

Livestock and the Environment

Who Cares About the Environment?

Recycling our garbage, planting trees and cleaning up rivers and roads are all great examples of people showing they care for our environment. What about farmers? Farmers have always depended on Mother Nature. Farmers are the original environmentalists. Their land, animals, and businesses depend upon it.



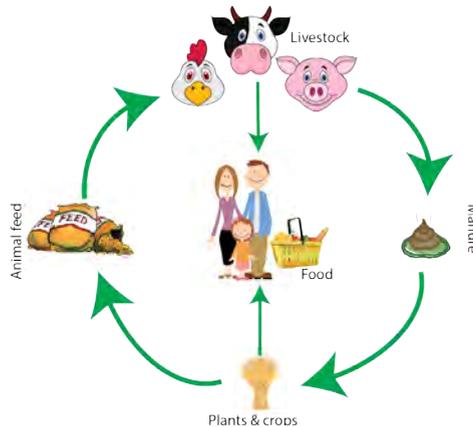
Maintaining a healthy environment is essential to the success of Alberta's agricultural producers. Many Alberta farmers have an environmental farm plan.

Plants, Animals and the Environment

All farmers depend on the environment for success. Plants need good quality soil, nutrients and the right mix of sun, rain and temperatures to grow. Plants absorb air pollutants and gases like carbon dioxide through their leaves and roots converting them into oxygen and fresh air. Animals depend on the plants for food and provide

manure to fertilize the next crop and the cycle continues. It's called the nutrient cycle. What about people? We depend on plants and animals for food and plants for fresh air too!

Figure 1. Nutrient Cycle Illustration



The Scoop on Poop

Manure is the original fertilizer. Manure helps to build up soil with organic matter which helps hold water and nutrients. Manure provides some of the nutrients which plants and many helpful soil organisms need to grow. We get our nutrients from food and plants get nutrients from the soil.

The main nutrients in manure are nitrogen (N), phosphorus (P), and potassium (K). Plants need N to be green and healthy, P for healthy roots, and K for protection from wilting, disease, cold, and dryness. The next time you see a bag of fertilizer in the store, check for three numbers (eg. 5-10-15). Those numbers stand for the amount of N,

P, and K in that fertilizer. Farmers can send manure samples to be tested in a laboratory to find out exactly what nutrients are in it.

Figure 2. Fertilizer Bag



Other uses for manure:

Some farmers put the manure into a concrete tank called a digester. It contains bacteria that digest the manure. This process produces methane gas. The methane gas is captured and then used as fuel to power electric generators to produce electricity.

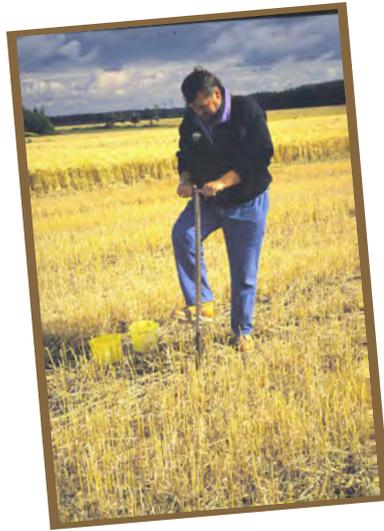
The manure that has been in the digester is separated out and the liquid portion is used to fertilize the fields. This manure has less smell.

Figure 3. Biodigester

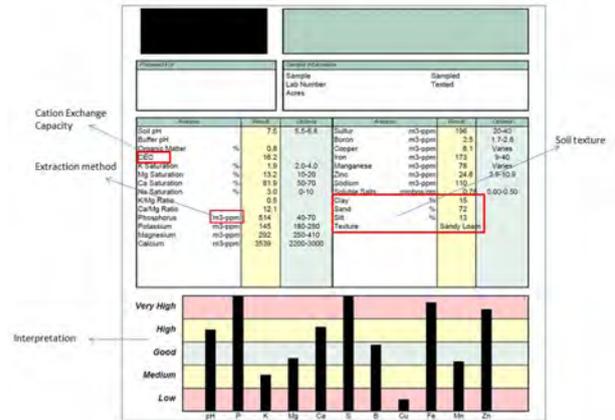


Composting manure:

Although manure can decompose on its own, composting is a method of speeding up this natural process. The breakdown of manure and bedding occurs much more rapidly in the compost pile because the environment can be made ideal for the microbes to do their work. The end result of composting is a dark, crumbly, earthy-smelling product similar to potting soil. Composting, if it is done properly, kills parasites and destroys weed seeds. Composting also reduces the odour of the manure and can decrease the size or volume of the pile by 50 per cent which reduces transportation costs for farmers. Finished compost can be used to improve soil quality or sold to serve as a mulch or growing media for plant nurseries and gardeners.



soil tests show how much N-P-K is already in the soil and how much would be needed to fertilize a certain crop. If there are not enough or too many nutrients in the soil, the plants will not grow properly.



A soil analysis shows the nutrients in the soil sample very similar to a nutrition label on a cereal box.

Nutrient Manage What?

So now that we know what nutrients are in the soil and our manure, what's next? Farmers match their manure and fertilizer nutrients with what their crops need in an environmentally friendly way. This is called nutrient management. Farmers record their information in a Manure Management Plan which includes:

- Type of manure storage and sizes
- Manure application locations, methods and dates
- Amount and type of manure applied
- Environmental risk identification
- Contingency plans (what to do if something goes wrong)



Farmers use computer programs and workbooks to record their soil, crop and manure management information.



Composting turns the manure into a dark, crumbly, earthy-smelling product similar to potting soil.

Soil Testing: An important exam!

We learn the nutrient values of our food by reading the nutrition label. Look on a cereal box to see the nutrients and calories. Farmers cannot read a label on their field but they can send a soil sample to a laboratory for a nutrient test. The

Manure Storage

There are different methods of manure storage based on the type of manure. Some barns have solid floors and use straw bedding to help absorb manure and liquids. Many barns have floors that allow the manure to fall through and into a manure storage below. Manure storages can be earthen, specially treated metal or made of concrete. Concrete storages can be built under the barn or located nearby. The size of the manure storage is built according to the number of livestock. The manure storage must be large enough to hold all the manure that the animals will produce until such time as the manure can be applied as a fertilizer.

The farmer's equation:

$$\text{The amount of manure applied} = \text{the amount of nutrients the crop requires}$$

The best time to spread manure is when the plants need nutrients the most. Farms should have enough storage to keep manure over the winter so they can spread it when it is needed and at the most environmentally friendly time.

Manure: To the Fields!

Manure can be put on the land in many ways. It can be injected into the soil, worked into the soil, or put on top of the soil. Farmers decide how to spread their manure based on their soil and land, time of the year, and the type of crop they plan to grow. Farmers try to apply the manure in a way that gets the most nutrients to the plants while keeping the smell to a minimum.

Figure 4. Manure application equipment



Use of technology:

Manure application equipment can be really advanced. Some equipment can take a satellite image grid map of a field and apply exactly the amount of manure that is needed in each section of the field. Manure equipment is always being updated with new features to make it more accurate with less smell or risk to the environment.

What's That Smell?

If beauty is in the eye of the beholder, smell must be in the nose of the sniffer! Odours are most often noticed during collection, stirring, transportation, or spreading manure on the land. Farmers spend a lot of time and money on reducing odours in many ways including keeping barns and pens clean, feeding strategies, covering manure storages, planting shelterbelts and working manure into the soil to reduce its airtime exposure.



Straw covers on manure storages help to reduce odour.

What About E.coli?

All mammals, including people, have E.coli in their manure. It's a particular strain of bacteria called E.coli 0157:H7 that can make people sick from drinking water. Researchers are looking at ways to prevent and reduce these harmful strains of bacteria.

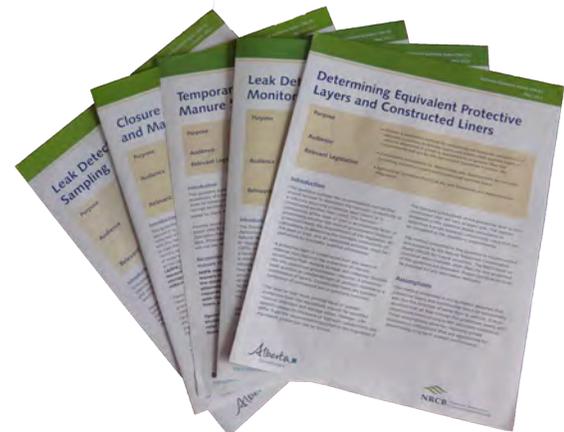
Laws

There are laws in place like the *Agricultural Operation Practices Act (AOPA)* to make sure manure does not pollute our water or cause other problems. The government has people who work to make sure the rules are understood. These *Confined Feeding Operation Extension Specialists* can be reached through the *Alberta Ag-Info Centre* at 310-3276. *Natural Resources Conservation Board (NRCB)* staff work with livestock operations to make sure farmers are following the rules. There is even a 24 hour hotline (1-866-383-6722) that people can call if they have any concerns.

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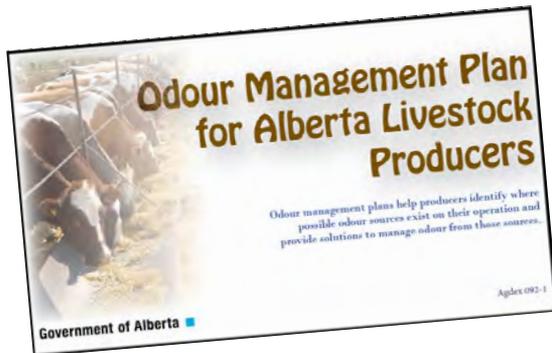
NRCB Response Line:
1.866.383.6722

Figure 5. Technical Guidelines for farmers



Beneficial Management Practices

Farming is a perfect combination of science, practical experience and common sense. There are many tools and resources available to farmers on environmental stewardship practices such as odour management plans, manure calculators, nutrient management plans, etc.



An example of a resource to assist farmers with odour management

Raising livestock is more than a full-time job for most farmers. They are building their homes, their businesses and raising their families in rural communities across Alberta. Farmers are and always have been an important part of rural communities.

Like other businesses, today's farms are larger than in the past. As farmers specialize in livestock production, they invest in technology, equipment and environmental improvements. All farms regardless of size depend on a healthy environment for success.

Farmers take their responsibility seriously and treat the land, water and air with respect. Don't forget, farmers and their families are affected directly by their own farm's

activities; they live and work on the land, breathe the air and drink the water. It is in everyone's best interest to preserve resources today and for the farmers of the future.



Farmers depend on a healthy environment for their success and for the farmers of the future.

For more information:

Alberta Agriculture and Rural Development:

Contact a Confined Feeding Operation Extension (CFO) Specialist with Alberta Agriculture and Rural Development (ARD) by calling 310.3276. They provide technical expertise to livestock producers, consultants, municipalities, and other interested parties. CFO extension services ensure Alberta's livestock industry grows in a competitively and sustainable manner.

www.agriculture.ab.ca/aopa

www.agriculture.ab.ca/manure

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Acknowledgment: The above text has been adapted from the "Dirt on Pigs and the Environment" with the permission of the Manitoba Pork Council.