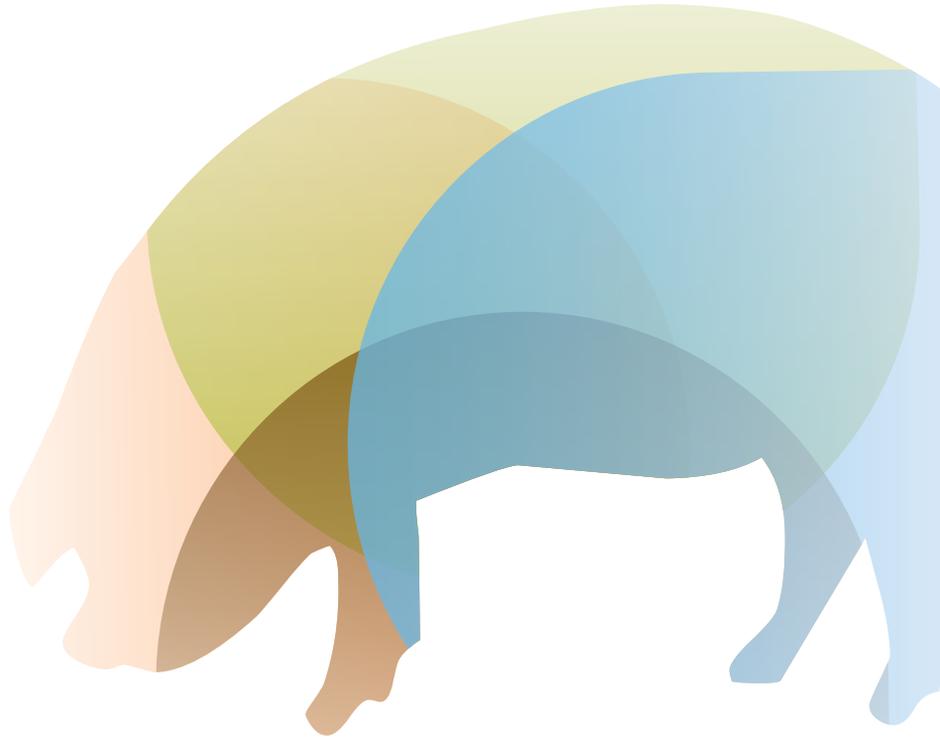


INDICATORS OF SUSTAINABLE DEVELOPMENT  
FOR THE PORK INDUSTRY IN QUEBEC





## SUSTAINABLE DEVELOPMENT

Sustainable development (SD) is a concept increasingly in use by all kinds of organizations. The ultimate goal of this approach is to meet the needs of present-day society while protecting the quality of life and well-being of future generations.

Sustainable development depends on a long-term vision that recognizes the interdependency of the environmental, economic and social dimensions of development.

The approach of the Fédération des producteurs de porcs du Québec (FPPQ) is based on the conviction that our action plan must reconsider three equally crucial priorities:

1. **Maintain the integrity of the environment** in order to guarantee health and safety in human communities and protect life-sustaining ecosystems.
2. **Ensure fairness in society**, in order to guarantee self-fulfillment for all, support thriving communities and respect biodiversity.
3. **Make economic efficiency our goal** in order to create an innovative and prosperous – yet ecologically and socially responsible – economy.

## THE FPPQ APPROACH

Many sectors of the Quebec economy have been attempting for some years to convert to sustainable development principles. Given this context, the FPPQ has established a series of measures to help our sector evolve in the direction of practices that incorporate SD principles. The hog marketing plan now in place, the agro-environmental plan for the pork industry adopted in 1997 and our participation in public hearings on the Quebec Sustainable Development Plan are just a few examples of activities designed to meet this goal.

The *Fédération des producteurs de porcs du Québec* is now investigating the performance of Quebec's pork industry in terms of sustainable development. The FPPQ has begun a process of developing SD indicators for the pork industry in order to provide the hog farming sector with a tool to monitor its environmental, social and economic performance. These SD indicators are effective communications and management tools that have become indispensable for strategic planning and adaptation to change. They simplify the process of measurement and evaluation of progress in a specific field.

In order to support and work with the pork production sector in determining which sustainable development indicators best apply to Quebec's pork industry, an exercise was conducted in several stages, as follows:

- **Preliminary stage:** A list of sustainable indicators was compiled for the farming and forest sectors (review of literature on relevant SD indicators conducted by *Transfert Environnement* consultants in August 2008).
- **A representative technical committee was created**, including (among others) the *Regroupement des organismes de bassins versants du Québec (ROBVQ)*, *Fédération Québécoise des Municipalités (FQM)*, *La Coop fédérée*, *ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ)*, *ministère du Développement durable, de l'Environnement et des Parcs (MDDEP)*, *ministère des Affaires municipales, des Régions et de l'Occupation du territoire (MAMROT)*, *La Financière agricole du Québec (FADQ)*, *Institut de recherche et de développement en agroenvironnement (IRDA)*, *Union des producteurs agricoles (UPA)*, *Centre de développement du porc du Québec inc. (CDPQ)*, *firme BPR*, *Association des détaillants en alimentation du Québec (ADAQ)* and FPPQ representatives.
- **Training sessions on the theme of sustainable development were held.**
- **A workshop was held to establish key points in the SD indicator selection process** (report on applicable indicators workshop by *Transfert Environnement* consultants in October 2008).
- **Another workshop was held to identify and select the key indicators** (report on applicable indicators workshop by *Transfert Environnement* consultants in October 2008).

As a result of these activities, the FPPQ developed a list of 13 SD indicators that apply to the Quebec pork industry. Of these indicators, three are environmental, three are social and seven are economic. For example, one of the selected indicators for the environmental sector is greenhouse gas and ammonia emissions. For the social sector, one of the selected indicators is the extent of social involvement of pork producers in their communities. And one of the selected economic indicators is the change in average net agricultural income of pork producers.

To track this initiative, the FPPQ prepared a fact sheet for each selected indicator, describing the key facts, issue at stake, method of calculation and corresponding results. These indicators will make it possible to measure the progress and performance of pork producer operations in terms of sustainable development.

## SOCIAL INDICATORS

Proper animal care practices based on **Animal Care Assessment (ACA)** standards (compliance with the AAFC *Recommended code of practice for the care and handling of farm animals*)

### The issue

Animal care is just as important to pork producers as it is to the general public. Consumers today want to know about how farm animals are treated and the conditions they live in. Various pressure groups as well, many quite active and publicly visible, claim to defend the rights of animals.

This situation has led pork producers to obtain third-party animal care certification.

### Indicator and method of calculation

Number of hog operations participating in **Animal Care Assessment (ACA™)** program and certified by qualified auditors.

### Results

The following table shows the number of producers audited and certified under the **ACA program**. Use of this audit program and procedures on hog farms began in 2005.

Year	Number ACA certified Hog Operations
2009	26

## The pork industry and public perception

### The issue

Quebec's pork producers are frequently criticized on environmental grounds, including odour emissions. Pork producers do in fact take definite measures to protect water, air and soil. In 1997, for example, they voluntarily adopted an agro-environmental management plan.

Over the past few years, the FPPQ has organized many public relations activities to help spread awareness and publicize pork producer activities on this front. We must continue this work with pressure groups, governments and rural and urban communities.

### Indicator and method of calculation

The key indicator will be an improvement in the perception of the pork industry among our targeted public groups. This improvement will be measured by means of an opinion poll conducted every two years. Having identical polls targeting the same public allows the pork industry to measure how perceptions have improved.

The overall tone of media coverage is also a helpful tool in gauging public attitudes.

### Results

After a "good neighbours" campaign in 2007 and 2008 promoting the pork industry as a profession, surveys of the general public were conducted – once in 2007 with 401 residents in rural areas, and again in 2008, using the same survey, with 1129 residents in urban areas.

The majority of those surveyed – 80% of residents in rural and 78% in urban areas – said they felt "very" or "somewhat" favourable toward pork producers. In rural areas, it was primarily odours that made residents feel unfavourable toward pork producers. Of those in urban areas, on the other hand, who felt unfavourable toward pork producers, the majority felt that hog operations generated "too much pollution".

In 2007, 59% those surveyed said that pork producers were sensitive to the environmental concerns of people in Quebec, compared to 48% in 2008.

## Social involvement of pork producers in their communities

### The issue

Pork producers are often involved in their communities as a matter of course. Some are local councillors, or even mayors, in their municipalities. Others may participate in community organizations or sit on school boards.

Social involvement also means resolving the various conflicts of coexistence. In a number of regions, pork producers have come together to find ways of solving the problem of odours generated by hog production. Some of these efforts have been true success stories.

Pork producers are also involved in their communities through the *Fondation Tirelire* – the FPPQ “piggy bank” fund to help the hungry.

Activities like these help pork producers earn the gratitude of their fellow citizens and residents.

### Indicators and methods of calculation

The primary indicators concern increases in the numbers of pork producers directly involved in their communities, and the nature of their involvement. A survey of pork producers was chosen as the tool for measurement.

Annual increases in the number of coexistence conflicts resolved and positive outcomes resulting from public consultations are also social indicators of sustainable development.

The value of the donations which the *Fondation Tirelire* makes in the community and the number of articles published about this organization also help us measure the social involvement of pork producers.

Amounts raised as a result of fundraising activities by the foundation and the number of volunteers involved are also indicators.

It is also crucial to measure public awareness of the social involvement of pork producers.

## Results

**Table 1.** Public consultation process – Hog operations

Year	Number	Number of operations	Number of operations without conditions imposed for approval	Highly controversial operations
2005	15	10	3	4
2006	40	20	11	1
2007	20	5	4	0
2008	7	0	0	0

Source: Université Laval (M-A Bertrand, MAPAQ 2009)

**Table 2.** Sustainable development indicators – *Fondation Tirelire*

Year	Fundraising activities (\$)	Number of volunteers involved	Donations to the community (\$)	Press coverage (Number of articles)
2008	16,000	10	154,000	84
2009	57,586	35	298,388	127

# ECONOMIC INDICATORS

## Change in added value

### The issue

In recent years, pork production has improved thanks to differentiated products creating added value in the sector. Under the new hog marketing agreement in Quebec, the production of differentiated products was made feasible by developing “specific hogs.” A specific hog means an animal raised by methods that lead to a specific differentiation from animals raised in the regular way. The innovative character of this differentiation helps create higher demand for the hogs while creating added value.

### Indicator and method of calculation

This indicator measures changes in total premiums paid to producers for the production of specific hogs. Another indicator is the ratio of the number of specific hogs raised to the total number of hogs slaughtered in Quebec. This calculation is based on data supplied by the FPPQ marketing department.

### Results

The following table shows the changes in the total premiums paid to pork producers for the production of specific hogs.

Type of specific premium	2007	2008	2009
<b>Total premiums paid</b>	<b>\$1,575,393.34</b>	<b>\$3,621,539.30</b>	<b>\$5,154,702.22</b>
Total number of specific hogs produced	239,922	461,336	708,009
Total number of hogs slaughtered	7,320,788	7,813,926	7,710,349
Total number of specific hogs over total number of hogs slaughtered (%)	3.3%	5.9%	9.2%

Source: Hog sales & Logistics Service, Fédération des producteurs de porcs du Québec

## Change in net agricultural income (before depreciation)

### The issue

In recent years, several events have influenced changes in net income in Quebec's pork industry. These include an outbreak of porcine circovirus disease, increases in the cost of feed and fluctuations in the exchange rate.

### Indicator

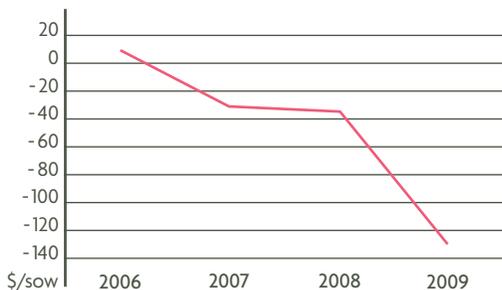
This indicator shows changes in net income (before depreciation) of hog operations that took part in the FPPQ annual Production Cost Study from 2006 to 2009. In 2009, 124 pork producers in various regions across Quebec participated in this study.

### Method of calculation

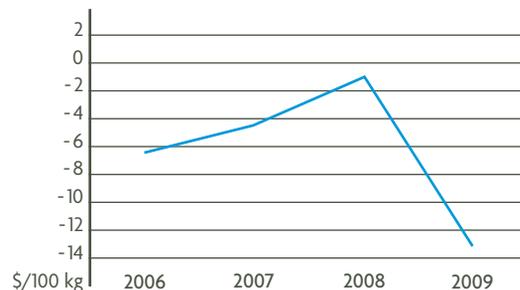
In calculating net income, a hog operation's income and expenses were applied to the year in which they actually occurred. Depreciation and repayment of capital were not included in the calculation. Changes in livestock inventories and harvests were rebalanced at their year end market value.

### Results

**Graph 1.** Changes in net income –  
Breeder operations



**Graph 2.** Changes in net income –  
Finisher operations



Source: FPPQ – Production Cost Study

## Pork consumption

### The issue

Pork, in all its forms, is the primary meat consumed in France, Europe and most other parts of the world. In Quebec, in 2008, pork consumption ranked third after chicken and beef. We can see exciting potential for increasing pork consumption in Quebec in line with trends elsewhere in the world.

### Indicator and method of calculation

This indicator represents changes in pork consumption per capita in Quebec from 2005 to 2008. Also shown is the ratio of pork consumption to total meat consumption.

### Results

**Table 1.** Meat consumption trends in Quebec

		2005	2006	2007	2008	2005-2008 (%)
Pork consumption per person	kg	23.03	23.43	24.83	23.51	2.1%
Total meat consumption per person	kg	91.72	92.05	94.28	91.92	0.2%
Total pork consumption over total meat consumption (%)	%	25.1	25.5	26.3	25.6	—

Sources: Institut de la statistique du Québec and Statistics Canada.

## Change in equity ratio

### The issue

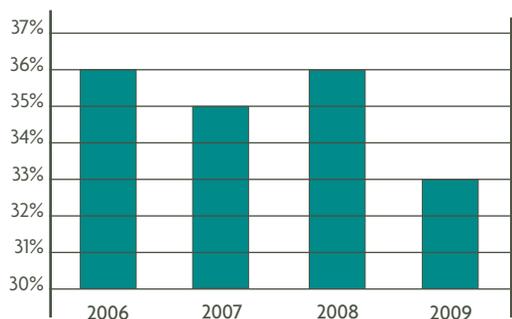
In agriculture, the high cost of the assets needed in order to begin production has an impact on the net worth of agricultural operations. The pork industry is no exception to this reality. The net worth of hog operations changes over time, depending on financial results, and is measured in terms of the equity ratio.

### Indicator and method of calculation

The chosen indicator is equity ratio of pork operations. This indicator is calculated using financial results from the annual FPPQ Production Cost Study. For every hog operation participating in the study, the equity ratio is obtained by dividing the net worth of the owners by the total debt. The indicator corresponds to the average of the equity ratios.

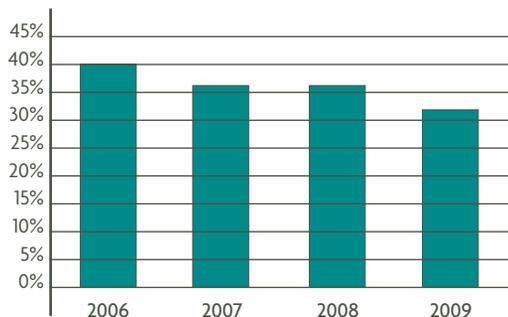
### Results

**Graph 1.** Trend in the equity ratio for breeder operations



Source: FPPQ Production Cost Study

**Graph 2.** Trend in the equity ratio for finisher operations



Source: FPPQ Production Cost Study

## Proportion of market-derived income

### The issue

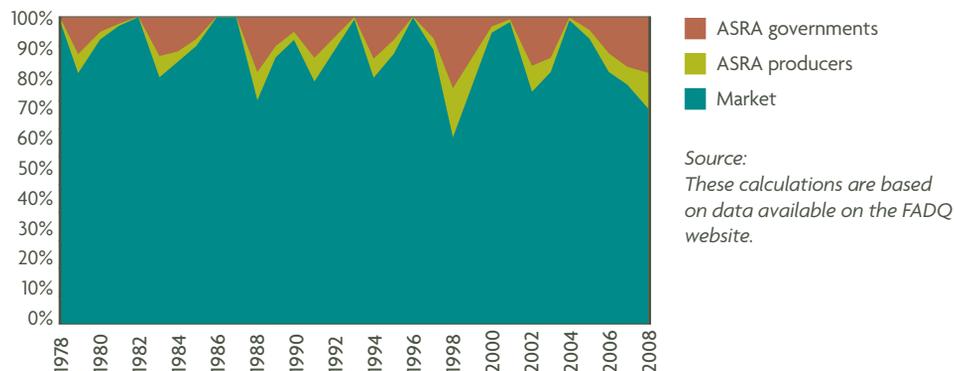
The market price of pork is impacted by numerous factors the producer has no control over. To moderate fluctuations in the market price, the Quebec pork industry is supported by the *Programme d'assurance stabilisation du revenu agricole* (ASRA) administered by *La Financière agricole du Québec* (FADQ). This farm income stabilization insurance plan is funded by the government (2/3) and contributions from pork producers (1/3).

### Indicator and method of calculation

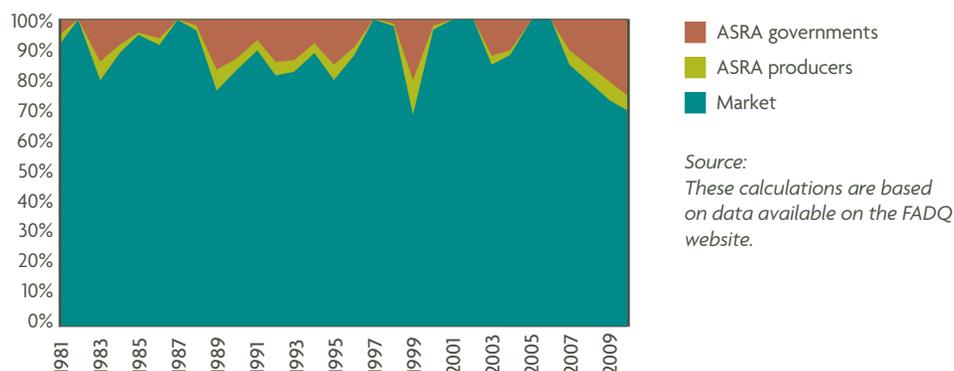
This indicator shows the ratio of annual income derived from the market to income funded by the ASRA program. The results demonstrate that one part of ASRA compensation is paid by the government and the other part is paid by pork producers through their contributions to the program.

### Results

**Graph 1.** Change in market-derived income for breeder operations



**Graph 2.** Change in market-derived income for finisher operations



## Economic activity generated by pork production in Quebec

### The issue

Pork production plays an important role in the Quebec economy. Upstream from production, suppliers of goods and services generate substantial economic activity. Most of the hogs produced in Quebec are slaughtered in the province, leading to added economic activity downstream from production. The pork industry creates jobs and generates direct and indirect benefits as well as taxes to various levels of government.

### Indicator

The economic spinoffs indicator for the pork industry measures economic impact on other businesses (spending generated) and resulting in government revenues as well as personal income taxes. Economic spinoffs are measured in terms of parameters such as employment, sales and income taxes, value added, and contributions to government agencies and programs (CSST, FSS, RRQ).

### Method of calculation

Economic activity is calculated on the basis of an intersectoral model for calculating benefits generated by an increase or a decline of spending in the economy. Direct and indirect economic activity were estimated using intersectoral model simulations developed by the *Institut de la statistique du Québec* (ISQ). They were then recomputed using the Dynatec 2008 model created by EcoTec Consultants. This model is based on input-output tables complemented by econometric modules.

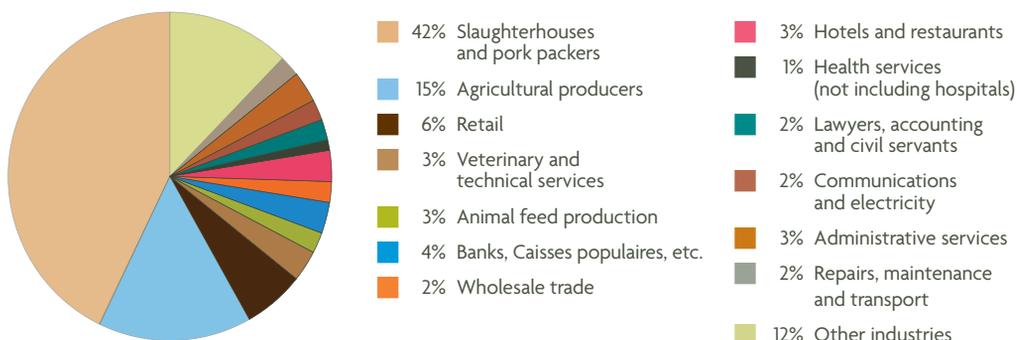
### Results

- Total direct and indirect employment in the industry is estimated at 23,758 jobs
- Total economic activity generated by the pork industry is \$1.5 billion
- Estimated provincial income and sales tax is \$123.3 million. Including related contributions to other provincial agencies, total estimated revenue to government is \$251.3 million.
- Benefits at the municipal level are estimated at \$19.1 million.

**Table 1.** Total economic activity generated by the pork industry

	2008
Hogs sold at market annually (millions)	7.8
Farm income (\$ million)	995.6
Export industry (\$ million)	1,161
Total direct and indirect jobs	23,758
Total economic activity (\$ billion)	1.5

**Graph 1. Type of direct and indirect jobs in the pork industry (percentage), 2007**



Sources: • Institut de la statistique du Québec and EcoTec Consultants  
• ÉcoRessource Consultant, December 2008

**Table 2. Government revenues generated by the pork industry in Quebec in 2007 (\$ million)**

Revenue	Provincial government	Municipality	Federal government	Total
Taxable income	57.0	–	44.3	101.3
Sales tax	66.3	19.1	117.2	202.6
<b>Total</b>	<b>123.3</b>	<b>19.1</b>	<b>161.5</b>	<b>303.9</b>
Government agencies (RRQ, CSST, FSS)	128.0	–	23.0	151.0
<b>Total</b>	<b>251.3</b>	<b>19.1</b>	<b>184.5</b>	<b>454.9</b>

Sources: • Institut de la statistique du Québec and EcoTec Consultants  
• ÉcoRessource Consultant, December 2008

## Changes in research and development allocations

### The issue

The pork industry has always kept pace with the latest technologies and production techniques, and as a result pork producers have often been among the leaders in agricultural innovation in Quebec. The FPPQ assumes responsibility for research and development, and has a specific budget allocation for this purpose.

### Indicator and method of calculation

The chosen indicator here corresponds to the total amount invested by pork producers in research and development. Calculation of the indicator is based on data from the FPPQ marketing department. Deductions for research and development are respectively \$0.33 per hog and \$0.84 per sow. The total contribution is obtained by multiplying the numbers of hogs sold at market and culled sows by the appropriate rate for each category.

### Results

The following table shows contributions levied for research and development:

Year	Deduction per hog	Number of hogs sold	Deduction per sow	Number of sows culled	Total deduction
2000	\$0.03	6,760,554	\$0.84	147,438	\$346,946.20
2001	\$0.03	6,956,379	\$0.84	151,922	\$357,174.99
2002	\$0.03	7,282,217	\$0.84	138,609	\$356,744.72
2003	\$0.03	7,440,599	\$0.84	147,299	\$369,270.93
2004	\$0.03	7,610,306	\$0.84	146,031	\$373,806.14
2005	\$0.03	7,315,246	\$0.84	161,767	\$377,287.40
2006	\$0.03	7,122,422	\$0.84	178,735	\$385,177.33
2007	\$0.03	7,326,322	\$0.84	186,290	\$398,252.23
2008	\$0.03	7,829,487	\$0.84	120,399	\$359,508.23
2009	\$0.03	7,789,859	\$0.84	127,956	\$364,548.39
<b>Total</b>	–	<b>73,433,391</b>	–	<b>1,506,446</b>	<b>\$3,688,716.54</b>

# ENVIRONMENTAL INDICATORS

## Recognition of best agro-environmental management practices and Canadian Quality Assurance (CQA®) program for the pork industry

### The issue

The social acceptability of the pork industry remains a challenge for producers. Development and the implementation of an environmental specification program is an interesting tool to demonstrate social and environmental responsibility of pork producers to citizens, consumers and government departments concerned about agriculture, sustainable development and urban and rural planning.

The FPPQ, in association with our industry partners, has developed an environmental specification consisting of 13 requirements in this context. Practices covered by the specifications include the agro-environmental management of manure and ongoing provisions for viable coexistence. Gestion Qualiterra will conduct audit procedures on hog farms to ensure compliance with the FPPQ environmental specification.

In Canada, as in other countries, pork producers, packers, retailers and consumers all have a very real concern for food safety. Effective food systems around the world today are turning to the Hazard Analysis Critical Control Point (HACCP) model to provide controls. The CQA® program is a system based on HACCP, with special emphasis on farm procedures.

### Indicator

The first selected indicator will be the number of pork producers audited by Gestion Qualiterra and found compliant with the FPPQ environmental specification. The second indicator will be the number of hog operations in Quebec registered and certified under the CQA® program.

### Results

Table 1 shows the number of pork producers we anticipate will be audited on their farms by Gestion Qualiterra. This audit of farm procedures as part of the environmental specification program began in 2010.

**Table 1.** Anticipated number of pork producers to be audited by Gestion Qualiterra

Year	Anticipated number of pork producers to be audited by Gestion Qualiterra
2010	30

Table 2 shows the numbers of registered and certified hog operations under the CQA® program.

**Table 2.** Number of pork operations registered and certified by the CQA® program

Year	Registered operation	Certified operation
2010	2,766	2,736

## Changes in phosphorus discharge

### The issue

In a sustainable development context, striking a fair balance between agricultural development, social acceptability and protection of the environment is almost certainly the best way to protect resources, such as water and soil. One of the aims of on agriculture operations (RAO) adopted by Quebec in 2002 is to arrive at a more effective balance between the use of fertilizers and the needs of plants, while promoting lower levels of pollution caused by the introduction of these substances into the environment. Central to this approach is a rigorous management of phosphorus relative to each livestock operation.

Accordingly, all on-site practices bearing on the conversion, composition and consumption of animal feeds will have an impact on the amounts of nitrogen and phosphorus discharged.

### Indicator

The key indicators for estimating phosphorus discharges from hog production in Quebec are the amounts of:

1. Consumed phosphorus (kg P/head)
2. Retained phosphorus (kg P/head)
3. Discharged phosphorus (kg P/head)

### Method of calculation

A survey of feed mills in Quebec made it possible to collect information on total phosphorus levels in animal feed formulas, as well as the amounts of feed consumed by piglets, hogs and sows, in order to calculate phosphorus discharges into manure.

### Results

Innovative feeding strategies were implemented in sow barn, farrowing houses, nurseries and finisher barns by adding phytase enzyme to the diet, installing wet-feed hoppers and water-saving drinking bowls, and by decreasing the quantity of feed consumed by animals, allowed producers to reduce the level of phosphorus (P) discharged by hogs by 24% to 40%, depending on the categories of swine.

**Table 1.** Changes in feeding strategies and discharge of phosphorus by category of hog

Factor	Sow barn		Nursery		Finisher operations	
	1998	2009	1998 (4.5 to 30 kg)	2009 (5.2 to 25.7 kg)	1998 (30 to 107 kg)	2009 (25.8 to 116 kg)
P (kg/head) consumed	8.53	6.78	0.28	0.175	1.45	1.082
P (kg/head) retained	0.44	0.67	0.18	0.109	0.46	0.478
P (kg/head) discharged	8.09	6.11	0.10	0.066	0.99	0.604

## Greenhouse gas (GHG) and ammonia emissions

### The issue

In June 2006, Quebec made fighting climate change one of its governmental priorities. This sustainable development approach aimed at greenhouse gas reduction by adopting, on the eve of the Copenhagen Conference in 2008, a new target of a 20% reduction in GHG emissions from 1990 levels by 2020.

Although the hog operations sector does not represent a major source of GHG emissions, there is sometimes a link between these emissions, odours and the efficiency of hog farm feed operations. So it is necessary for the pork industry to promote sound agricultural practices to help reduce these emissions.

### Indicator

The key indicators for estimating greenhouse gas emissions from hog operations in Quebec (expressed in metric tonne carbon dioxide equivalents or MtCO<sub>2</sub>e) are:

1. **Methane (CH<sub>4</sub>) emissions** from manure management (manure storage under anaerobic conditions)
2. **Indirect emissions of nitrous oxide (N<sub>2</sub>O)** from manure management (free ammonia from volatilization of nitrogen in nursery buildings and manure storage structure).
3. **Direct and indirect nitrous oxide (N<sub>2</sub>O)** emissions, depending on the method of soil management on farmland.

### Method of calculation

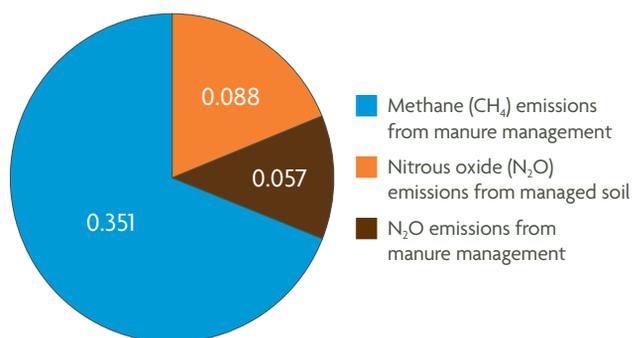
The inventory of greenhouse gas emissions (GHG) produced by the pork industry in Quebec follows the guidelines of the Intergovernmental Panel on Climate Change (IPCC), an organization established under the UN Environment Programme and the World Meteorological Organization (WMO), which among other things oversees the National Greenhouse Gas Inventories Programme. The methodology and equations used in our calculations are from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

### Results

Ammonia emissions from volatilization in barns were 11,722 Mt of nitrogen and 2,540 Mt of nitrogen after manure application on land for a total of 14,262 Mt of ammonia nitrogen.

The most recent survey estimated total GHG emissions 0.496 MtCO<sub>2</sub>e for the pork industry in Quebec.

**Fig 1.**  
Total GHG emissions (MtCO<sub>2</sub>e)  
by category of sources





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