

Name: _____

Food Production: Natural and Human-Caused Factors

You read previously in this module that there are several factors that directly affect what a farmer in this country will produce. All these factors can be organized into two categories:

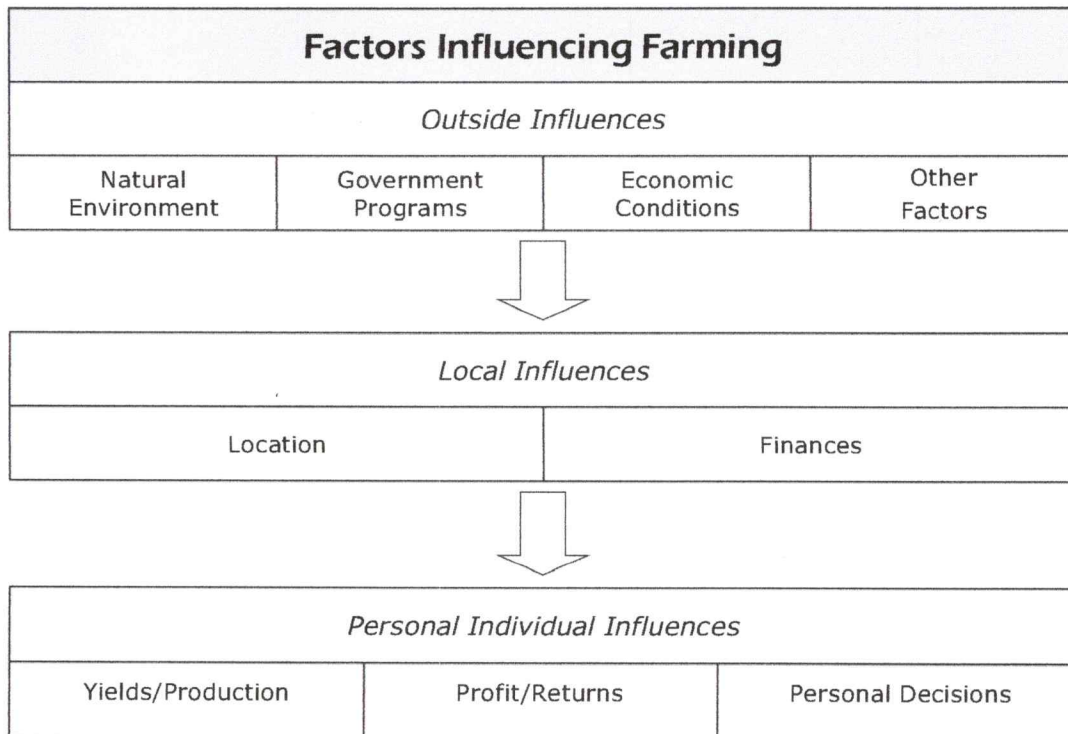
- natural
 - having to do with the physical environment
- human
 - caused by and having to do with the actions of people

The following diagram arranges these two categories one step further, by sorting them into

- outside influences
 - overarching factors over which the farmer has limited or no control
- local influences
 - factors that are related to the area in which a farmer lives, like a province or a region such as the prairies

- personal/individual farm influences
 - factors that have to do with the farmer and his/her farm

Study the following diagram carefully. Which of these factors is a result of the natural environment? Which of these factors are caused by humans?



Climate Change and the Production of Food

As you have learned, physical forces play a large and determining role in the agricultural process and the production of food. To simplify things, we can define food production as “the access by all people at all times to enough food for an active, healthy life.” Let’s look at how climate change is affecting and will affect food production.

It is generally accepted that one of the greatest transformations in the physical world over the past 50 years has been that of climate change. Climate change is the change in average **weather** over time in a particular region. Climate change includes changes in temperature, wind patterns, and precipitation. Changes in weather patterns and climate are natural processes but, over the past 50 years, these changes have been intensified by human actions. Over the past five decades, average temperatures in Canada have risen by 1.2°C, almost twice the global rate. As a matter of fact, all ten of the warmest years on record have occurred since 1980.



What is causing climate change? The world's scientific community generally agrees that climate change is being caused by human activities that increase the amount of carbon dioxide and other greenhouse gases in the atmosphere, such as burning fossil fuels to drive our cars, or to heat and cool our homes. Increased concentrations of these greenhouse gases are increasing the **greenhouse effect**, which is resulting in warmer temperatures worldwide. It has already resulted in changing weather patterns internationally and more frequent extremes in weather, such as hurricanes and droughts. The term **global warming**, which strictly means an increase in the world's mean temperature, is often used to describe the warming caused by human activity.



Water shortages, heat waves, storms, and floods are likely to be the result of global warming caused by human actions. Global temperatures are predicted to rise by about 3°C by the year 2100. According to **The Intergovernmental Panel on Climate Change (IPCC)**, the effects of climate change are likely to have major impacts on soil and water resources, which will have direct impacts on agriculture and food production.



How will food production be affected by climate change? The **Food and Agriculture Organization (FAO)** of the United Nations indicates that climate change, over the long term, in particular global warming, could affect agriculture in a number of ways, the majority of which would threaten food security for the world's most vulnerable people.

- The overall predictability of weather and climate would decrease, making planning of farm operations more difficult.
- Climate variability might increase, putting additional stress on fragile farming systems.
- Climate extremes—which are almost impossible to plan for—might become more frequent.
- The sea level would rise, threatening valuable coastal agricultural land, particularly in low-lying small islands.
- Biological diversity would be reduced in some of the world's most fragile environments, such as **mangroves** and tropical forests.
- Climatic zones and ecozones would shift, forcing farmers to adapt, as well as threatening natural vegetation.
- Quantities of fish and seafood, as well as their distribution, could change dramatically, wreaking havoc in established national fishery activities.
- Pests and diseases would spread into areas where they were previously unknown.

On the other hand, global warming might have some positive effects for farmers, especially in areas of the northern hemisphere such as Canada and Russia. Some positives might be as follows:

- As temperatures increase, higher levels of carbon dioxide may have a fertilizing effect for many crops, increasing growth rates and water use efficiency.
- Higher temperatures could lengthen the growing season and increase crop production in northern regions.

Experts believe that the impact of climate change on agriculture and food production will most likely be more extreme in tropical areas compared to **temperate regions**. How vulnerable countries and regions in the world are to climate change's impacts on agriculture will depend on their access to land, water, and government support and action.

Coffee-Conscious Canadians

Canadians love their coffee. The following are a few statistics about Canadians and coffee*:

- 81% of Canadians drink coffee at least occasionally.
- More than 63% of Canadians over the age of 18 drink coffee on a daily basis, making it the number one beverage choice of adult Canadians.
- Canadian coffee drinkers consume an average of 2.6 cups of coffee per day.
- Coffee is more popular in Canada than the United States of America, with just 49% of Americans drinking coffee on a daily basis.
- For several decades coffee has been more popular than tea, milk, beer, fruit juices, and soft drinks among Canadians.
- More teenagers between the ages of 18 and 19 are consuming coffee than ever before.
- 37% of coffee drinkers have an awareness of organic—up from 30% in 2001. Awareness of fair-trade coffee increased from 4% in 2001 to 11% in 2003.



Take another look at the last bullet in the coffee statistics list. What does **organic** mean? What is **fair trade**? Let's look at how you (or your parents and friends) can choose a coffee that's healthier for people and the environment. Let's also investigate why people are searching for a coffee that is healthier for people, the environment, and even songbirds.

* Coffee Association of Canada. www.coffeeassoc.com/index.htm. (2005).

Coffee is produced in countries that are situated between the two Tropics where the climate is hot and humid. These countries may be divided into four geographical zones: South America (Brazil, Colombia, Venezuela, Peru, and Ecuador); Central America and the Caribbean (from Mexico to Panama, and in the various Caribbean islands); Africa (Kenya, Tanzania, and Cameroon); and Asia (India, Thailand, and Indonesia).

Beginning in the late 1990s, people in developed countries, such as Canada and the United States of America, became concerned about several issues surrounding the production of coffee in developing countries. The coffee industry was supplying millions of dollars' worth of coffee to consumers in wealthy countries. At the same time, however, the coffee industry itself was exploiting its growers and harming the environment.

Average coffee workers (including farmers and mill workers) in the Central American country of Nicaragua were making \$3 per day, while Canadians were spending on average over \$500 per person per year to drink coffee! Furthermore, coffee growing puts great stresses on the environment, often due to poor agricultural practices.

During the 1960s and 1970s, changes in growing methods made the production of coffee increasingly harmful to the environment. Coffee, which was traditionally grown under a shade canopy of trees, was now being grown without a canopy, under the sun. The trees were removed and the elimination of this shade canopy also caused an elimination of a vibrant habitat for wildlife. Also, growing coffee under direct sunlight required a dramatic increase in the use of fertilizers, pesticides, and insecticides, as well as excessive use of water, which led to the contamination of rivers resulting from runoff.

In light of an increased awareness of the harm the coffee-growing sector was inflicting on the environment, companies involved in the manufacturing and selling of coffee have given us—consumers—several options when we buy coffee. Some of the choices we now have centre on several labels.

■ Organic

■ *What does this mean?*

- This means that coffee is grown without the use of fertilizers, pesticides, and insecticides. About 90% of organic coffee is grown under tree cover rather than in full sun.

■ *Why care?*

- Coffee is one of the most chemically treated foods and may contain toxic chemicals that cause, among other things, nausea and lung damage. Coffee grown without chemicals is better for the ecosystem as well.

■ Fair Trade

■ *What does this mean?*

- Fair trade means that workers and producers in the coffee industry get fair wages for their labour and products.

■ *Why care?*

- Vulnerable workers and producers in developing countries will receive a secure income, and children will not be exploited producing the coffee that we drink here in the developed world.

■ Shade-Grown (Bird Friendly)

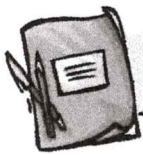
■ *What does this mean?*

- This means that coffee is grown under a canopy of different species of shade trees.

■ *Why care?*

- Instead of destroying forests to make room for coffee crops, shade-grown coffee provides a habitat for a variety of birds and other species and even helps prevent global warming.

We can have positive effects on the environment through our consumer choices.



Consequences of Our Food Choices



1. Using Dr. Gritzner's definition of geography, analyze the section of this lesson titled, "Coffee-Conscious Canadians." Be sure to focus your analysis on the environmental consequences of food choices.
 - a) Why there? Use at least two clear and distinct points to support your response.
 - b) Why care? Use at least three clear and distinct points to support your response.

Industrial Hemp

Industrial hemp (*Cannabis sativa*) is one of the oldest cultivated plants in the world. The species was banned in North America in the late 1930s because its leaves and flowers contain a hallucinogenic drug known as delta-9 tetrahydrocannabinol (THC). Hemp is often confused with marijuana; however, hemp is not a consciousness-altering drug like its cousin marijuana.

In March 1998, the commercial production and cultivation of industrial hemp was permitted in Canada. Farmers were allowed to plant and produce hemp by obtaining a licence and authorization from Health Canada. Before 1998, only a handful of licences were issued to grow industrial hemp in Canada.

- In 1998, the first year after Health Canada opened up the licensing process, 241 licences were issued. The licensees grew almost 2,370 hectares of hemp for industrial use.
- In 1999, the number of applications to grow hemp jumped dramatically to 545, with the area of hemp production increasing six-fold to nearly 14,000 hectares.

It appears that interest in producing industrial hemp has returned. In 2004, the amount of land licensed for industrial hemp production increased by 28% over 2003 to 3,531 hectares.

What Is Hemp Used For?

Hemp is used for textiles, paper, food, body care products, and building materials. Hemp is often known as a "dual crop" because both the seeds of the plant and the stalk can be used. The seeds can be used for food and body care products, and the stalk can be used to create a fibre that is used for paper, textiles, and building materials.

Manitoba Industrial Hemp Industry

In Canada, industrial hemp is viewed as a new, alternative crop that complements other crops grown in the Prairies. Hemp grows in a wide variety of climate and soil types, making it a good choice for areas of Manitoba that do not have ideal crop-growing conditions for crops such as beans and sunflowers.

Manitoba farmers were quick to see potential in the growing industrial hemp industry after 1998. Manitoba farmers have been pioneers not only in the growing of hemp but in the harvesting of hemp as well. A hemp crop can grow three to four metres tall, which is a challenge at harvest time. Producers have made many of the necessary equipment changes on their farms to overcome many of the obstacles to growing hemp.

Hemp-processing companies in Manitoba are involved in the procurement, processing, marketing, and distribution of raw hemp and hemp products to other out-of-province processors. As of 2007, there were at least three companies involved in hemp processing in this province.

- Hemp Oil Canada, in Ste. Agathe
- Manitoba Harvest (Fresh Hemp Foods), in Winnipeg
- Parkland Industrial Hemp Growers Coop Ltd. (PIHG), in Dauphin

It seems that the hemp industry has sprouted up overnight. Not only have farmers and business people developed an interest in hemp, so have politicians and researchers. Many people are in favour of growing industrial hemp because it is beneficial to both the economy and the environment. Rotated with other crops, it gives farmers a secure income. It can be grown with few or no fertilizers, herbicides, or pesticides. It can be planted year after year on the same field; the hemp-growing process pulls carbon out of the air (carbon sequestering), which enhances the quality of the air we breathe; and every part of the plant is used: seed, grain, and fibre.

The industrial hemp industry is a new industry in Western Canada. Nonetheless, many see it as being full of endless potential and believe it will benefit not only agriculture, but also consumers, all levels of government, companies, and people living on the Prairies with the creation of new jobs.