

## N<sub>2</sub>O EMISSION REDUCTIONS FROM AGRICULTURE: BENEFICIAL MANAGEMENT PRACTICES

### WHAT IS A BMP?

Beneficial management practices (BMP's) are practical and affordable activities that achieve desired goals, such as protecting and conserving on-farm resources, facilitating the reduction of GHG emissions, or encouraging carbon sequestration.

The Greenhouse Gas Mitigation Program for Canadian Agriculture (GHGMP) combines BMP's with demonstration and communication activities to introduce favourable technologies to producers.

### WHAT IS N<sub>2</sub>O?

Nitrous oxide (N<sub>2</sub>O) is a major agricultural contributor to global warming. One kilogram of N<sub>2</sub>O has an equivalent global warming potential of approximately 310 kg of carbon dioxide (CO<sub>2</sub>). Highest emissions of N<sub>2</sub>O occur in moist soil conditions through a process called denitrification.

### WHAT YOU CAN DO

Agricultural producers can reduce N<sub>2</sub>O emissions by adopting the following BMP's:

#### *Soil Nitrogen Test*

Avoid the application of N in excess of plant N requirements. The amount of nitrate (NO<sub>3</sub>) present in the soil at the time of planting or fertilizing is a good indicator of the capacity of a soil to supply N.

A spring soil N test allows producers to match nutrients with crop requirements, saving money and time (due to excessive N applications), and indirectly reducing N<sub>2</sub>O emissions and potential impacts to groundwater.



#### *Nitrogen Use Efficiency*

How well does your crop utilize available soil N? The more N used by the crop means less will remain in the soil, therefore reducing the amount that can be lost through leaching as NO<sub>3</sub>, volatilization as NH<sub>3</sub> or denitrification as N<sub>2</sub>O. Specific practices for N efficiency include:

- apply what the crop needs, when it needs it
- place N close to crop roots for easier access

- use cover crops to tie up fall N levels
- improve soil aeration (promotes drainage) and avoid excessive irrigation
- use advanced fertilizer and manure technologies (ie slow release fertilizers, nitrification inhibitors)
- practice conservation tillage

#### *Manure Management and Storage*

Proper manure management can contribute to the mitigation of N<sub>2</sub>O. Of all agricultural GHG emissions, animal manure and handling contributes approximately 60% of total Canadian agricultural N<sub>2</sub>O emissions. Excessive amounts of manure applied to crops will result in soil accumulation of N, as well as increased N<sub>2</sub>O and NH<sub>3</sub> production and losses. Specific practices to follow are:

- test manure to match nutrients to crop needs
- cover manure storage areas and manage pH by adding straw
- incorporate manure into soil as soon as possible
- avoid spreading of manure on frozen ground
- utilize feeding strategies that reduce the N content of manure
- use buffer strips to prevent high-N runoff from agricultural fields from reaching water sources



**Liquid manure being injected into a corn crop.**

### SUMMARY

These BMP's are agricultural practices that match N supply with crop needs, and integrate manure and crop residue management into crop production. The net result will be an improved economic return, combined with a reduction in N (e.g. N<sub>2</sub>O, NH<sub>3</sub>) losses ...a *win-win* situation for producers and the environment.