



Reducing GHG emissions through **CATTLE FEED MANAGEMENT**

Greenhouse gases (GHG) contribute to global warming. Agriculture, with approximately 10 per cent of the total emissions, produces less GHG than many other sectors of the economy, such as transportation and industry. However, agricultural activities still remain a significant source of GHG. Therefore, we have to explore possible ways to reduce emissions. The primary gases are carbon dioxide (CO_2), nitrous oxide (N_2O) and methane (CH_4).

Through their digestive system, cattle contribute significantly to farm emissions of CH_4 , a gas with a warming potential 21 times stronger than CO_2 . Cattle operations can participate in the reduction of GHG emissions through feed management practices, which also can result in increased herd productivity.

Fédération
des producteurs
de bovins
du Québec



CH_4 , a product of cattle gastric fermentation

Methane (CH_4) is a by-product of the fermentation of food occurring that takes place in the rumen, the first digestive compartment of ruminants. The CH_4 that is produced is released by the animal through burping or belching (55 %), respiration (25 %) and flatulence (20 %). This results in a loss of energy for the animal that is estimated at between two and twelve per cent of the energy consumed.

The animal's productivity can be improved by decreasing these energy losses. More effective management will result in a greater portion of the feed's energy going into the production of milk or meat. The reduction of CH_4 produced by ruminants represents not only a long-term environmental factor, but also a short-term economic factor for cattle operations.

Cattle have a variable capacity to effectively use feed. CH_4 emissions by ruminants are influenced by:

- The animal's performance;
- The physical condition of the animal (health, age, weight and growth rate);
- Temperature;
- Feed (type and quantity of grain).

Some farm operations are trying to increase their animals' productivity by reducing CH_4 emissions by cattle. To achieve this, ruminants must be given highly digestible feed. Cattle consuming high quality forage, or whose ration has a high cereal content, emit less CH_4 per production unit.

Increasing production effectiveness reduces the GHG emitted per kilogram of meat produced while increasing profitability. The breeding periods are shortened and more meat is produced with fewer animals in the herd.

**More productivity,
more respect for
the environment...
and less GHG!**

Photos : A. Choquette / FPBQ



Strategies to reduce cattle CH₄

Strategies that improve farm productivity!

Genetics, health and herd reproduction

- Select animals with superior genetics and more productive animals
- Improve the reproduction rate
- Decrease the incidence of disease
- Provide a wind shelter in the winter in order to reduce feed consumption and costs.

Feeding cattle and providing high digestible feed

A balanced ration meeting the nutritional needs of the animal is essential to produce meat effectively and profitably. Concentrated feed must be included in the ration in reasonable proportions from a nutritional and economic point of view for a global vision of the viability of the operation and the environment.

It is helpful to know that to emit less GHG, it is preferable...

... to choose more digestible feed:

- Legume forage
- Tender forage
- Silage
- Chopped feed, fines, in pellets, ground in flakes.
- Concentrated feed (starch)
- Ration with rapeseed oil or sunflower seeds

Rather than less digestible feed:

- Grass forage
- Mature forage
- Dry hay
- Long and whole feed
- Fibre (forage)

Feed management

- Reduce the waste and loss of feed by managing feeders and storage sheds
- Have feed analyzed and formulate a balanced ration corresponding to the needs of the life and production stage of the animals
- Provide highly digestible feed
- Provide cattle with protein or energy supplements if forage is of low quality
- Increase the quantity of concentrated feed added to the ration for the most productive animals
- Increase the fat content of the ration by adding grain or vegetable oil (non-saturated fat)
- Improve feed control in pasture to provide nutritional and highly digestible forage

Many feed additives are also being studied to verify their effects on the reduction of CH₄ emissions: fat, enzymes (ex.: phytase), yeast, bacterin and ionophores.

GHG in agriculture : facts

The contribution of agriculture to the Canadian emissions of greenhouse gas (GHG) is estimated at 10 per cent. The GHG from farm sources originate mainly from microbial activities: ruminant digestion, manure and agricultural soil. These gases include:

nitrous oxide (N₂O)
methane (CH₄) and
carbon dioxide (CO₂).

Gas	Warming potential	Agricultural contribution
CO ₂	1	<1 per cent
CH ₄	21	38 per cent
N ₂ O	310	61 per cent



To try the greenhouse gas calculator for beef farm operations, contact the *Fédération des producteurs de bovins du Québec*.
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