

# Greenhouse Gas Mitigation Program

## FREQUENTLY ASKED QUESTIONS

### Q. What is the Greenhouse Gas Mitigation Program?

**A.** In April 2002, Agriculture and Agri-Food Canada announced funding for the Greenhouse Gas Mitigation Program for Canadian Agriculture under the Climate Change Action Fund 2000. The program aims to increase awareness within the

agricultural sector about the science of greenhouse gases (GHG), where they are produced on the farm, and how their production can be minimized. A network of demonstration farms has been established, allowing producers to witness, first-hand, the GHG reduction

options available to them. As well, information about the program, and the Beneficial Management Practices (BMP) being promoted, is being highlighted in numerous agricultural-industry publications across Canada.



### fact sheet

### Q. What are Greenhouse Gases?

**A.** There are three greenhouse gases (GHG) that are of particular importance to the agricultural sector, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Carbon dioxide is produced when fossil fuels are used to produce power or heat, or when intensive tillage is practiced, breaking down soil organic matter. Methane is produced from liquid manure storages when bacteria, working in an environment free of oxygen, decompose manure carbon into methane gas. Nitrous oxide is the most powerful agricultural GHG and is produced when soil containing nitrate nitrogen, becomes saturated with water. Certain anaerobic bacteria will use nitrate instead of oxygen for respiration under these conditions and produce nitrous oxide in the process.

### Q. Are the three agricultural GHG gases different?

**A.** Certainly, the strength of each GHG is measured in carbon dioxide equivalents (CO<sub>2</sub>e).

One molecule of methane will trap as much heat energy in the atmosphere as 21 carbon dioxide molecules, thus producing 21 CO<sub>2</sub> equivalents. Nitrous oxide will trap 310 times as much heat as CO<sub>2</sub>, making N<sub>2</sub>O the most potent of the three agricultural greenhouse gases.

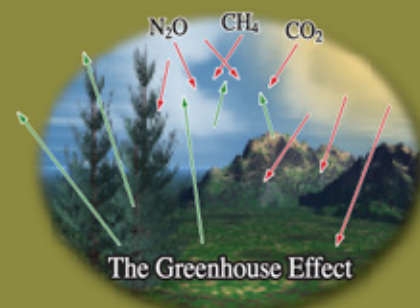
Greenhouse Gas	GWP* Relative to Carbon Dioxide (CO <sub>2</sub> e)
Carbon Dioxide	1
Methane	21
Nitrous Oxide	310

\*Global Warming Potential

### Q. Why is greenhouse gas production a problem?

**A.** The earth's atmosphere regulates the temperature of the earth by trapping a portion of the sun's heat energy as it is reflected off the earth's surface. Greenhouse gases, after being released into the atmosphere, cause more of the sun's heat energy to become

trapped in the atmosphere and can result in an increase in the earth's atmospheric temperature. This is known as the "Greenhouse Effect".



### Q. Won't greater atmospheric temperatures help me achieve higher crop yields?

**A.** Not necessarily. Along with higher overall atmospheric temperatures, climate scientists predict that weather patterns may change and that the frequency of "abnormal" weather events may increase. This may mean more extreme wet or dry years, with fewer "normal" years, which allow for consistent crop production.

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### Q. As a hog producer, why should I make efforts to reduce GHG production on the farm?

**A.** Greenhouse gases are produced when carbon and nitrogen become “misplaced” on the farm. Hog farmers use carbon (C) as energy, and nitrogen (N) as protein to produce high quality meat products. However, not all feed protein and energy can be used by growing animals, and some of the feed carbon and nitrogen will pass through the hog digestive system and become part of the manure stream. Minimizing the bypass of feed nutrients into the manure pit will decrease the costs associated with growing hogs and reduce the potential for producing GHG on your operation.

### CONSIDER THIS...

If reducing GHG can increase efficiency and gains in efficiency increase profitability, then a reduction in GHG emissions will increase profitability...

### Q. How can I reduce greenhouse gas production on my hog operation?

#### **A. FEEDING STRATEGIES**

Start by looking at your feeding system. Has your rate of average daily gain been increasing? How efficiently are you feeding your animals? Simple changes such as a switch from dry feed to wet/dry feeders can increase feed efficiency. Amino acid supplements are being used by many producers to reduce the level of feed crude protein in the diet, lowering the amount of manure nitrogen produced. Adding the phytase enzyme to rations has also been shown to increase feeding efficiency, as well as reduce manure phosphorus output.

#### **A. MANURE STORAGE MANAGEMENT**

Frequent removal of manure from hog facilities can help keep manure methane production to a minimum. Manure stored in the barn will tend to be warmer than manure stored outdoors, and will produce more methane. Manure storage covers have the potential to offer a host of on-farm benefits, in addition to GHG

management. Covers can trap manure gases such as methane, hydrogen sulphide and ammonia and keep them within the manure liquid, instead of escaping to the atmosphere. Covers are also highly effective in reducing manure odour production.

#### **A. MANURE NITROGEN MANAGEMENT**

Production of nitrous oxide accounts for a significant part of Canada’s agricultural emissions, being the most powerful of the three greenhouse gases pertinent to the hog industry. The key to avoiding N<sub>2</sub>O production is not to leave soil nitrate-nitrogen stranded in saturated soils. Applying manure before seeding or after crop emergence will avoid the presence of soil nitrate during wet spring thaw conditions. Applying manure nutrients to match crop requirements and avoiding excess soil nitrate after harvest will also help to minimize N<sub>2</sub>O emissions. The added benefit of increasing nutrient use efficiency with in-crop manure applications will also help to reduce your commercial fertilizer bill.

#### **A. MANURE TREATMENT TECHNOLOGIES**

Anaerobic digestion is a process where manure is mixed and heated in a vessel free of oxygen, the process encourages the production of methane which is then used to produce heat and electricity. Diesel engines are capable of running on methane gas, with a few minor modifications. Linking a modified engine with a generator can turn your manure storage into your own on-farm power plant. Significant engine heat is produced during power generation and can be used to heat hog barns, dry grain, heat houses or other farm buildings. GHG production on the farm is lessened and manure odours are reduced significantly during anaerobic manure treatment.

### Q. What is in store for Canadian pork producers and greenhouse gases?

**A.** Producing high quality crops and livestock is something Canadian farmers have done for decades. Along the way they have consistently learned how to use carbon and nitrogen more efficiently. Greenhouse gas production is linked to this efficiency, as is farm profitability. If a farmer can reduce GHG production by being more efficient in how carbon and nitrogen are used on the farm, the farm’s bottom line will increase as well.



## CONTACT US

For more information on the Canadian Pork Council Greenhouse Gas Mitigation Program visit us online at [www.cpc-ccp.com/envir/GHGMP.htm](http://www.cpc-ccp.com/envir/GHGMP.htm)

or contact Cedric MacLeod at:

**Canadian Pork Council**  
1101-75 Albert St.  
Ottawa, ON, K1P 5E7

Tel: 613.236.9239

Fax: 613.236.6658

Email: [macleod@cpc-ccp.com](mailto:macleod@cpc-ccp.com)

### Or contact your Provincial Pork Association

**British Columbia:**  
604-853-9461

**Alberta:**  
780-474-8288

**Saskatchewan:**  
306-244-7752

**Manitoba:**  
204-237-7447

**Ontario:**  
519-767-4600

**Quebec:**  
450-679-0530

**New Brunswick:**  
506-458-8051

**Prince Edward Island:**  
902-892-4201

**Nova Scotia:**  
902-895-0581