

# Learning Sources



PROJECT Agriculture  
Project-Based Learning and  
Teaching Series



## Trending Now

How do trends in agriculture affect quality of life?



[www.albertamilk.com/teacher-resources/](http://www.albertamilk.com/teacher-resources/)



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Farmers and consumers are interested in many of the same topics. Both care about food safety, food quality, the environment and good jobs. These concerns are often called trends in farming and agriculture. A **trend** is a pattern of change or a movement that occurs over time.

Trends like these affect communities. Rural communities need people and farmers. Canada has lost almost 80 000 farms since 1988 and the number of young farmers has decreased.



### Farm Variety



There are almost 230 000 farms in Canada that produce materials and products. These materials and products range from grains and oilseeds to vegetables, fruits and animals.

In 2016, there were over 193 492 farms in Canada, which was down about 6 percent from 2011. In 1931, there were over 728 000 farms across Canada.

In 1931, one out of every three Canadians lived on a farm. In 2016, one out of every 50 Canadians lived on a farm. Farm families have been getting smaller. In 1971, the average size of a farm family was 4.3 people. In 2006, the average size of a farm family was 3.1.

Farmers produce more food on less land. They use less water, fertilizer and other resources to produce this food. In 1900, one farmer produced enough food for 10 people. Today, that same farmer feeds more than 120 people. The use of new technology and modern, efficient equipment is a trend that has caused these changes.

Some people believe that family farms are in danger of disappearing. Some also believe that if the population of rural communities decreases too much, these communities will not be able to provide people with the services they need.

What effect do you think the trend toward fewer farms and farmers has had on communities?



### Census of Agriculture

Every five years, the government conducts a **census**, which is a survey that gathers information about people living and working in Canada. This information is used to help the government and people make decisions.

At the same time, the government sends out the *Census of Agriculture*. This survey asks people who are involved with agriculture to answer questions about farming and food production. The last *Census of Population* and *Census of Agriculture* were conducted in 2016.

When will the next census take place?  
How do you know this?



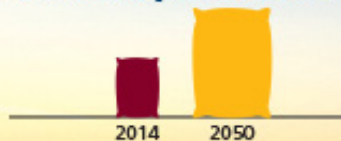


# AGRICULTURE is a Canadian success story



**98%**  
of farms are  
family farms

The world will need  
**60%**  
more food  
by 2050  
and we'll help fill that demand



The **BEEF**  
INDUSTRY  
contributes almost  
**\$25**  
billion  
to the  
Canadian economy  
annually



Minimum  
tillage  
saves over  
**170** million  
litres of  
fuel  
from being burned  
annually in Canada



**1 in 8**  
Canadian  
jobs are in  
ag and  
agri-food

Almost  
**25,000**  
farm  
operators  
are under the  
age of **35**

**#1**  
producer of  
canola  
in the  
**WORLD**

Created April 2015

  
**Agriculture**  
*more than ever*

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Agriculture More Than Ever. [www.  
agriculturemorethanevery.ca/  
resources/infographics/](http://www.agriculturemorethanevery.ca/resources/infographics/)

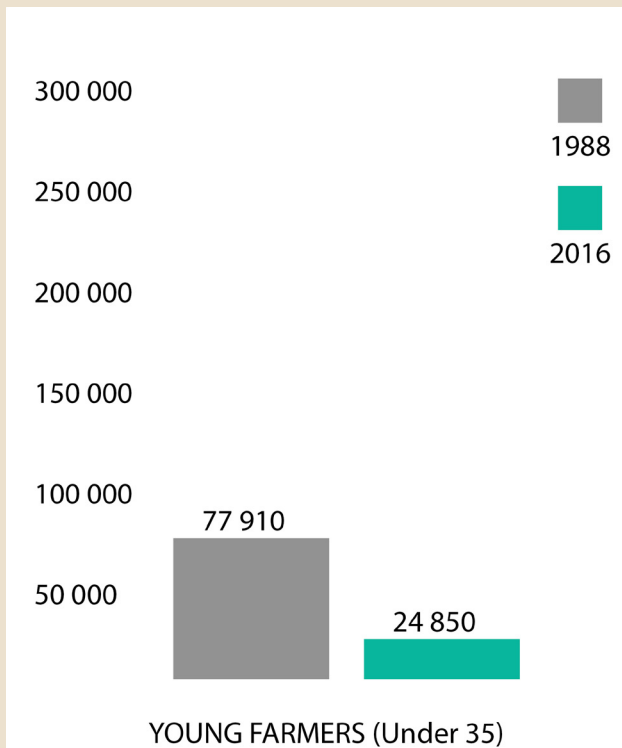
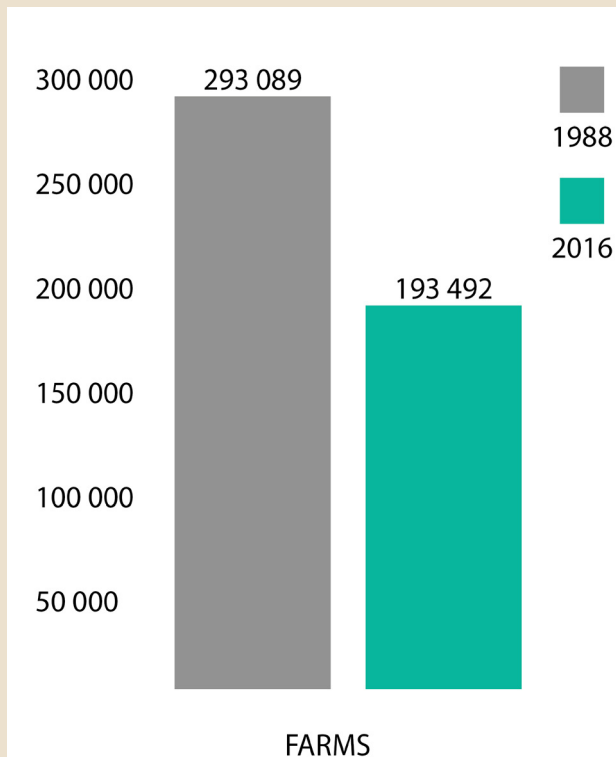
What trends can you identify in the four *Farm Number Trends* bar graphs? Find three trends.



## Farm Number Trends

These bar graphs show changes in the number of farms, the age of farmers and farm size across Canada and in Alberta. **Statistics Canada** uses acres to measure farm size. An **acre** is about three-quarters the size of a football field.

### Canada's Farms and Farmers

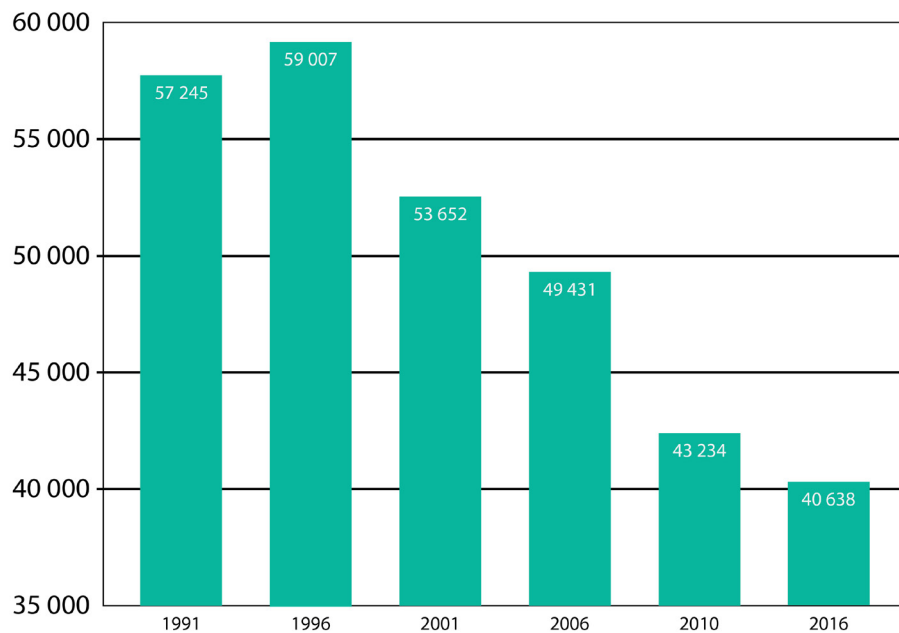




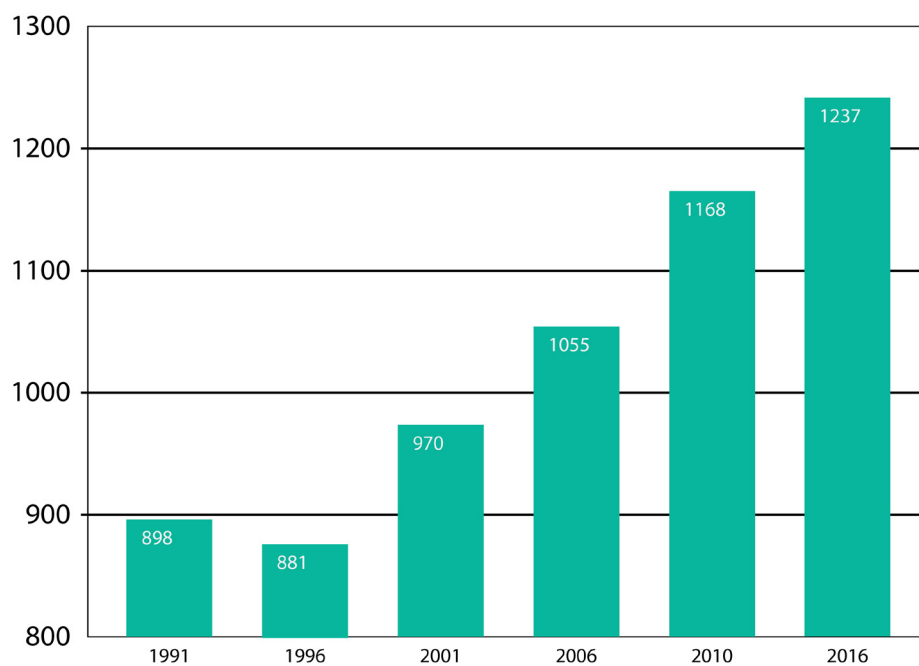


## Farm Number Trends

### Number of Farms and Average Farm Size in Alberta



NUMBER OF FARMS



AVERAGE FARM SIZE (Acres)

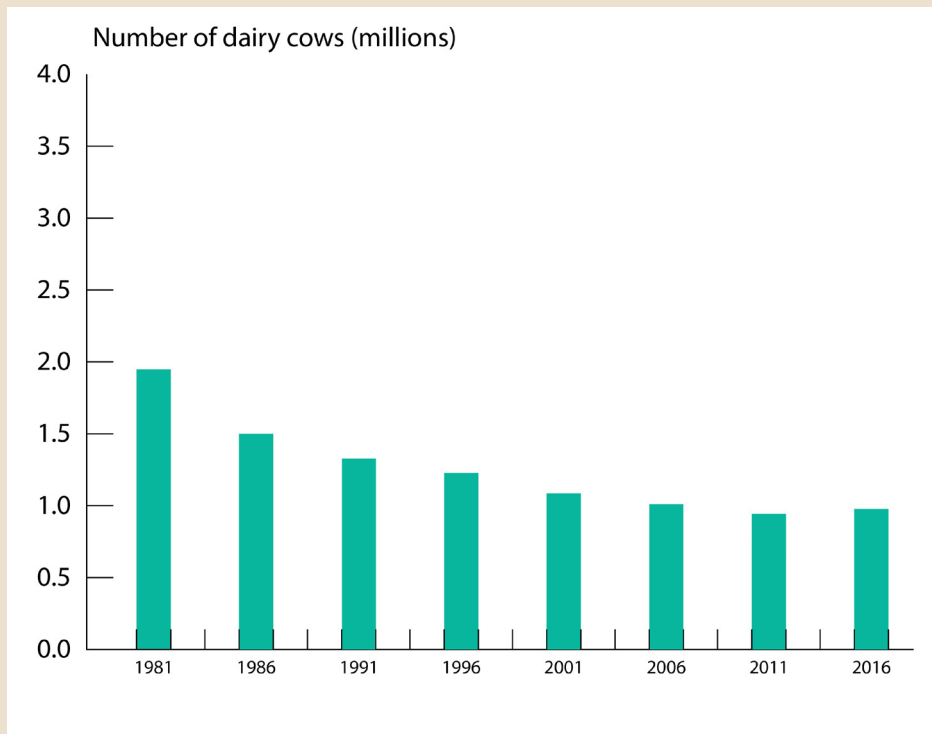
Trends in dairy farming are similar to trends in other types of farming. Farms like grain, beef, pig, sheep and canola are experiencing similar conditions.

- The total number of dairy farms has decreased over time. However, the size of the farms and the number of dairy cows on a farm has increased.
- Larger farms mean that some rural people now live further away from an urban community.
- The average age of farmers has gone up. Fewer young people are involved with farming.
- Dairy farmers have learned to use technology and better farming methods to increase their production of milk.
- Technology has allowed farmers to produce the same amount of milk with fewer cows.



### Dairy Cow Number Trends

#### Number of Dairy Cows from 1981 to 2016



This bar graph shows how the number of dairy cows found on farms across Canada has changed.



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## What about trends in technology?

Some farmers use social media such as Facebook and Twitter to provide information about how they farm. They share information on their crops and the products they produce.

Farmers also use GPS systems to map their fields and analyze the levels of nutrients and water. Smartphones make apps that help farmers manage their animals and crops.



### Technology on a Modern Farm

by Patricia Grotenhuis

So many people seem to look back at the “good old days” as the way things should be now on farms. That would, however, put an end to the tremendous growth and development we have seen recently.

Technology is everywhere on the farm. GPS technology was used in tractors and for tracking soil types on farms long before it was common in vehicles. My parents have had a home computer to do tasks related to the farm for as long as I can remember.

**Radio Frequency Identification, or RFID**, tags are used to track [animals] so that if there is a disease outbreak, [finding the diseased animals] will be simpler.

Today’s modern farms are technology-dependent. And in many ways, [technology helps] the farmers become more environmentally conscious. It is true that today’s farms are dependent on fossil fuels...it would not be possible to feed as many people as we do otherwise. Farmers are trying to cut back on that reliance, though.

It is not just the farmers who have benefited from advancements on the farm. Consumers can now enjoy products year-round that used to be seasonal, such as eggs.

The environment has benefited from farmers using new equipment and technology. Animals on the farm have benefited from larger stalls, improved handling systems and technologies, like alarm systems, that alert the farmers when the power goes off.

There will always be a **nostalgia** [a good feeling when the past is remembered] associated with the farms of the past. When looking at the farms of today, though, we should take notice of the large advancements we have made in caring for the land and animals, and be proud of those changes. Just think of what the next generation or two of farmers can accomplish!

From Let’s Talk Farm Animals website. [www.realdirtblog.ca/technology-on-the-modern-farm/](http://www.realdirtblog.ca/technology-on-the-modern-farm/)



## Farm Drones



Some types of technology help keep track of the weather. Other technologies are used to help with practices like making sure crops are planted in straight rows and that animals are fed and watered properly. Drones are used to watch over crops and animals.

Do you think the  
use of technology in  
agriculture is a trend?  
Why do you think  
this?





The eating patterns of Canadians have changed over time, with people paying more attention to different types of foods and drinks that are available to them.

In the last decade, the Canadian diet includes more fresh fruits, yogurts, cheeses, creams, juices, red meats and low-fat milk. Some people have also changed their food preferences to include less cereal, sugar, oils and fats.

When it comes to dairy products, Canadians are drinking more 1-percent and skim milk, but also eating more cheese and using more cream products.

Canadians are more interested in where a food product comes from. Canadian food and drink producers are starting to identify their products as coming from a specific location, whether it is a town, region or province. Many people want to know not only where their food and drinks come from, but how they are grown and raised.





## Labelling Local Foods



Food producers use the following types of labels to tell people that their products are made or produced in Canada:

- “Product of Canada” means that all or nearly all of the major ingredients, processing, and labour used to make the product are Canadian.
- “Made in Canada from domestic and imported ingredients” and “Made in Canada from imported ingredients” mean just what they say. A domestic ingredient is one made in Canada. An imported ingredient is one that comes from a country other than Canada.
- “Processed in Canada” or “Prepared in Canada” or similar statements tell you the product was made in Canada by Canadian workers to meet Canada’s strict regulations. It may contain imported ingredients or a blend of Canadian and imported ingredients.
- Other statements, such as “Made with 100% Canadian strawberries,” tell you exactly which ingredients in the product are Canadian.

From Agriculture and Agri-Food Canada: *Shopping for Canadian Food*. [www.inspection.gc.ca/food/labelling/food-labelling-for-consumers/canadian-food/eng/1409065542798/1409065599130](http://www.inspection.gc.ca/food/labelling/food-labelling-for-consumers/canadian-food/eng/1409065542798/1409065599130)





## Blue Cows



2008



2009



2017

The blue cow logo has been used on Canadian dairy products for many years. The cow is used as a logo to promote dairy products made from milk that is produced in Canada. When a milk product shows this logo, it means that the milk has been produced with quality and careful controls on a Canadian farm.

All the milk or milk ingredients used in producing a dairy product bearing the *100% Canadian Milk* symbol must be made entirely from Canadian milk produced by Canadian dairy farmers. These products include milk, as well as butter, cheese, yogurt and ice cream. Although fluid milk does not carry the symbol, it is usually produced, processed and sold in the same province.

What products can you find at home with the blue cow label?



## Traditional Practices



First Nations, Métis and Inuit have deeply rooted traditions for their food choices. Traditional practices involve hunting, trapping, fishing and harvesting wild foods.

**Health Canada** produces a document called *Eating Well with Canada's Food Guide: First Nations, Inuit and Métis*. The guide includes examples of traditional foods of Canada's Aboriginal Peoples, such as bannock, game meats, fiddleheads and wild rice. Each food group also includes alternative choices, as well as store-bought foods that are available in remote and rural communities.

How do First Nations, Métis and Inuit food traditions promote eating local?

What types of foods are grown locally in your area?

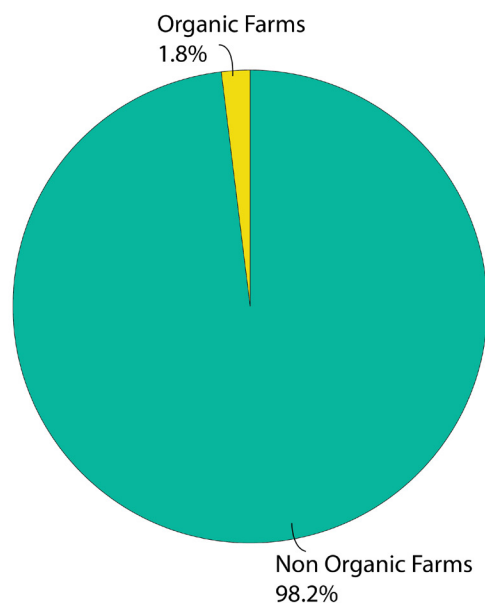


Farmers make choices about how they will produce the food they are growing. Canadians' increasing interest in healthy, natural foods has led to a higher demand for organic foods.

Organic food production is based on farming practices that protect the environment and do not use any chemicals. The number of certified organic farms in Canada has increased from 3914 in 2009 to 4045 in 2015. Most of these farms are located in Quebec, Saskatchewan and Ontario.



### Organic Farming



This circle graph compares the number of organic farms to farms that use traditional farming methods. It shows that 2 out of every 100 farms in Canada uses organic farming methods.



Why do you think organic farms only represent 2 out of every 10 farms in Canada? Do you think the number of organic farms will increase or decrease in the future? Why?

### Are there organic dairies?

There were seven certified organic dairy producers in Alberta in 2016. A producer is **certified** when he or she meets requirements, which are sets of rules. When a product is **certified organic**, it means that it has been grown or made according to strict rules.

It takes three years of testing land and soil to be certified as organic. Cows are fed and looked after organically for at least one year before they can be certified organic. There is no difference in the nutrient value of organic and regular milk. The difference occurs in the ways that cows are raised and managed on the farm.

In Canada, the number of farms that produce organic milk increased from 65 in 2001 to 222 in 2016. The most popular organic dairy products remain yogurt, ice-cream and cheese.

Do you think the trend toward using more technology helps organic farmers and food producers? Why do you think this?



## Trending for the Environment

Two main trends have changed Canadian agriculture. Both trends affect the soil, air, water and other plants in the environment.

- The first trend is a movement toward fewer, but bigger, farms.
- The second trend is the use of technology and improved agricultural practices to produce more agricultural commodities, such as grains and milk.

What are the effects of these trends? Read more to find out.



### Protecting the Soil

**SINCE 1987,**

soil erosion has decreased by

**69% in corn production**

**49% in soybean production**

**50% in wheat production**

Created April 2015

Source: The Real Dirt on Farming, 2014

**Agriculture**  
more than ever

Infographic used with permission from Agriculture More Than Ever. [www.agriculturemorethanever.ca/resources/fact-photos/page/2/](http://www.agriculturemorethanever.ca/resources/fact-photos/page/2/)

The quality of soil in Canada has improved over the last 30 years. Farmers traditionally used plows to turn over and loosen the soil after the harvest a crop. This traditional tillage left the soil exposed to wind and rain and led to erosion, which reduced the topsoil needed to grow healthy crops.

Two new tillage methods leave old plant materials in the soil. These methods work like **composting**, adding organic matter to the soil while protecting it against erosion. **Conservation tillage** uses special equipment to plant seeds, leaving some of the old crop materials in the soil. **No-till** is a method used to plants seeds without disturbing the old crop materials. No-till practices are used in over 56 percent of cropland in Canada.

Why is it important to find ways to protect the soil for farmers who grow crops as well as for farmers who raise animals?



## Manure



**Manure** refers to animal excrement that is used for fertilizer. It is a valuable by-product from dairy farms and is used as a resource with many benefits. Applying manure to cropland as a fertilizer is a sustainable agricultural practice because nutrients can be effectively recycled.

Manure is a source of plant nutrients and improves soil organic matter, structure, aeration and water holding capacity.





## Water Quality

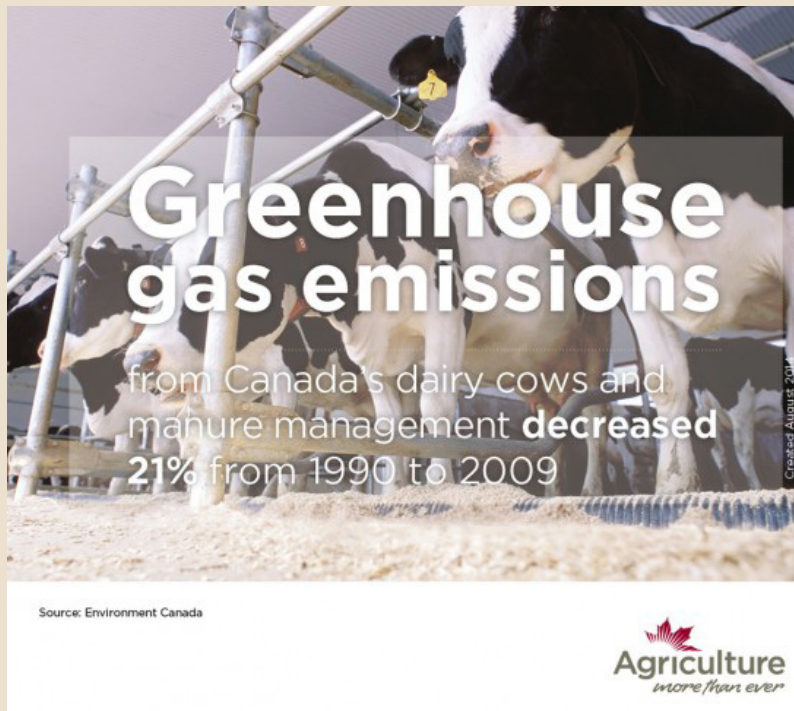


Agriculture uses water to irrigate crops and feed animals. Some of this water returns to its **original sources**, where the water first came from. These sources can include lakes, rivers and streams.

However, this water can carry soil and other substances. There may be surface runoff of **pesticides**, which are substances used to kill insects. Fertilizers and manure can also mix with the surface water. All of these substances can also run into **groundwater**, which is water found in the soil or in dents and cracks in rock. This groundwater, along with these different substances, will eventually find its way into lakes, rivers or the ocean.

There has been an increase in the use of plant nutrients and manure for fertilizer and higher use of pesticides. This has resulted in a trend toward lower water quality.

Why is it important to keep pesticides, fertilizers and manure out of groundwater?



**Greenhouse gases** are gaseous substances that can trap and hold heat in the atmosphere. Greenhouse gas emissions were lower in 2011 than they were in 1981. Greenhouse gases can include the methane that cows produce when they digest their food. Manure emits **methane**, the main component of natural gas, and nitrous oxide. If methane leaks into the air, it absorbs the sun's heat. This warms the atmosphere and contributes to climate change.

Dairy farmers have improved the type of feed used and increased production of milk. This has resulted in their ability to produce the same amount of milk with fewer cows. These improvements have helped to reduce greenhouse gas.

Air quality also looks at the presence of tiny particles of solid matter and liquid droplets that are suspended in the air. These solids and liquids can come from chemical substances in things like fertilizers and pesticides. They can also include dust, feather fibres and bacteria.

These particles are invisible. They come from human activities like preparing cropland for planting and harvesting. Changes to soil practices, like the use of no-till, reduces the dust and other particles in the air. The trend across Canada's prairie provinces has been a decrease in these particles. This has a positive effect on air quality.

Infographic used with permission from Agriculture More Than Ever. [www.agriculturemorethanevery.ca/resources/fact-photos/page/4/](http://www.agriculturemorethanevery.ca/resources/fact-photos/page/4/)



## Agroforestry



**Agroforestry** is the use of trees as shelter to protect soil, water and animals. Protecting barns, feeding pens and milking parlours with trees can lead to increased milk production. **Shelterbelts** are lines of trees that are planted to reduce soil loss and increase soil moisture. Fields that are protected by shelterbelts can produce better crops.



## Responsible Agriculture

People in Canada as well as other countries around the world are becoming more aware of the importance of food safety. They want to know that food products are grown and produced in safe, sustainable and socially responsible ways.

This means that there is more interest in organic, local foods and a demand that these foods be grown or made in sustainable ways.

**Sustainable agriculture** uses farming techniques that protect the environment and the health of communities and animals. **Sustainable food processing** uses packaging with less waste or reusable materials.

Farmers follow practices that make sure the food products they grow or make are safe. They use technology that ranges from robots to automated machinery to social media.

The government is also involved.

- The government approves and monitors the use of farm chemicals and medications.
- Laws protect the welfare of animals and the environment.
- Laws protect the safety of farmers.
- All food products in Canada are tested for pesticide residues, which are any trace of pesticide left on food. All food products must meet guidelines for maximum residues.





## Antibiotics



**Antibiotics**, medicine used to control infections, are used very carefully with cows. Sometimes dairy cows get sick and antibiotics may be needed to help them get better. **Health Canada** has strict guidelines in place that dairy farmers must follow. Cows that need antibiotics are identified and their milk is discarded to make sure that any leftover antibiotics do not get into the milk supply.

As an extra safety measure, once treatment is finished, the cow's milk is tested to ensure it is free of any traces of antibiotics before including it in the milk supply. In addition, milk processors test all milk for traces of antibiotics before accepting it. Milk is rejected if it shows any trace of antibiotics.

Why do you think people are becoming more concerned with food safety?

What other trends do you think could influence the growing interest in food safety?

## How do dairy farmers apply responsible practices?

The main priority of dairy farmers is the health and well being of their animals. Dairy farmers provide proper feed as well as safe and clean housing to make sure that their cows are healthy and productive. On most farms, cows are milked twice a day.



### Caring for Animals

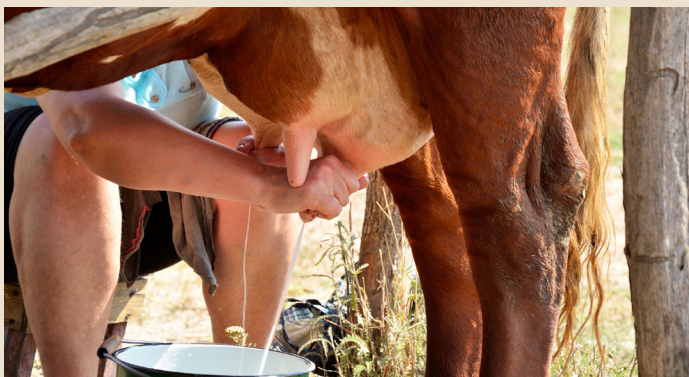


Healthy animals are needed to produce good quality milk. In Canada, the government also has a role to play in the dairy production cycle. Canada has laws that protect farm animals. These laws and **regulations**, or rules, help make sure that animals are treated **humanely**, with understanding, respect and caring. Everyone who handles **livestock**, animals used for food, as well as the food products that we get from livestock, must follow these regulations.

Most provinces are members of **Farm Animal Care Associations**, which are made of people from different industries who work together for the responsible care of animals.



### Milking a Cow



Years ago, dairy farmers milked their cows by hand. This took a long time and was not as **sanitary**, or clean and healthy, as milking by machine.

Milking today is done in stanchions or tie stalls. A **stanchion** is a bar that helps hold the cow in place while it is being milked. A **tie stall** is a stall where cows are tied in place to be milked.



Many dairy farmers also use **milking parlours**, where dairy farmers come to the cow.

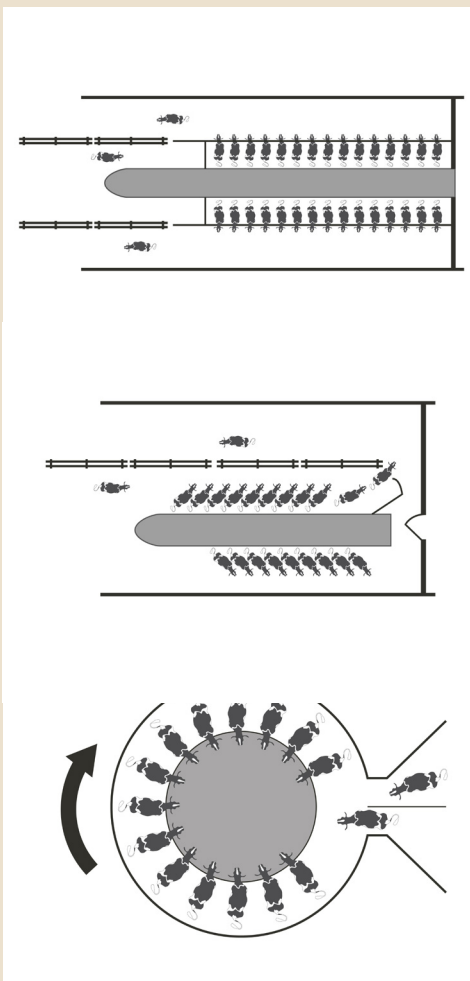
There are different types of **milking parlours**, which are a section of the barn where farmers keep the milking machines.

Before milking, the cow's identification is checked and the udder, where milk is produced by the cow, is gently massaged so the milk flows into the **teats**, or nipples. The teats are cleaned and sanitized before the milking machine is attached.

Milking each cow takes about five minutes. Milking machines have automatic sensors that work much like the suckling of a baby calf. The sensors remove the machine when the milk flow has stopped.



### Milking Parlours



In a **parallel milking parlour**, cows are lined up in straight rows. The farmer moves from one cow to the next to attach the milking machine and milk the cow.

In a **herringbone milking parlour**, cows are lined up at an angle. This makes it easier for the milking machine to be attached and the cows to be milked.

A **carousel, or rotary, milking parlour** moves the cows around so that the farmer can stay in one place to attach the milking machine.

On some farms, milking is done with **robotic milking machines**, which are machines controlled by computers that keep track of when each cow is milked.

The newest method of milking is called the **voluntary milking system**. It uses computers and robots so a cow can choose when she wants to be milked. After feeding, the cow passes through an automatic gate that reads its identity. If the cow is ready to be milked, it is directed to a milking pen.

Watch a video that shows voluntary milking on the Alberta Milk website at <https://albertamilk.com/food-stuff/voluntary-milking-system/>.

How does this milking method consider the animals' needs?

Watch the **Farm Food 360** videos on tie stalls and free stalls at [www.farmfood360.ca](http://www.farmfood360.ca). Click on the **Dairy Farm** tile and select each video. How do these milking methods compare to milking parlours and voluntary milking systems?

Stainless steel pipes send milk directly to a large refrigerated bulk tank in the milk house of the dairy farm. The milk arrives in the bulk tank as **raw**, or unprocessed, milk. **Unprocessed milk** has had nothing done or added to it. The milk is quickly cooled in the bulk tank to just below 4°C.

This raw milk is then picked up and transported by a milk hauler every second day to the **dairy processing plant**, which is where milk is made into various products like milk, cream or yogurt.



### Hauling Milk



A **milk hauler** collects the milk in an insulated tanker truck, but also checks and tests it. Milk haulers must have a **license**, which gives them official permission from the government, to check the milk and make sure it is safe.

The milk hauler must make sure the milk is delivered quickly to the processing plant. A milk hauler often picks up milk from several farms and takes a full load to the dairy processing plant.

Dairies today must be **registered** with the government or have a provincial license. This registration or license says that the dairy meets safety and health requirements for making food products.

A dairy plant inspector inspects the dairies to ensure they are clean and safe. They also make sure that proper processes are used to make healthy dairy products. In today's automated dairy plants, milk is never exposed to air, light, or human hands. Milk is kept cold and stored in insulated **silos**, large containers used for storage, until it is processed and packaged.

Adapted with permission from **Alberta Milk** and **Calgary Herald**. *Calgary Stampede Aggie Days: A special information supplement*, 2010: p. 11.