observed that there are ways for provincial adaptation councils, industry committees, and federal research centres to work together. It is not clear yet whether this mix of initiatives will produce the strategic, well-co-ordinated research effort that is needed.

#### **Reports to Parliament not comprehensive or balanced**

**4.2.31** Federal departments are supposed to provide enough of the right kind of information for members of Parliament to assess whether departmental

programs are getting the expected results. We reviewed the last five annual reports to Parliament by Agriculture and Agri-Food Canada and Environment Canada, looking for references to managing nutrients and manure. We found little mention of it. The few references we did find reported positive results in managing manure and fertilizer, and did not discuss their growing impact on the environment.

**4.2.32** Other recent documents—the report on agri-environmental indicators, *The Health of Our Soils*, and *The Health of Our Water*—described the results of current research, but they were not intended to assess the specific results of federal programs for manure and fertilizer management.

## Conclusion

**4.2.33** Despite the efforts of Agriculture and Agri-Food Canada, Environment Canada, the provinces, and agricultural organizations over the last decade, nutrients are accumulating in the soil on farms in the basin. Their environmental impacts are increasing. On more than 30 percent of farmland the levels of residual nitrogen pose a risk of water contamination.

**4.2.34** Many producers need to improve their farming practices. Agriculture and Agri-Food Canada and Environment Canada have offered financial incentives and promoted good practices to encourage good management of manure. The federal government has not determined what effect these measures have had on the quality of the environment. It is time for it to rethink its approach, recognizing that this is a long-term problem.

**4.2.35** There are now two good sources of information that support stronger policy measures: a science assessment of the impact of nutrients on the environment, and a report on agri-environmental indicators. There are federal objectives for controlling nitrogen and phosphorus but not bacteria. There is no plan that clearly shows responsibilities for achieving the objectives.

**4.2.36** Agriculture and Agri-Food Canada has supported several initiatives for research and technology transfer, including the Hog Environmental Management Strategy. It is not clear yet whether this mix of initiatives will produce the strategic, well-co-ordinated research effort that is needed.

**4.2.37** In their annual reports to Parliament, Agriculture and Agri-Food Canada and Environment Canada have not provided comprehensive or balanced information on this growing problem.

## Our audit objectives and main findings

Holding the federal government to account		
① Has the government fulfilled its commitments?	Commitments	Results
	No specific commitments.	Manure and nutrient problems are getting worse.
Assessing the government's performance		
② Has the government applied good management practices?	Strengths	Weaknesses
	<p>The government has identified indicators and performance objectives.</p> <p>It has selected some appropriate tools.</p>	<p>The government has not identified programming priorities and expected results.</p> <p>The tools it uses are not adequate, and it has not evaluated their results.</p>
③ Has the government established good governance structures?	The government has documented issues well in special reports.	<p>The government's key reports to Parliament are incomplete and unbalanced.</p> <p>Agriculture and Agri-Food Canada and Environment Canada need to improve co-ordination.</p>

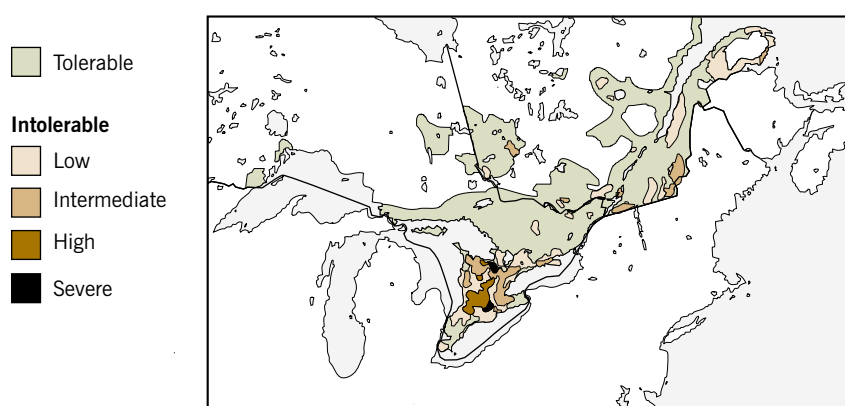


## 4.3 Soil Erosion

### The issue

**4.3.1** Close to half of Ontario's agricultural soil is at risk of washing away faster than new soil can form (Exhibit 4.5). Soil erosion has contributed to phosphorus management problems in the basin; soil particles carry phosphorus and other contaminants into the basin's rivers and lakes. More than 10 years of federal and provincial government intervention has slowed soil erosion somewhat, but at a rate that could take 90 years to bring soil loss down to sustainable levels.

**Exhibit 4.5** Risk of soil erosion by water on cropland



Source: Agriculture and Agri-Food Canada

**4.3.2** Farmers in the Great Lakes and St. Lawrence River basin have paid a high price. In 1986 the costs of soil erosion to Ontario farmers alone were pegged at \$157.3 million a year in lost yield, lowered crop quality, and higher tillage and fertilizer costs.

**4.3.3** Soil erosion also affects people who live and work downstream. About 650,000 tonnes of sediment are deposited in the Great Lakes every year. In 1984 the estimated downstream costs in Ontario were as high as \$91.2 million—almost 90 percent of that in southwestern Ontario. These were the costs of losses to recreational fisheries; dredging of sediment from harbours; damage caused by sediment to inland lakes, reservoirs, and channels; water treatment; and removal of sediment from road ditches and municipal drains. Recent information suggests that the downstream costs of soil erosion are higher than the costs to farmers, but there is no up-to-date estimate of the costs at a provincial or regional level.

### The federal role

**4.3.4** Over the last decade, Agriculture and Agri-Food Canada promoted good soil management practices and monitored the status of the soil. Its programs to control soil erosion focussed on partnerships with provincial agriculture ministries, universities, and agricultural associations.

**4.3.5** Both Canada and the United States have targeted erosion in their separate programs that support the Great Lakes Water Quality Agreement. In

the areas of concern (a feature of the Agreement), Environment Canada has promoted soil conservation with a range of partners—Ontario ministries, conservation authorities, producer associations, community organizations, and individual landowners.

### Our audit questions

**4.3.6** How has the federal government managed the fight against soil erosion, both on its own and with its partners? What lessons has it learned from earlier programs? Have the effects of those programs been sustained?

**4.3.7** Because more than seven times as much land is at risk in Ontario than Quebec, we focussed our attention on Ontario.

### The story

#### Changed federal approach to soil erosion

**4.3.8** In its 1984 report, *Soil at Risk: Canada's Eroding Future*, the Standing Senate Committee on Agriculture, Fisheries and Forestry said that without quick action, Canadians could lose much of their agricultural land in the next 100 years. The Committee cited soil erosion as a main cause of land degradation.

**4.3.9** The Senate report and similar assessments spurred the government to act. The late 1980s and early 1990s saw a series of programs in Ontario under federal–provincial agreements. Between 1990 and 1997, the federal and provincial governments spent roughly \$94 million to tackle a range of agri-environmental problems. They tried to control soil erosion by offering incentives to farmers, promoting best land management practices, and conducting research.

**4.3.10** Since 1995, programs that involve industry in their administration and delivery have replaced federal–provincial programs and arrangements. In Ontario, the Agricultural Adaptation Council, a coalition of 52 agricultural, agri-food, and rural organizations, has been one of Agriculture and Agri-Food Canada's key partners.

**4.3.11** From 1995 to 2000, under the more recent federal partnerships with the Ontario industry, environmental programs, including soil conservation measures, received \$11 million; another \$7.4 million is planned for 2000 to 2003. Environment Canada has also been involved—from 1990 to 2000 it funded soil conservation projects in nine areas of concern around the Great Lakes, primarily to prevent phosphorus pollution.



Conservation tillage disturbs the soil less than conventional methods of tilling.

Source: Agriculture and Agri-Food Canada

#### Conservation tillage has reduced soil erosion

**4.3.12** When raindrops strike bare soil on cultivated land, they dislodge soil particles and wash them away. Conservation tillage and no-till practices have been a key tool in the federal effort to slow soil erosion in Ontario. These practices leave crop residues on the land, and the soil relatively undisturbed, reducing the amount of soil that is washed away by rain.

**4.3.13** Virtually non-existent in the 1980s, by 1996 these methods accounted for 43 percent of tillage in southwestern Ontario. Farmers adopted them partly because of the perceived economic benefits and the availability of new

crop technology. But their real impact in reducing erosion has been monitored at only a few research sites. As a result, the federal government has not captured important lessons about how effective these methods have been or how to improve the results of its programs.

**4.3.14 Future gains may be limited.** Conservation tillage may produce only limited additional gains. Fewer farmers are converting their land to this method, perhaps because there is still little information about the costs and benefits of conservation tillage and other soil conservation measures. Some evidence suggests that conservation tillage may increase nitrate losses and pesticide pollution. And research by Agriculture and Agri-Food Canada shows that some conservation tillage of clay soils—in southern Ontario, for example—may even damage the soil and reduce yields. Research like this is necessary to understand where different conservation methods are most effective.

### Slow progress over 15 years

**4.3.15** Overall, better farming practices have had only a modest impact on soil erosion in Ontario. Between 1981 and 1996 there was a drop of only 7 percent in the amount of land where soil erosion was classed as “intolerable.” In 1996, 42 percent of cropland was still at “intolerable” (unsustainable) risk. Within the class of land at intolerable risk, the risks range from low to severe. Based on a 7 percent change over 15 years and assuming a constant rate of progress, it could take another 90 years to get soil erosion down to sustainable levels on all cropland in the province.

### A soil erosion target with no action plan to meet it

**4.3.16** One of Agriculture and Agri-Food Canada’s current objectives is to bring soil erosion down to a sustainable level on all cropland—that is, under six tonnes of soil per hectare lost to erosion each year. At the time of our audit, the Department had not obtained agreement from the provinces and other federal departments on this objective. Nor had the Department set out an action plan with activities and milestones to achieve the objective. An action plan could include working with partners to identify areas where the risk of soil erosion is high. Given Environment Canada’s efforts to control soil erosion under the Great Lakes Water Quality Agreement, the two departments would need to establish who would do what, and where.

### Information for decision making is not being updated

**4.3.17** To manage Canada’s soils and soil problems, governments at all levels need consistent, up-to-date, and accurate soil data and maps. Managers need specific information on the extent and location of soil erosion problems and how they are changing over time.

**4.3.18** Systematic soil surveys began in the 1930s, when the federal government organized the national soil survey program with the co-operation of the provinces and universities. Until the mid-1990s, Agriculture and Agri-Food Canada collected information on soil and land resources in a national

### Did you know?

- Estimated costs of soil erosion in 1984 to Ontarians downstream of farmland: **\$91 million**
- Percentage increase in conservation tillage in southwestern Ontario since the early 1980s: **43**
- Percentage reduction in federal soil science staff in Ontario, Quebec, and the Atlantic provinces: **88**  
percentage reduction of geographic information system staff: **50**
- Number of long-term benchmark sites established in Ontario and Quebec in 1988 to measure soil quality: **7**  
number currently active: **1**
- Number of years since some Ontario counties last had a soil survey: **over 40**
- Number of years it would take, at the present rate, to bring soil erosion under control: **90**

database and provided it to all levels of government. Using these data, managers could identify problem areas, link information on soil and land to other data, and assess land status at a regional, national, or international level.

**4.3.19** As a result of budget cuts, however, the national soil survey program has almost disappeared. Only small remnants of it in some areas remain.

**4.3.20** Cutbacks have also affected other kinds of soil information. In 1988, Agriculture and Agri-Food Canada started a national system for monitoring soil quality. It selected benchmark sites in Ontario and Quebec to observe changes in soil properties over time—a valuable means of tracking changes in agricultural and global ecosystems. Only one site is currently active.

**4.3.21** Soil characteristics change over time, and so do the kinds of information collected through soil surveys. Today, little or no new soil data are collected. Nor, except for one local effort, is anyone in Ontario mapping detailed soil information. Over time, the currency, relevance, and reliability of the existing data have eroded. Without up-to-date soil surveys and mapping, it gets harder as time goes by to make informed decisions on land management and to track the progress of efforts to limit soil erosion. Agriculture and Agri-Food Canada is currently exploring options such as remote sensing to try to fill these gaps.

**4.3.22 No formal federal–provincial co-ordination.** In 1995, the Canada–Ontario agreement on soil databases ended. Until then, a federal–provincial committee of soil survey experts had co-ordinated the work on soil data. Discussions are still under way toward new agreements.

### **The Department is not ready to take its planned next steps**

**4.3.23** Agriculture and Agri-Food Canada has planned its next steps to reduce the risk of soil erosion. It will set goals for the proportion of farmland at tolerable risk of erosion; and it will target its efforts at areas that are particularly prone to erosion or that carry an unsustainable level of risk.

**4.3.24** In our opinion, however, the Department is not ready to take those steps. Given the loss of scientific expertise and up-to-date soil information, it may set goals and targets that are not realistic. And without good data, the federal government will be unable to determine whether it is actually reducing soil erosion, and unable to estimate the economic impacts accurately. Overall, we are concerned that Agriculture and Agri-Food Canada is ill-equipped to provide information and advice on soil and water quality.

**4.3.25** To speed up its progress in controlling soil erosion, the government may have to try additional approaches such as economic instruments and programs aimed at high-risk areas (see case study, Controlling erosion in the Bay of Quinte watershed). There may also be practical lessons in the successes of the Agriculture and Agri-Food Canada Prairie Farm Rehabilitation Administration; its long-term objectives are to support Western rural growth and ensure that land and water resources are used in

ways that can be sustained. A similar approach, delivered with the provinces, could support effective soil erosion programs. An essential part of any new program will be careful monitoring of the results.

#### Controlling erosion in the Bay of Quinte watershed

Agricultural runoff, sediment, sewage treatment plants, industrial discharges, urban runoff, sewer overflows, illegal sewer connections, shoreline development: all have contributed to water quality problems in the Bay of Quinte. In 1985, the International Joint Commission designated the Bay as one of 43 areas of concern where beneficial uses of the water were impaired. The watershed is on the northeast shore of Lake Ontario and covers roughly 17,500 km<sup>2</sup>.

From 1991 to 1999, the Bay of Quinte received approximately \$1.9 million from the Great Lakes 2000 Cleanup Fund to pay for projects such as construction of manure storage facilities, improvements to household septic systems, purchase of conservation tillage equipment, and fences to control livestock access to streams. These projects were predicted to reduce the phosphorus input to the Bay by 16,500 kilograms, exceeding the target set for the area of concern.

One valuable innovation proposed for the Bay of Quinte was a trading scheme for phosphorus discharges. The costs of reducing phosphorus discharges into the Bay varied with the source. Using alternative farming practices to limit soil erosion may be one of the cheapest ways to reduce the total amount of phosphorus going into surface waters—compared with changing sewage treatment, for example. The proposal was that sewage treatment plants would pay farmers to reduce the phosphorus running off their land rather than making more costly modifications to their plants, thereby reducing the total cost for all users. (This approach would not deal with other water quality problems associated with sewage treatment.)

Although the scheme was considered feasible and would have cut costs overall, it was not adopted at the Bay of Quinte. A similar proposal was used successfully, however, in the South Nation watershed in eastern Ontario.

### Conclusion

**4.3.26** More than 40 percent of Ontario's cropland is at risk of eroding at an unsustainable rate. Federal and provincial efforts over the past decades have led to an only modest reduction in soil erosion.

**4.3.27** Agriculture and Agri-Food Canada has identified overall objectives for reducing soil erosion but has no action plan detailing how it expects to achieve them. A good action plan would set a schedule for progress and specify who would be accountable for what results.

**4.3.28** Baseline soil information is essential to good land management decisions, but the present data are becoming more outdated and less useful as time passes. The federal and provincial governments have no formal mechanism for co-ordinating data management.

## Our audit objectives and main findings

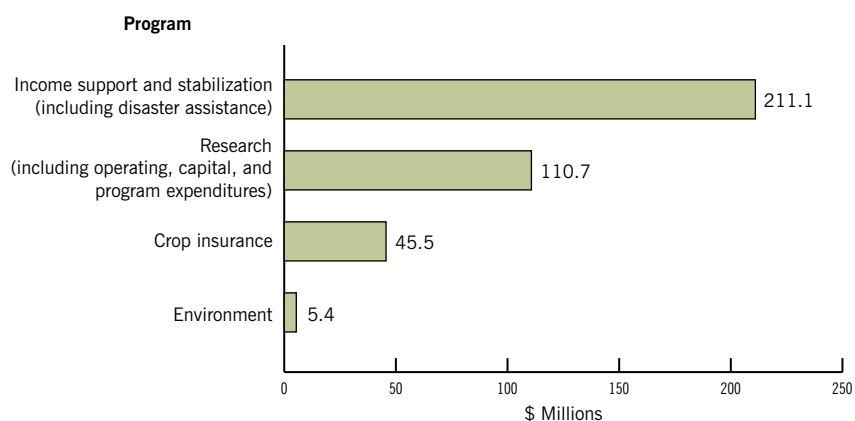
Holding the federal government to account		
① <b>Has the government fulfilled its commitments?</b>	<b>Commitments</b>	<b>Results</b>
	Agriculture and Agri-Food Canada has committed to sustaining the resource base for agriculture.	Soil erosion problems are improving, but progress has been very slow.
Assessing the government's performance		
② <b>Has the government applied good management practices?</b>	<b>Strengths</b>	<b>Weaknesses</b>
	The government has identified indicators and objectives.  Conservation measures have reduced soil erosion somewhat.	The government has not translated its objectives into priorities or an action plan.  It has not defined expected results of current activities.
③ <b>Has the government established good governance structures?</b>	The government has documented issues well in special reports.	The government has not clearly defined accountability for results among departments and partners.  It has not maintained soil databases.

## 4.4 Environmental Impacts of Agricultural Policies and Programs

### The issue

**4.4.1** Agriculture and Agri-Food Canada spends far more money on agricultural programs in the basin such as crop insurance and disaster assistance than it spends directly to reduce the impacts of agriculture on the environment (Exhibit 4.6). Income support and other programs may be unintentionally encouraging farmers to take actions that harm the environment, countering the gains made by environmental programs. The federal government has recognized that its large subsidies to farmers have potential impacts on the environment.

**Exhibit 4.6** Agriculture and Agri-Food Canada program expenditures in the basin (1998–99)



Source: Agriculture and Agri-Food Canada

**4.4.2** In some other countries, agricultural subsidies have led to soil degradation, misuse of water resources, and loss of wildlife habitat. A 1995 analysis of U.S. subsidies compared the current support programs with several alternatives. The study concluded that current subsidies were increasing soil erosion, increasing nitrogen and phosphorus pollution, raising pesticide costs, increasing greenhouse gas emissions, and increasing farmers' costs. In Portugal, support for grain production encouraged its expansion into marginal lands, increasing erosion and triggering serious soil losses. Mexico, Japan, and Iceland have seen similar problems. In New Zealand, subsidizing fertilizer use led to increased water pollution.

### The federal role

**4.4.3** In 1996, the federal government made a commitment to Parliament to have departments assess the environmental impacts of their existing taxes, grants, and subsidies and report the results in their sustainable development strategies (Exhibit 4.7). Cabinet has directed all major departments to also evaluate new policies and programs for their potential effects on the environment.

**Exhibit 4.7 Commitment to assess the environmental impacts of policies and programs**

Type of assessment	Nature of commitment	Timing	Reporting
Review existing taxes, grants, and subsidies.	Government's response to the report of the Standing Committee on Environment and Sustainable Development.	Commitment made in 1996, significant progress to be made by 1997.	To be reported annually to Parliament and in sustainable development strategies. Progress on tax measures to be included in the budget.
Do environmental assessment of proposed policies, programs, and plans.	Cabinet directives in 1990 and 1999.	To be done at the earliest appropriate stage, prior to approval.	To be included in memoranda to Cabinet.
Do environmental assessment of income support programs.	Requirements under the <i>Farm Income Protection Act</i> .	Programs to be assessed within two years of a federal-provincial agreement and every five years after that.	No specific reporting requirement, but agreements specify how assessments will be done.
Ensure environmental sustainability of agricultural research.	Policy commitment.	Environmental impacts of research projects to be identified prior to approval.	No specific reporting requirement.

**4.4.4** Agriculture and Agri-Food Canada has additional obligations. The *Farm Income Protection Act* requires it to carry out environmental assessments of its income support programs for farmers, which include the most costly programs in the basin. And its Research Branch is supposed to evaluate the potential impacts on the environment—both positive and negative—of research it proposes to do.

### Our audit questions

**4.4.5** Are Agriculture and Agri-Food Canada's programs and policies at cross-purposes with its environmental goals? How well does the Department assess the possible environmental impacts of its programs and policies?

### The story

#### Potential environmental impacts of subsidies

**4.4.6** Agricultural subsidies have dropped substantially in the last several years, mostly in response to trade concerns. Still, the Organisation for Economic Co-operation and Development (OECD) estimates that Canada's subsidies to farmers account for 18 percent of their income, and averaged \$5.6 billion per year from 1998 to 2000. Canada's subsidies are significantly lower than some other OECD countries pay.



**4.4.7** Federal and provincial governments now direct most of their financial support for farmers not at specific crops but at the farmer's net income. Such programs are intended to avoid distorting trade and production decisions. The support also provides no direct incentive to grow one type of crop over another—so it would not promote the growing of crops that have severe environmental impacts. There may be indirect effects, however. For example, by reducing the risk of financial losses, income support programs encouraged Ontario farmers to keep their fields in corn. This increased the risk of groundwater contamination by nitrogen. A study of Ontario farm support policies found that income stabilization encourages more intensive production, the growing of crops on marginal land, and increased use of pesticides, fuel, and fertilizer.

#### **Existing taxes, grants, and subsidies not assessed adequately**

**4.4.8** After a 1994 review of how Canada's economic policies could incorporate environmental concerns, the Standing Committee on Environment and Sustainable Development recommended that all departments do a comprehensive study of their tax measures, grants, and subsidies to determine whether they were environmentally sustainable. The government agreed to assess its existing taxes, grants, and subsidies.

**4.4.9** Agriculture and Agri-Food Canada has reported only one environmental assessment that met this commitment—an assessment of crop insurance, required by the *Farm Income Protection Act*. But assessments required by the Act do not meet all the requirements of the study the Standing Committee recommended. For example, they do not include the implications for federal environmental priorities or the potential social effects of programs, such as their impact on rural communities.

**4.4.10** In its latest sustainable development strategy, the Department has committed to reviewing its existing and new policies, programs, and initiatives by 31 March 2004 to see if they are sustainable. It has not said how it plans to meet this commitment, nor has it reported the progress it has made so far. In the six years since the Committee recommended this kind of study, the Department has not evaluated some major grant and subsidy programs that could be having significant effects on the environment. Without having done the assessments, it cannot identify whether corrective action is needed.

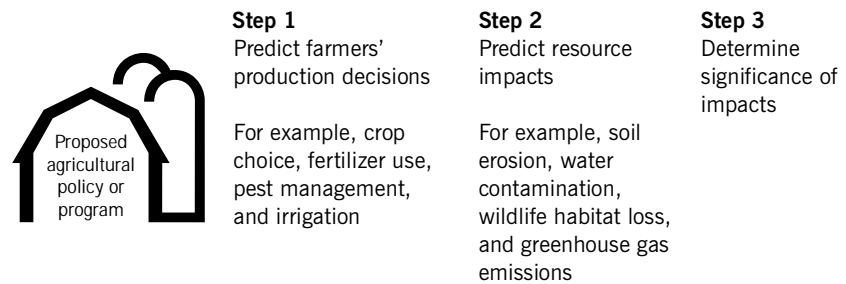
**4.4.11** Nor has the Department reported any work to assess the environmental impact of tax measures affecting farmers, such as the GST exemption for fertilizers and pesticides.

#### **Some gaps in assessing new policies and programs**

**4.4.12** In 1990, Cabinet directed federal departments to assess the environmental impacts of their new policy and program initiatives. Environmental assessments are done to ensure that before deciding to proceed with a policy, plan, or program, decision makers consider the potential environmental effects of the options available. The assessment is to include the environmental effects fully, and they are to be considered at the

earliest appropriate stage, on a par with economic and social considerations (see Exhibit 4.8 for one approach).

#### Exhibit 4.8 Environmental assessment of an agricultural policy or program



Source: Agriculture and Agri-Food Canada

**4.4.13** Agriculture and Agri-Food Canada has not set up a formal process to ensure that it makes decisions properly and documents them. Rather, its current process is ad hoc and incomplete. In its latest sustainable development strategy, the Department acknowledges the need for an improved process.

**4.4.14** In 1999, the Cabinet directive was updated. Departmental managers have not yet received training or new guidance on how to apply the updated directive.

**4.4.15 Relative lack of detail.** In the Department's environmental assessments we reviewed, we were struck by the lack of detail in the analysis of potential environmental effects. The information provided to ministers lacked detail in turn.

**4.4.16 Assessing sectoral export goals.** Agriculture and Agri-Food Canada has assessed at least one broad policy initiative. It attempted to predict the environmental consequences of the agriculture sector's goals for increased exports. The Department concluded that this policy objective could lead to substantial impacts on the environment (see case study, Environmental assessment of the national export target). In our view, this assessment could be a starting point for evaluating other programs and policies.

#### Assessment gaps under the *Farm Income Protection Act*

**4.4.17** The *Farm Income Protection Act* provides farmers with income security through national programs such as crop insurance and the Net Income Stabilization Account; the Act also provides for support programs that are specific to the provinces. These programs help farmers stay in business during difficult periods. All programs under the Act are guided by principles of social, economic, and environmental sustainability.

**4.4.18 Gaps in compliance.** The Act requires federal–provincial agreements on farm income support to provide for periodic environmental assessments. Several major programs are excluded from the requirement, but in at least

two cases an assessment that was required was not done. One is the Net Income Stabilization Account, which spends more than \$200 million each year across Canada; an assessment required in 1998 was not completed. Without timely assessments, the Department is not in a position to learn how to reduce the environmental effects of its programs or to inform its provincial partners of the possible impacts. We also found that the Department did not ensure that federal–provincial agreements included all of the provisions stipulated by the Act, such as the requirement for guidance on the assessment.

**4.4.19 Lack of verification.** Given that the assessments under the Act are done well after a program starts—in some cases, after it has run for several years—we would expect the Department to report the program’s observed effects on the environment. In the case of crop insurance, the Department has not verified whether predicted impacts have actually occurred. In our view, this is a significant gap because ministers are not able to judge how reliable predictions have been.

**4.4.20 Assessing crop insurance.** Crop insurance is one of the most important programs under the *Farm Income Protection Act*, so we took a closer look at the environmental assessments of that program. The 1998 assessment used computer models to predict possible soil erosion, soil salinity, water quality, and wildlife habitat—with and without crop insurance.

#### Environmental assessment of the national export target

This case illustrates how the Department’s goals of economic growth and environmental protection can come into conflict.

The Canadian Agri-food Marketing Council is an advisory body to the Minister of Agriculture and Agri-Food and the Minister for International Trade. In 1998, the Council set new targets for 2005. It wanted to increase Canada’s share of the world’s agriculture and agri-food exports to 4 percent, of which 60 percent would be processed goods. Agriculture and Agri-Food Canada has adopted this national goal and is supporting the industry’s efforts.

The Department studied the export target’s implications for the performance of the agriculture sector, employment, resource use, trade, the environment, and policy. It identified several environmental risks, including the following:

- More intensive land use, including the use of more fertilizer, pesticides, and irrigation, with implications for air pollution, water quality, and greenhouse gas emissions.
- Increased use of marginal lands, which are susceptible to degradation. This could result in the conversion of land that provides wildlife habitat, such as wetlands.
- Increased livestock production, which could lead to odours, more contamination of groundwater, and increased tension between farmers and other rural residents. Significant expansion of livestock production may conflict with new greenhouse gas emission targets in the recent Kyoto Accord.

The Department explicitly recognized that pursuing the export target could shift the relative weights of competing public policy objectives and priorities. Information like this is essential to making sound choices.

**4.4.21** Based on the assessment, the Department concluded that, overall, crop insurance did not appear to have any significant environmental implications. There may be local or regional impacts—for example, the assessment suggested that Ontario would see a five percent increase in soil erosion.

### Environmental consequences of research not adequately assessed

**4.4.22** Research is a key federal activity. Agriculture and Agri-Food Canada's Research Branch influences the long-term sustainability of agriculture in the basin by shaping future management practices and tools for producers. The Branch is committed to developing and promoting practices that are environmentally sound.

**4.4.23** The Branch does some research aimed at increasing crop and animal production—for example, by developing new crop varieties or extending the range of current varieties. Applying the results of such research could have negative effects on the environment—if, for example, the new crops exposed more soil to water erosion. Researchers are supposed to describe the potential environmental and social impacts of their research and to do a cost-benefit analysis. We reviewed 20 recent proposals from research centres in the basin and found little evidence that they had assessed the environmental impacts appropriately.

**4.4.24 Evaluating research centres.** Some centres do research on resource conservation, research that is supposed to be integrated with the crop, animal, and food research of other centres. We expected that the Department would consider environmental objectives in evaluating the performance of its research centres.

**4.4.25** We found, instead, that evaluations focus on the economic benefits of the research and on whether a centre is meeting the industry's needs. For example, the success of research on crop and animal production at the Dairy and Swine Research and Development Centre in Lennoxville, Quebec was measured only in terms of economic benefits.

**4.4.26** Review committees that evaluate research centres include representatives of government, academe, and industry. But they do not include stakeholders with a direct interest in reducing the environmental impacts of agriculture—municipalities, for example, or fishers.

**4.4.27 Evaluating research areas.** The Research Branch has also evaluated its research on wheat, forage, potatoes, and swine. These evaluations calculate the direct economic impacts of the research on the agriculture sector but do not include the environmental costs or benefits.

## Conclusion

**4.4.28** Faced with potentially conflicting goals, Agriculture and Agri-Food Canada needs to carefully and explicitly consider the implications of its policies and programs for the environment. The Department has not met some requirements in its legislation and policies to do this.

### Did you know?

- Amount spent in 1998–99 by Agriculture and Agri-Food Canada in Ontario and Quebec on income support and stabilization programs:

**\$211 million**

amount spent on environmental programs:

**\$5.4 million**

- Year that the federal government committed to a study on the environmental effects of its tax measures, grants, and subsidies: **1996**
- Year that Agriculture and Agri-Food Canada says it will complete the next part of its study: **2004**

- Amount spent on programs under the *Farm Income Protection Act* that do not require an environmental assessment: **over \$500 million**

- Possible percentage increase in soil erosion in Ontario due to crop insurance: **5**

**4.4.29** Agriculture and Agri-Food Canada has made limited progress in the study of its existing tax measures, grants, and subsidies, but it has not completed the study. Nor has it reported on the status of this work.

**4.4.30** The Department made early progress in applying the Cabinet directive on environmental assessments of policies and programs, but it has no systematic, formal process to conduct them. As a result, the Minister cannot be assured that the Department is complying with the Cabinet directive.

**4.4.31** There are gaps in the Department's compliance with the *Farm Income Protection Act's* requirements for environmental assessments. The Department has concluded that current income support programs are not likely to encourage farming practices that damage the environment. Some programs, however, could have local or regional impacts—for example, crop insurance could be increasing the risk of soil erosion in parts of Ontario. The Department does not attempt to monitor the actual impacts of its policies on the environment to determine whether its predictions have been accurate.

**4.4.32** The information used to select individual research projects does not have enough details on their potential environmental effects. Evaluations of some of the Department's broad research areas applicable in the basin did not take account of the possible environmental effects. Evaluations of the research centres focus on the economic impacts of research and whether the needs of the agriculture industry have been met.

## Our audit objectives and main findings

Holding the federal government to account		
① Has the government fulfilled its commitments?	Commitments	Results
	Review existing taxes, grants, and subsidies.	Agriculture and Agri-Food Canada has not completed the review.  It has not reported results of the review to Parliament.
	Do environmental assessment of proposed policies, programs, and plans.	It has completed some assessments but they lack details.
	Do environmental assessment of income support programs.	It has not fulfilled some legislated requirements for assessments.
	Ensure environmental sustainability of agricultural research.	Its research proposals lack adequate information about environmental impacts.

## Our audit objectives and main findings

Assessing the government's performance		
<b>2</b> Has the government applied good management practices?	<b>Strengths</b>	<b>Weaknesses</b>
	Agriculture and Agri-Food Canada has completed some integrated environmental-economic assessments.	Agriculture and Agri-Food Canada has no formal process for tracking decisions on environmental assessments of policies and programs.  Its information on the environmental impacts of research is inadequate.
<b>3</b> Has the government established good governance structures?	Agriculture and Agri-Food Canada has made available to the public some environmental assessments completed under the <i>Farm Income Protection Act</i> .	Agriculture and Agri-Food Canada has not reported the status of its study of taxes, grants and subsidies.  It has not reported on its application of the Cabinet directive.

## 4.5 Working Toward Environmentally Sustainable Agriculture

**The issue** **4.5.1** Farming practices in the Great Lakes and St. Lawrence River basin are having effects on the environment that cannot be sustained. While some impacts such as soil erosion are improving slowly, others such as water contamination and loss of wildlife habitat are getting worse (Exhibit 4.9).

**4.5.2** The effects of agriculture will likely worsen as farmers step up production to respond to the rising demands of export food markets. Low food prices and international subsidies are squeezing profits and limiting what farmers can do on their own to remedy these effects. And federal programs and funding have shrunk.

**The federal role** **4.5.3** The federal government has a role to play by providing national leadership, promoting and supporting good farming practices, and doing research. It also monitors the state of the ecosystem, tracks the impacts of agriculture, and reports to Parliament.

**Our audit questions** **4.5.4** Has the federal government established an effective plan to manage the range of sustainable agriculture issues in the basin? Has it defined who is accountable for what?

**Exhibit 4.9** Trends in some key environmental impacts

Environmental impact	Measurement	Time period	Improving
Pesticide use in Ontario	Tonnes of active ingredient	1983–1998	2.7% reduction per year
Pesticide use in Quebec	Tonnes of active ingredient	1992–1997	1% reduction per year
Soil erosion in Ontario	Percentage of cropland at unsustainable risk of soil erosion	1981–1996	0.5% reduction per year
Greenhouse gas emissions	Tonnes of carbon dioxide equivalent	1990–1996	Roughly constant
Nitrogen contamination of water	Percentage of farmland with increased nitrogen content of water	1981 and 1996	71% of farmland has a higher nitrogen content
Wildlife habitat loss on agricultural land	Percentage of habitat types with decreased habitat area	1981 and 1996	75% of habitat types have less area

Getting worse

## The story **Management challenges for the federal government**

**4.5.5 Need for an integrated view.** To manage the environmental effects of agriculture successfully, many farmers need to improve their practices. They need to know how each of their practices interrelates with the others and with the ecosystem.

**4.5.6** Individual problems cannot be managed in isolation from the others. Draining water from farmland may improve crop yields, but it may contaminate downstream rivers and lakes with phosphorus, nitrogen, and pesticides. Using less insecticide may benefit birds, but it may lead to greater damage by insects. Manure is a source of greenhouse gases, yet it also provides crop nutrients. Strips of vegetation along streams to stop erosion may also provide good wildlife habitat. Working manure into the soil may conflict with best practices for preventing soil erosion. Farmers may need to meet conditions such as the rigorous use of pesticides to be eligible for crop insurance, yet this counters federal and provincial efforts to reduce pesticide use. In short, farmers need clear and consistent government messages.

**4.5.7** To support farmers properly, the federal government needs an integrated approach to managing for sustainable agriculture. This requires that it do the following:

- define its objectives clearly;
- select appropriate tools to achieve its objectives;
- use its resources where they stand to do the most good;
- co-ordinate the use of selected tools;
- measure and report progress; and
- define clearly who will do what.

### **Objectives defined clearly but crucial gaps remain**

**4.5.8** In its latest sustainable development strategy, Agriculture and Agri-Food Canada defines sustainable agriculture in very broad terms:

Sustainable agriculture protects the natural resource base, prevents the degradation of soil, water, and air quality, and conserves biodiversity; contributes to the economic and social well-being of all Canadians; ensures a safe and high-quality supply of agricultural products; and safeguards the livelihood and well-being of agricultural and agri-food workers and their families.

**4.5.9** While this definition incorporates the three dimensions of sustainable development (environmental, economic, and social), to be a useful guide for action it needs to be translated into specific objectives and targets. These must provide a clear path forward to resolve potentially conflicting direction. For example, safeguarding the livelihood of agricultural and agri-food workers may mean stepping up production, which could conflict with preventing water pollution.

**4.5.10** Agriculture and Agri-Food Canada has set some objectives for the Department and has identified others for the agriculture sector. Most of the

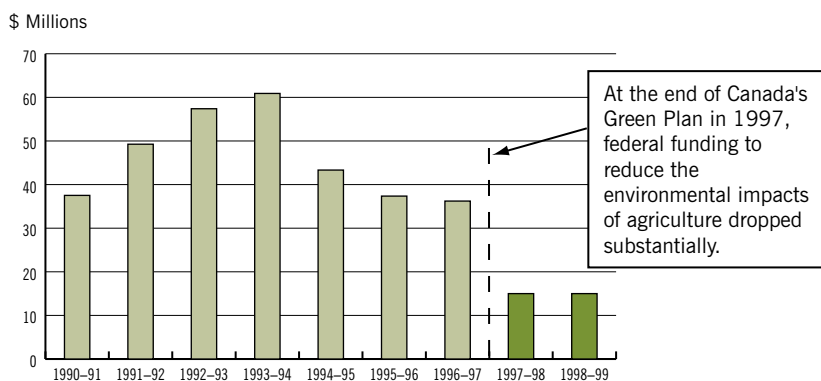


Department's objectives say what it will produce (research projects, policy analyses) but not how those products will contribute to the broader objectives for the agriculture sector. To achieve the sector objectives, which are measurable and have clear deadlines, the Department has not said what it will do and what it expects others to do. In our view, this is a crucial gap in the management of environmental issues in the basin.

### Selecting the right tools

**4.5.11 A basic shift in program delivery.** The funding levels and the nature of federal initiatives for sustainable agriculture have seen major changes in the last five years. At the end of Canada's Green Plan in 1997, federal funding to reduce the environmental impacts of agriculture dropped substantially (Exhibit 4.10). At about the same time, Agriculture and Agri-Food Canada turned to other ways of delivering programs to meet its objectives. These include economic instruments (using market forces to achieve policy goals), stewardship, environmental management systems, and educational programs.

**Exhibit 4.10** Agriculture and Agri-Food Canada spending on environmental programs



Source: Agriculture and Agri-Food Canada

**4.5.12** Today, the government gives much of its support in the form of grants to farm organizations and other agencies that select and fund projects—mainly through the Canadian Adaptation and Rural Development Fund. Industry-led agricultural adaptation councils oversee programs in both Ontario and Quebec, giving producer groups more opportunity to influence priorities and results. Environmental sustainability is one of their priorities.

**4.5.13** Through the adaptation councils, the federal government has supported two different approaches in Ontario and Quebec to meet environmental objectives. Both approaches rely on voluntary participation and education.

**4.5.14 Quebec agri-environmental clubs.** The federal and provincial governments, in partnership with agricultural organizations, have promoted clubs for farmers to share information and co-operate in conservation measures, with technical experts for each club to provide advice. Today, the province has about 75 farm conservation clubs, representing roughly



Members of an agri-environmental club in Quebec learn about the environmental impacts of farming practices.

Source: Bruno Gosselin, Quebec Ministry of Agriculture, Fisheries and Food

4,000 farms. The Quebec adaptation council, the provincial government, and producer organizations had a target of 4,000 farms participating in conservation clubs by 2001.

**4.5.15 Ontario environmental farm plans.** In Ontario, the environmental farm plans have a higher profile than any other agri-environmental program in the province. Using workshops and workbooks, the program helps participating farmers identify their own environmental problems and develop plans to remedy them. When peer review committees accept the plans, the farmers are eligible for grants to help tackle their priority problems. The federal government has given more than \$21 million to the program since 1992.

**4.5.16** The program is also seen as a way to reduce the amount of phosphorus and other pollutants in runoff from farms and thereby help meet obligations under the Great Lakes Water Quality Agreement. Support for this program was a target of the 1994 Canada–Ontario Agreement.

**4.5.17 Common features.** The main advantages of these two voluntary programs are their flexibility and the strong commitment of their participants. Common drawbacks include diffuse accountability and incomplete measurement of results. For example, no link has been made between the environmental farm plans and observable benefits to the environment, such as better water quality. The programs give farmers little specific incentive to minimize their impacts on the environment beyond the farm gate.

**4.5.18** How effective a voluntary approach can be depends on how many farmers are willing to participate. By 2000, the environmental farm plan workshops had drawn 18,614 participants from over 35 percent of Ontario farms. Of these, 7,976 had taken advantage of the financial incentives to make improvements. The agri-environmental clubs in Quebec involve a smaller proportion of Quebec's farmers (12 percent). But they encourage continuous participation, unlike the one-time preparation of an environmental farm plan.

**4.5.19** In our opinion, given the increasing impacts of agriculture on some parts of the basin ecosystem, relying on these and similar approaches to influence farmers will not be enough for the government to achieve its environmental objectives.

**4.5.20 An old tool needs clearer priorities.** One way Agriculture and Agri-Food Canada can achieve its environmental goals is to give farmers information about new and better practices. This makes research an essential part of the management framework.

**4.5.21** Since 1995, Agriculture and Agri-Food Canada has delegated a separate mandate to each of its 19 research centres across the country. This has given research centres the flexibility to adapt to local needs and circumstances, but it also raises the challenge of ensuring that national priorities are targeted. The Department has not set priorities that each research centre is to meet for the environmental issues in its mandate.

**4.5.22** With the long lead times in research, the mix of research projects normally changes quite slowly. At the same time, however, the timing, scope, and relevance of current research projects are not co-ordinated well enough to meet the needs of agriculture policy development. With a few exceptions, there is a gap between those who do research and those who develop and enact policies.

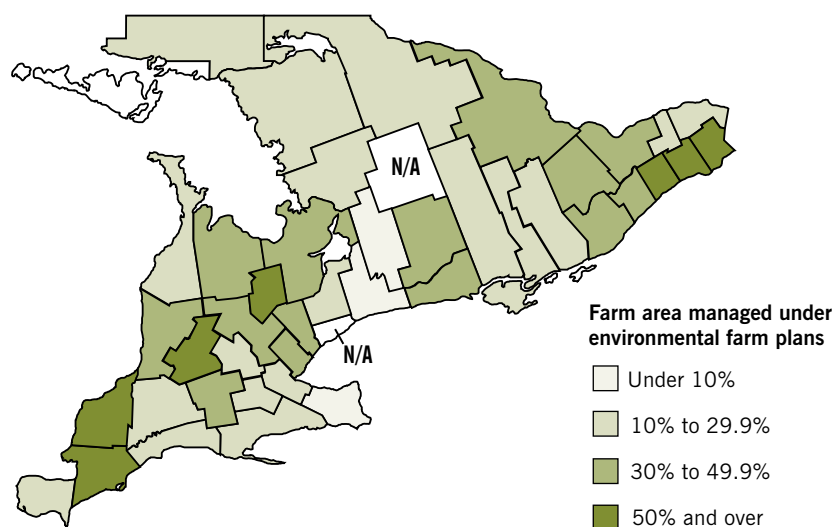
### Using resources where they can do the most good

**4.5.23 Programs need to be targeted better.** In 1993, Agriculture and Agri-Food Canada recognized that program design and allocation of resources should be based on quantitative measures and indicators. In its latest sustainable development strategy, it reiterates the need to target geographic areas for environmental improvement. It is not doing this yet.

**4.5.24** While the Department has some information about where the biggest threats to the environment are located, we found no evidence that it has spent the most money in those areas. The risks to the environment from agriculture are much greater in Ontario than in Quebec. Yet the National Soil and Water Conservation Program (1997 to 2000) gave each the same amount, \$2.5 million; and the Agricultural Environmental Stewardship Initiative (2000 to 2003) gave them each \$2.475 million.

**4.5.25** Nor is the Department directing its initiatives in Ontario to where they can do the most good. We found that rates of participation in the environmental farm plan program were unrelated to the risks of soil erosion, for example. Southwestern Ontario has a higher risk of soil erosion than eastern Ontario, but a smaller proportion of farmers who participated in the program (Exhibit 4.11). The nine counties with the worst soil erosion have some of the lowest rates of participation.

**Exhibit 4.11** Participation in Ontario environmental farm plans



Source: Ontario Soil & Crop Improvement Association, April 1999; 1997 Ontario farm registration database; 1996 Census of Agriculture.

**4.5.26** Targeted incentives may be an effective complement to generally available programs. One Ontario example is the Rural Water Quality Program, delivered by the Grand River Conservation Authority and funded by the Region of Waterloo, County of Wellington, and City of Guelph. It requires an environmental farm plan as a prerequisite for participation in the incentive program. The Rural Water Quality Program is providing roughly three million dollars to farmers in the region to assist them in adopting practices that improve and protect water quality. These incentives have dramatically increased participation in the environmental farm plan program. In our view, the size of the effort to improve environmental quality should not reflect local organizational abilities and financial resources alone. We believe the federal government needs to provide a broader strategic perspective that also reflects the severity of the problem.

### Co-ordinating the use of tools

**4.5.27 Linking different agricultural programs.** Separate federal efforts to change farmers' practices need to send consistent signals. Under the *Farm Income Protection Act*, Parliament specified that crop insurance could be withheld, restricted, or enhanced as needed to protect the environment and encourage sound management practices, in order to ensure sustainability.

**4.5.28** In Quebec, Agriculture and Agri-Food Canada does not require that farmers belong to agri-environmental clubs to be eligible for crop insurance. Environment Canada does not require that farmers have an environmental farm plan or equivalent demonstration of environmental performance to receive grants from the Great Lakes 2000 Cleanup Fund in Ontario, or the Community Interaction program in Quebec.

**4.5.29** A report prepared for Agriculture and Agri-Food Canada concluded that cross-compliance with program requirements is feasible in Canada and noted that an Ontario farm association was advocating it. Cross-compliance is a potentially effective instrument if properly designed, applied, and monitored. The Auditor General of Quebec recommended in 1995–96 that the Quebec Ministry of Agriculture, Fisheries and Food ensure that its financial aid programs reflect its environmental concerns.

**4.5.30** In 1993, our Office recommended that Agriculture and Agri-Food Canada continue a detailed examination of the feasibility of including cross-compliance measures in federal and provincial agriculture programs. The Department ultimately decided against requiring cross-compliance because it considered that participation in its income support programs was too low to give it the necessary influence over farmers.

**4.5.31** In our view, the context for agriculture policy has changed substantially since 1993. The Department now has some overall information on how the new mix of tools is working; it knows how the environmental impacts from agriculture are changing over time. We believe that the Department needs to re-evaluate the mix of policy and program tools, including opportunities to ensure that they work together well.

### Measuring and reporting progress

**4.5.32** The Research Branch and the Strategic Policy Branch of the Department have been developing agri-environmental indicators since 1993. The results of their work have been published as *The Health of Our Soils*, *The Health of Our Air*, and *The Health of Our Water*, along with a report on agri-environmental indicators issued early in 2000. The indicators estimate the geographic distribution of variables such as soil erosion, wildlife habitat, and water pollution, and the changes in them.

**4.5.33** This work is essential to closing two key gaps in the Department's management framework: the need to set targets and the need to measure progress toward them. Without accurate data and knowledge from monitoring, scientists and managers can only speculate about environmental problems, their probable causes, the likely consequences, and the adequacy of current measures to protect and restore environmental quality. At present, for example, the Department is ill equipped to answer some fundamental questions about its environmental programs. Are they funded adequately? Are they funded at levels higher than the anticipated benefits would warrant?

**4.5.34** A strength of the Department's current sustainable development strategy is that it links its agri-environmental indicators to the objectives for the agriculture sector. The Department proposes to measure progress using the indicators and to report it in the yearly departmental performance report. Parliament and Canadians can then track its progress toward sustainable agriculture.

**4.5.35** We are concerned that the Department is ill equipped to maintain the agri-environmental indicators and keep this valuable source of information current. It took close to seven years to develop this first set of information. The Department has lost and not replaced some of its resident expertise. As a result of departmental restructuring, the documentation and data used in the latest report are now fragmented. Internal responsibility for maintaining them has not been determined. These issues had not been resolved at the end of our audit. If the Department does not resolve them soon, it may lose the important progress it has made.

**4.5.36 Some key risks not included.** The current set of agri-environmental indicators does not capture all of the main environmental issues in agriculture. For example, it does not include the impacts of pesticide use. Without a good indicator of pesticides, it will be difficult to compare the relative risks associated with the pesticides used on different crops and to target pesticide reduction programs accordingly.

### Defining clearly who does what

**4.5.37 Federal linkages.** We found that federal departments are not working with each other as effectively as they could. There is no document that formally sets out the division of roles and responsibilities for agri-environmental issues between Agriculture and Agri-Food Canada and Environment Canada. They co-operate on some research activities under a memorandum of understanding. But they do not consistently co-ordinate

policy analysis, program design, monitoring, or reporting, even though they both have programs that target the same environmental problems and the same farmers.

**4.5.38** The two departments do not always use each other's expertise or build on each other's initiatives. For example, using the Great Lakes 2000 Cleanup Fund, Environment Canada supports the construction of manure holding structures. In contrast, Agriculture and Agri-Food Canada has two programs that explicitly rule out support for these structures. As a result, the departments risk working at cross-purposes or sending mixed messages.

**4.5.39 Federal–provincial linkages.** We observed that there is no clear, up-to-date mechanism to guide Agriculture and Agri-Food Canada in collaborative efforts with the provinces. In the early 1990s, the Department signed environmental accords with the Ontario and Quebec agriculture ministries. The accords outlined their respective responsibilities and were used to administer a series of major programs. The last of these programs, Canada's Green Plan, expired in 1997. The management committees for the accords have not met in over four years.

**4.5.40** While for some functions there are implicit arrangements between the federal and the provincial governments, the role of each is not clearly defined. This can jeopardize the federal government's ability to reach its environmental goals. For example, it has assumed responsibility for basic research and relied on the provinces to transfer the results of the research to farmers, through their agricultural extension services. Recent changes to Ontario's agricultural extension service mean that the federal government must find other ways to tell farmers about the results of its research.

#### **Scaled-back effort to include agriculture in federal ecosystem initiatives**

**4.5.41** Managing agriculture's effects on the environment calls for an approach that recognizes the links among those effects and the role of agriculture in the ecosystem. Both Agriculture and Agri-Food Canada and Environment Canada support an ecosystem approach to making those links, in part through the regional ecosystem programs.

**4.5.42** The federal government did not allocate resources for agriculture issues in phase I of St. Lawrence Vision 2000. In phase II (1993 to 1998), Agriculture and Agri-Food Canada and its Quebec counterpart supported actions such as plans to reduce agricultural pollution in four Quebec watersheds. The Department contributed \$2.1 million. In phase III (1998 to 2003), it scaled back and shifted its participation to \$1 million for research projects over five years, projects that had been under way before phase III started. The remaining federal contribution to agriculture in the third phase is \$3.5 million from Environment Canada, most of which will be used to "top up" provincial programs aimed at reducing pesticide use, increasing the area under integrated pest management, and tracking results. The mid-term review of phase III in July 2000 noted that the program had not met its target for reduced use of pesticides.



**4.5.43** Great Lakes 2000 had strong involvement by Agriculture and Agri-Food Canada at first. But with funding cuts in the mid-1990s and the absence of new funding for agricultural programs in the third phase of the program (Great Lakes 2020), the Department's involvement has dropped off significantly.

**4.5.44** The federal government could have used these regional ecosystem programs to integrate the management of agriculture and its environmental effects. But it has not done that. Agriculture and Agri-Food Canada has not effectively integrated its policies and programs in the basin with those of its federal and provincial partners. Indeed, most of its efforts toward sustainable agriculture have been outside the umbrella of the flagship programs.

#### *Did you know?*

- Number of agri-environmental indicators in the basin that Agriculture and Agri-Food Canada estimates are improving: **7**  
number of indicators showing no change: **4**  
number of indicators getting worse: **6**
- Percentage decrease in federal program funding to reduce environmental effects of agriculture, 1993–94 to 1997–98: **75**
- Number of agri-environmental farm clubs in Quebec (representing 4,000 farms): **75**
- Federal contribution to the environmental farm plan program in Ontario: **\$21 million**
- Number of farmers attending the program's workshops by May 2001: **about 20,000**
- Environmental benefits from the program: **unknown**
- Number of years it took to develop the first agri-environmental indicators: **7**
- Number of years since the management committees for the federal–provincial environmental accords last met: **4**

#### **More action needed on key issues**

**4.5.45** Other parts of this Section have discussed what the federal government is doing to manage soil erosion and pollution from manure and fertilizer. Three other major problems it must manage to ensure that agriculture is sustainable are the risks in using pesticides, the loss of biodiversity, and greenhouse gas emissions.

**4.5.46 Pesticide risks.** Pesticides can be a hazard to human health and the sustainability of the ecosystem. Because 91 percent of pesticides sold in Canada are used in agriculture, attempts to minimize their risks need to tackle agricultural uses.

**4.5.47** In 1999, we found that the federal government had not made adequate plans to reduce the risks or use of pesticides. In 1998, the Pest Management Regulatory Agency committed to preparing a risk reduction strategy by 2000. It has also committed to a joint risk reduction strategy with Agriculture and Agri-Food Canada for pest management in agriculture. Some elements of both strategies have been developed, but neither has been finalized.

**4.5.48** One way to reduce the risks in using pesticides is integrated pest management—a mix of methods to control pests and reduce their damage. In 1999, we noted that the Agency had not set clear goals for its efforts to promote integrated pest management; this is still the case today.

**4.5.49 Loss of biodiversity.** Farming practices have contributed to the loss of wetlands and other wildlife habitat. The federal response has been to promote stewardship by landowners, conduct research, and monitor habitat losses. Current agricultural practices have also led to the loss of genetic diversity in crops and livestock, which may make them more vulnerable to pests and pathogens.

**4.5.50** Agriculture and Agri-Food Canada has developed its own part of the Canadian Biodiversity Strategy. The latest version, in the Department's sustainable development strategy for 2001–04, has some elements of an action plan, including targets for both the Department and the agriculture sector. For example, the Department has committed to “contributing to biodiversity conservation and enhancement on the land it administers.” But

the strategy lacks other elements, such as the results expected from departmental programs.

**4.5.51 Greenhouse gas emissions.** With Canada's total emissions of greenhouse gases still growing, the federal government allocated \$4 million in 1999 for research on ways to reduce the net emissions by agriculture. The Department has worked with other stakeholders to identify a variety of reduction measures and policy options, which have been incorporated into the Government of Canada Action Plan 2000 on Climate Change. The action plan lacks targets for reducing emissions by agriculture, in regions of Canada or in Canada as a whole.

## Conclusion

**4.5.52** The federal government has not said how it will achieve sustainable agriculture in the basin. It has identified some measurable objectives for the sector, with clear deadlines, but has not said how its own activities will contribute to these objectives.

**4.5.53** Over the last decade, funding for agricultural environmental programs has dropped and the focus has changed to educating the public and supporting voluntary groups. It is not clear who is accountable for what long-term outcomes.

**4.5.54** Agriculture and Agri-Food Canada needs to improve the way it sets priorities in agricultural research, one of its prime tools. It also needs to do a better job of directing program funds to where they will do the most good.

**4.5.55** The Department could make its policies and programs more effective by coupling them—for example, linking income support programs to environmental programs.

**4.5.56** The agri-environmental indicators are an impressive synthesis of several years' work; they play a key part in managing environmental issues. The Department's ability to sustain this reporting framework is in doubt unless it finds the will, the resources, and the people to collect the information.

## Our audit objectives and main findings

Holding the federal government to account		
<b>1</b> Has the government fulfilled its commitments?	<b>Commitments</b>	<b>Results</b>
	Sustain the resource base for agriculture.	Agriculture is currently not environmentally sustainable in the basin.
	Prepare a risk reduction strategy for pesticides.	The government has not prepared this strategy.
	Target program resources using quantitative information.	It has not targeted resources.
	Develop agri-environmental indicators.	It has developed indicators, but not included pesticides.



## Our audit objectives and main findings

Assessing the government's performance		
<p><b>2</b> Has the government applied good management practices?</p>	<p><b>Strengths</b></p>	<p><b>Weaknesses</b></p>
	<p>Agriculture and Agri-Food Canada has set measurable targets for the agriculture sector.</p> <p>It has developed agri-environmental indicators—an important start.</p>	<p>The government has not set departmental targets for environmental impacts.</p> <p>It has not linked priorities to areas where it can do the greatest good.</p> <p>Its major tools are not enough to remedy some impacts.</p> <p>It has not taken the opportunity to link income support and environmental programs.</p>
<p><b>3</b> Has the government established good governance structures?</p>	<p>The government has credible information on overall trends.</p> <p>It has made agriculture a part of major ecosystem initiatives.</p>	<p>The government has poor information on program results.</p> <p>The links among departments are weak.</p> <p>It needs to clarify roles between federal and provincial governments.</p>

