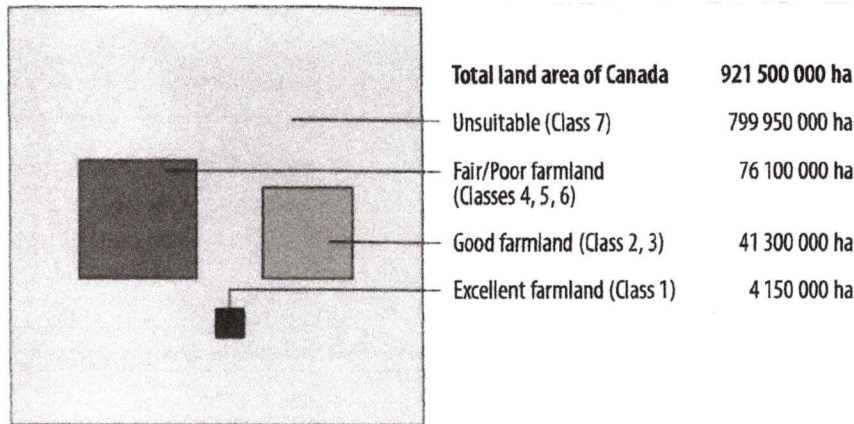


Name: \_\_\_\_\_

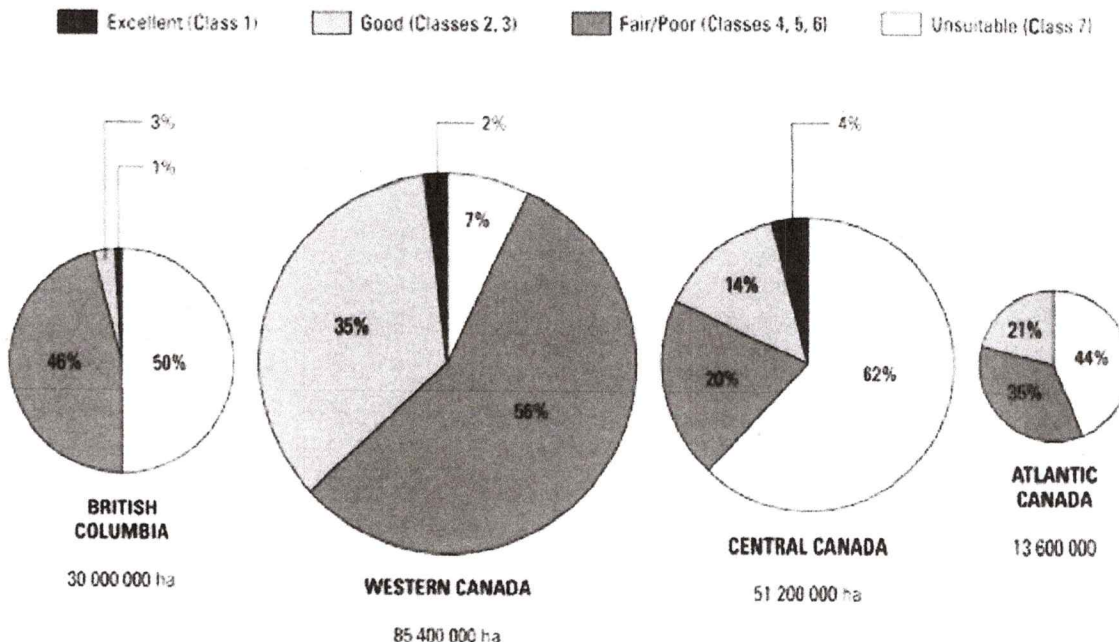
## Land: The Basic Resource

During the 1960s and 1970s, the federal and provincial governments in Canada surveyed most of the land in Canada: approximately 2.4 million square kilometres. This survey enabled them to divide Canada's land into seven classes: Class 1 to Class 7. Class 1 land has deep soils and is excellent for farming. This accounts for 0.5% of Canada's land. Class 7 land has no capability for farming. This represents about 87% of Canada's land.



Clark, Bruce W., and John K. Wallace. *Geographic Issues of the Twenty-first Century*. Don Mills, ON: Pearson Education Canada Inc., 2005. 287.

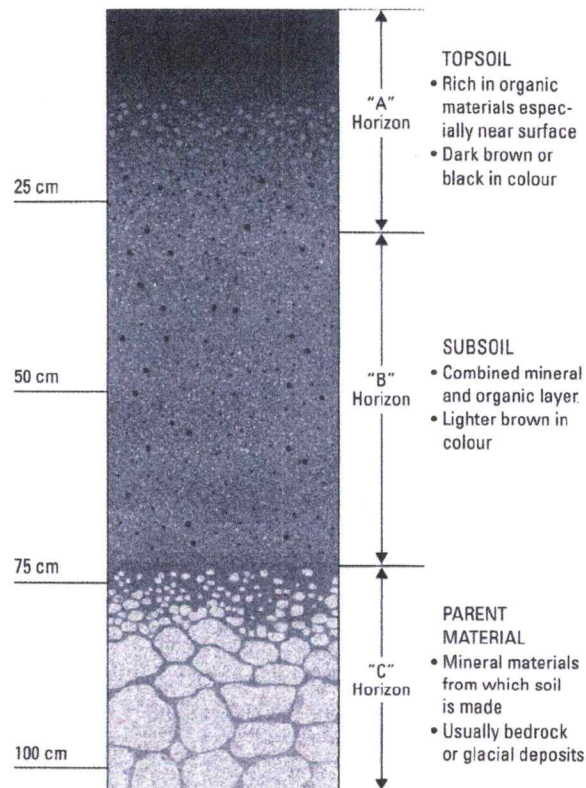
Limitations such as climate and soil quality reduce the amount of land that can be used for agricultural production. Dependable agricultural land includes Class 1, Class 2, and Class 3 land and is concentrated in three provinces: Saskatchewan, Alberta, and Ontario.



Clark, Bruce W., and John K. Wallace. *Geographic Issues of the Twenty-first Century*. Don Mills, ON: Pearson Education Canada Inc., 2005. 287.

What qualities make soil high quality and excellent for farming? Let's take a look at a cross-section of the layers of soil and then at the composition of soil.

As you can see in the image that follows, soil is found in layers. Each layer is called a horizon. The top layer, the most important horizon in respect to agriculture, is called **topsoil**. Seeds germinate and the roots of plants grow in this dark-coloured layer. It is made up of **humus** (decomposed organic matter) mixed with mineral particles. The next horizon is called **subsoil**. It contains clay and mineral deposits. The layer beneath the subsoil is called parent material and is made up of **regolith** and solid **bedrock**. Regolith consists of slightly broken-up bedrock. Plant roots do not penetrate this layer; very little organic material is found in this layer. At the bottom of the parent material layer is bedrock, which is solid, unweathered rock.



Clark, Bruce W., and John K. Wallace. *Geographic Issues of the Twenty-first Century*. Don Mills, ON: Pearson Education Canada Inc., 2005. 141.

As previously mentioned, topsoil is the most important horizon of soil. What does topsoil consist of? Basically, soil is composed of the following four things:

- **minerals:** These come from weathered rock and include calcium, phosphorus, and potassium. They provide nutrients for plant growth.
- **bacteria and organic materials:** When plants and animals die, they are decomposed by bacteria in the soil. As bacteria break down the matter, nutrients are released. Decaying organic materials form the humus.
- **air:** Plants need air around their roots. Air spaces are created by worms, insects, and small animals that tunnel through the soil.
- **moisture:** Water dissolves nutrients plants need to grow, and helps decay rock and organic minerals.

Topsoil makes up only the upper 5 to 12 centimetres of soil. Without topsoil, little plant life is possible. It takes approximately 500 years for one inch of topsoil to be deposited. It is quite a fixed amount and must be carefully managed. This “thin skin” of farmable surface is responsible for supporting humankind.

## Food Production in North America

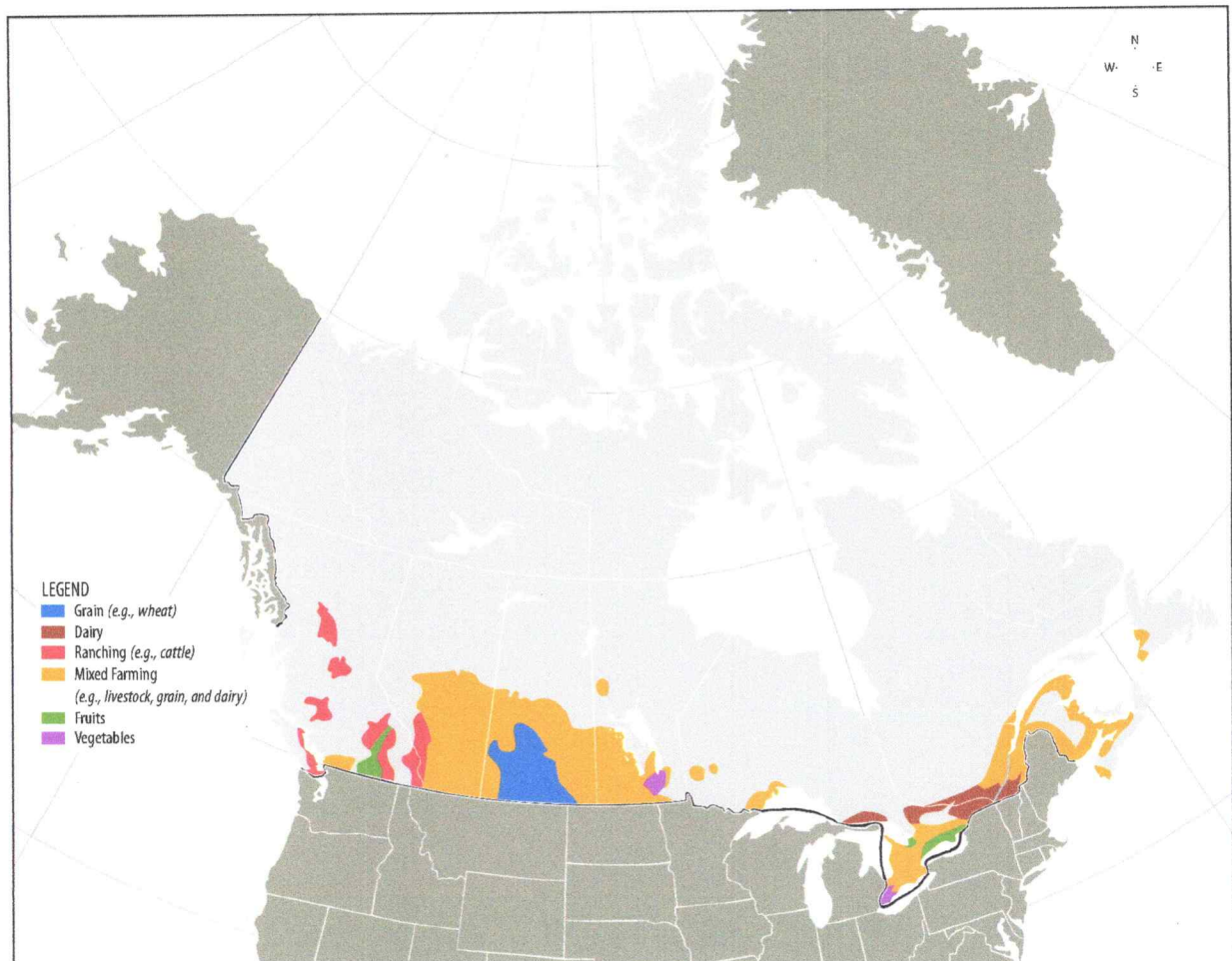
Most food production occurs in the central region of North America. The foothills of the Rocky Mountains mark the region's boundary. The region extends from the Peace River in northwestern Alberta to the east at the North Saskatchewan River, which creates its northern border in Manitoba and Saskatchewan. The boundary cuts through the southern part of the Prairie Provinces (Alberta, Saskatchewan, and Manitoba) and stops just east of Winnipeg where the Prairies meet the Canadian Shield. South of the Great Lakes-St. Lawrence area, from Quebec City to Windsor, Ontario, we find Canada's other major food-producing region. This farming region then expands southward to the border between the United States and Mexico.



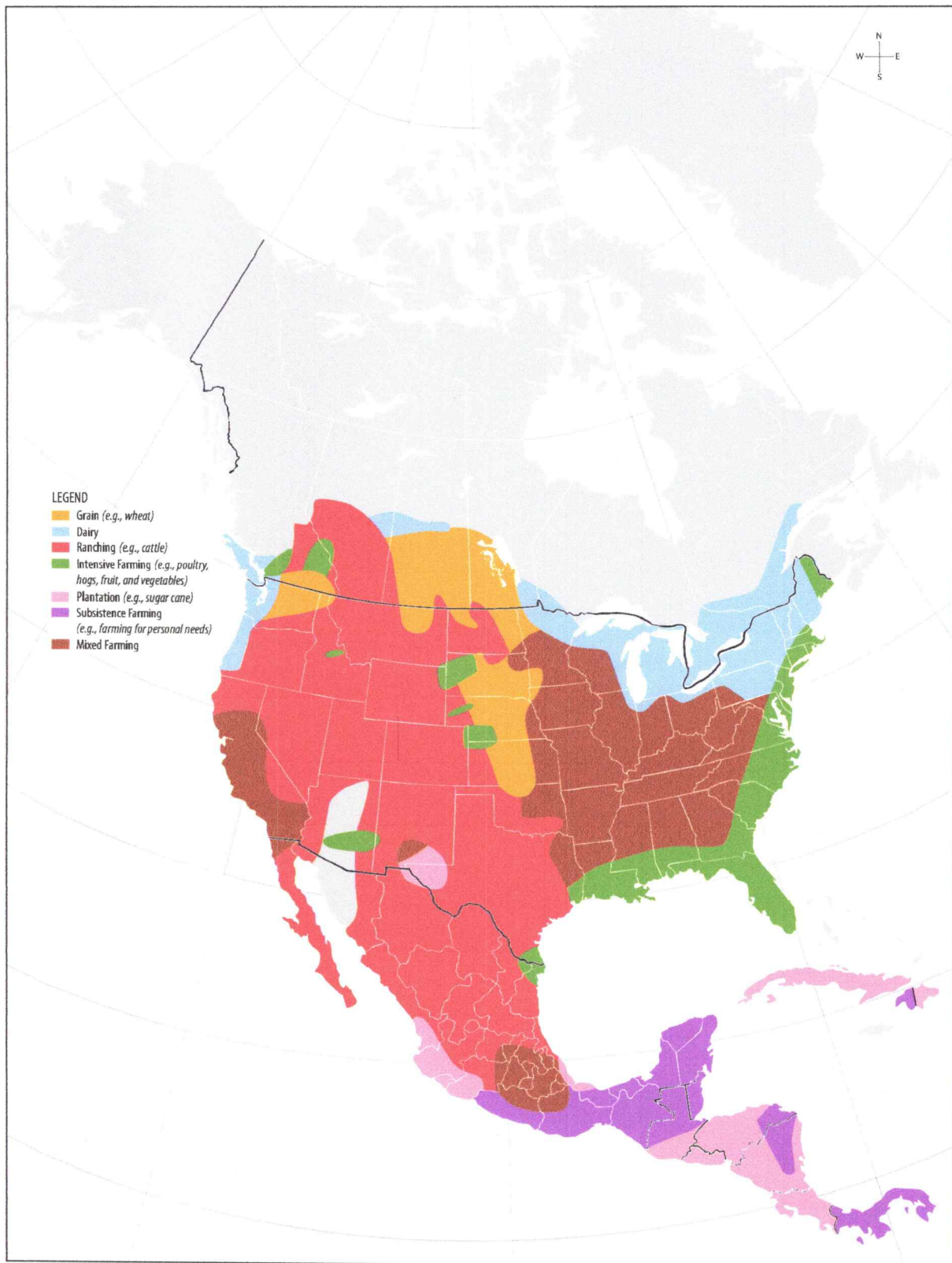
This area of food production includes a vast resource base that includes geology, landscape, soils, **natural vegetation**, and water. All of these interact to support agriculture. To keep the land productive, it must be carefully managed.



## Canada's Agricultural Regions



## North America's Agricultural Regions





**Note:** As the scale becomes larger, the details shown in the map become more generalized. This is why the agricultural production regions on the map of North America are not consistent with those on the map of Canada. In this case, some new terms need to be used to describe these generalizations. The term *intensive* refers to a method of farming that requires a small amount of land but a large amount of labour. Products produced on *intensive* farms include fruits, vegetables, poultry, and hogs. *Plantation* farming is the opposite of *intensive* farming. *Plantation* farming uses a large amount of land and requires a relatively small amount of labour, and is known as *extensive* farming. Products of *plantation* farming include sugar cane and other cash crop products that are mass produced for profit. *Subsistence* farming is a type of farming in which the products are solely used for the farmer's personal consumption. In essence, *subsistence* farming is farming for survival. Only surplus products are sold in local markets.

## Food Production in the World

The United Nations estimates that more than one-third of the world's land area (not including Greenland and Antarctica) is in some form of agricultural use. Forty-two percent (42%) of the world's labourers are employed in agriculture, making it by far the world's most common occupation. Nevertheless, agricultural production accounts for less than 5% of the gross world product (the total gross domestic product of all the countries in the world).



How do we determine how much food a country produces? Agricultural output is a component of a country's **gross domestic product (GDP)**. The GDP is the value of all goods and services produced in a country per given year. In 2005, China and the **European Union** (the EU is an intergovernmental union of 27 countries in Europe whose aim is to cooperate economically) led the world in agricultural output. This means that of all the goods and services produced in China and the EU, agricultural products account for more of the total than in any other country. As the top producer, China grosses \$267,000,000,000 in agricultural output; however, even though China and the EU lead in agricultural output, the United States of America leads in productivity per farmer.



## Food Production: Physical Factors

What physical factors are needed to produce food? As you read previously, soil is the most important factor affecting most types of land-based food production. Other physical factors are



- amount of precipitation
- climate
  - the amount of heat a region receives has a considerable effect on the types of crops or food products that may be produced
- growing season
  - the average number of days without frost
- topography
  - level land is the best-suited land for farming

### Agricultural Practices and the Physical Environment

In the late 1800s, about 80% of Canadian families farmed the land. Today, this number is less than 3%. What caused this overwhelming change? One hundred years ago farmers used animals such as horses and oxen, as well as their own manpower, to do the tasks needed to run a farm. Farmers were able to manage relatively small farms of about 50 hectares in size. Today, one or two people using modern machines can operate large farms of 200 hectares or more.

In 1996, the average farm size was 246 hectares. In 2001, it was 274 hectares. By 2006, farm size had grown by nearly 8% to 295 hectares. Today, there are fewer farms producing more food than ever before.

Farming is a very expensive business. It costs anywhere from \$500,000 to more than \$1 million in start-up costs alone. Yearly costs to maintain a farm are also very high. Farming is a high-debt industry: farmers must pay for seeds, veterinary care, equipment, pesticides and other chemicals, vehicle repairs, insurance, and other costs.



As you read earlier, land or soil is the most important resource for farming. In order for a farmer to make a profit, he or she must make sure the land yields the greatest amount of produce possible. Unfortunately, over the past 100 hundred years or so, much of Canada's soil and farmland has been damaged by poor agricultural practices designed to increase yields. Some of the damages have been a result of

- **leaching**

- Leaching occurs when soil loses its nutrients through excessive irrigation.

- **compaction of soil**

- Farmers use heavy equipment like tractors and combines. The use of these can compact the soil so that it loses its ability to hold water and air, which are necessary for plant growth.

- **erosion**

- Erosion is the wearing away of the Earth's surface (in this case the topsoil) to other locations. Erosion may be caused by water, wind, ice, and the natural downward slope of the land, as well as poor agricultural practices. Erosion can occur because of nature or because of human activity.

- **contamination**

- Farmers use chemical fertilizers, **herbicides**, and **pesticides** to increase their yields and profits. These chemicals cause great concern because run-off fertilizers are known to contaminate water bodies. Herbicides harm wildlife as well as humans. Pesticides kill many useful insects such as bees, and may upset the natural balance of the ecosystem.

Food production in North America is entirely dependent on the land. The quality and character of the soil determine how good a farmer's crop will be. Soil is all too often mistaken as an infinite, everlasting resource. This is only true if soil is carefully managed. Soils must be protected from a variety of destructive forces—the production of our food depends on it.



This may be a good time to ask your learning partner for help. Remember, your learning partner is anybody whom you choose to help you with your course.