



# How is **plant diversity** affected by **agricultural landscapes**?

## diverse landscapes

Despite Canada's size, Statistics Canada reports that, as of 2018, only about 6.5 percent of Canada's total land area was used for agriculture. This includes all types of agriculture – pastures for livestock and fields for crops.

Some of the land identified as agricultural land also includes wildlife habitats like forests, wetlands, streams and hedgerows.

These habitats contain thousands of species of birds, mammals, insects and natural plants. Many of Canada's farmers work to protect these natural habitats.

Nearly a third of land in Alberta is used for agriculture. From a total land area of 157 million acres, 50 million acres in Alberta is cultivated land, pastures or used to support crops or livestock.

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## Mapping crops

Identifying and mapping crops is important for many reasons. Maps of crop type are created by agricultural organizations, agencies that work with agriculture and governments.

Crop mapping happens in Canada as well as many other countries. Crop maps allow countries and organizations to inventory what is grown in certain areas, as well as when crops are planted and harvested.

These maps can help identify how crops are growing, the condition of the soil and how much damage may have occurred because of a storm or drought. Different colours that appear on the images can show varying amounts of water and other substances in plants and soil.

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What words could you use to describe different types of agricultural landscapes you would expect to find in Alberta?

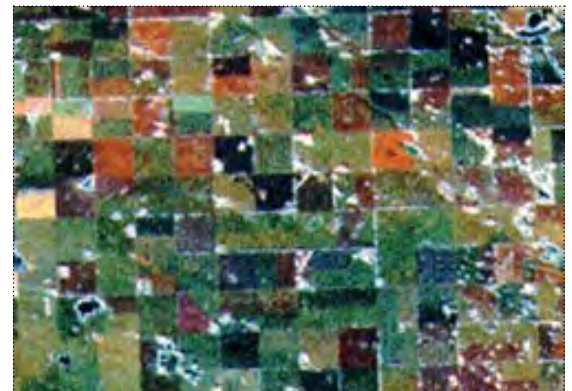
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Natural Resources Canada. Crop Type Mapping. Government of Canada: Online. [www.nrcan.gc.ca/earth-sciences/geomatics/satellite-imagery-air-photos/satellite-imagery-products/educational-resources/14649](http://www.nrcan.gc.ca/earth-sciences/geomatics/satellite-imagery-air-photos/satellite-imagery-products/educational-resources/14649)

Crop mapping is carried out with remote sensing technology. Remote sensing uses special cameras on satellites or high-flying aircraft. Radar is also used. The combination of remote sensing and radar can detect the type of crop, changes in growth of a crop, how healthy it is and the moisture content of plants.

Images that are taken over a period of time are used to identify crop plants and their condition. For example, crops like canola may be easier to identify when they are flowering, because of their energy signature on an image combined with the timing of the flowering.

## influences on land use

Climate, landforms and soil quality strongly influence the crops grown across different areas of Alberta. Consider how these factors influence the production of cereal, oilseed and pulse crops in the examples that follow.

## FOCUS ON SEASONS

Wheat can be grown in a wide range of climates and soil conditions. It can grow in cooler and wetter conditions.

Spring wheat – planted in the early spring – can grow in cool, wet soils and even light frosts. It can also grow in the hotter and drier conditions of the western prairies. Spring wheat seeding starts about the middle of April and finishes around the middle to end of May.

Winter wheat is usually planted in August and September. Winter wheat provides cover for the soil during the fall and winter. This prevents moisture being lost from the soil in the spring.

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If you were reading satellite images of crop maps, how would the information about the influences on different types of crop plants grown in Alberta help you?

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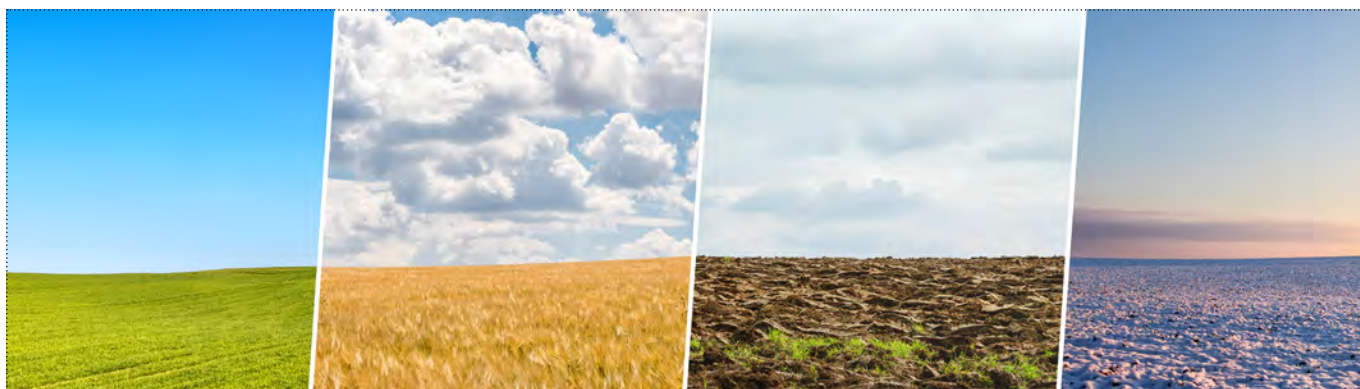
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Winter wheat was originally grown mainly in the southern areas of the prairies, including southern Alberta. However, more recent varieties of winter wheat are now being grown in the Parkland area of Alberta.

The Parkland area has a short, cool growing season and is an area in which spring wheat, barley, canola, oats and dry peas are grown. However, early frosts in this area can still damage spring wheat crops.

More recent winter wheat varieties that are planted in late August or early September can survive the winter in this area. The winter wheat is seeded directly into the stubble of fields that have been harvested. The stubble helps protect the seeds and reduces soil erosion. These winter wheat crops help farmers in this area make their growing seasons longer because they can plant over colder seasons.

Farmers check the winter wheat crops in the spring. The winter wheat plants may look as if the leaves and roots are dead. However, if new, white roots appear from the crown of the plant, it is alive and will likely recover.

Farmers dig up a few plants in the early spring and take them into the house to grow them for 7 to 10 days. If new roots develop, this means the wheat plants are alive. Winter wheat has a great ability to recover.

Some information from Agri-Facts (2018). Winter Wheat in the Parkland Area of Alberta. Alberta Agriculture, Forestry and Rural Economic Development: Online. [www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex94/\\$file/112\\_11-1.pdf](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex94/$file/112_11-1.pdf)



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In what ways do you think the planting of new varieties of wheat can help address changes in climate conditions?

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Look up a map of Alberta and identify the areas in which barley is grown.

## FOCUS ON CLIMATE AND SOIL CONNECTIONS

Climate and soil work together to provide the conditions that are suitable for other crops. For example, barley grows in an area of land that extends from Vermillion to the foothills of the Rockies in the west – and northwest around Lacombe and southeast around Stettler and Drumheller.

The type of soil found in areas of Alberta influences what crops can grow where. The soil in the area in which most of Alberta's barley is grown is fertile but has more arid – or dry – land to the east and south and shorter growing seasons to the north and west.

Soil type is also important for canola crops. Canola is a cool season crop. It grows well on the prairies, where cool nights and hot days allow it to develop.

Canola can be grown on a wide range of soil types. However, it grows best on soils that are well drained. The best soil for canola should have some water-holding capability and receive enough rainfall.

All soils contain **soluble salts** – which means the salts are able to dissolve in water. **Soil salinity** refers to the amount of water-soluble salts in the soil. When the levels are sufficient to harm plants, the soils are referred to as **saline**. Crops will vary in their ability to tolerate salinity. Canola is considered moderately tolerant to salt and sodium levels in soil.

## finding growing conditions

**Soil zones** are geographic areas that are based on the type of soil found there.

### BROWN SOIL ZONE

The **brown soil zone** is the most arid, with frequent droughts and hot dry winds. This soil zone has a longer growing season. The natural vegetation is mixed prairie grasses.

The longer growing season and greater growing degree-days makes this region the most ideal for irrigated crop production on the prairies.

No-till farming practices can be used to conserve soil moisture and leave protective crop residues on the soil surface. This practice also helps to control weeds. **No-till** is an approach to crop farming that ensures the soil is kept as undisturbed as possible. The soil is mildly disturbed during seeding and left alone otherwise.



CANOLA GROWING REGIONS IN WESTERN CANADA

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What effect do you think higher levels of salt have on crop growth?

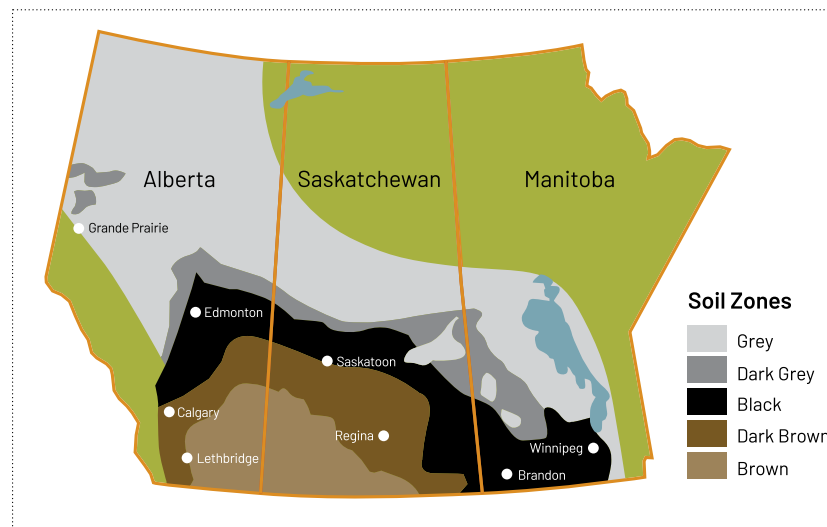
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SOIL ZONES IN WESTERN CANADA



## CROPS IN THE BROWN SOIL ZONE

Hard red spring wheat is the most commonly grown wheat type. Irrigated crops in the brown soil zone generally include cereals (wheat and barley), forages, canola and special crops, including potatoes, sugar beets, beans and corn. Some of these crops are **rotated** with each other in different seasons.

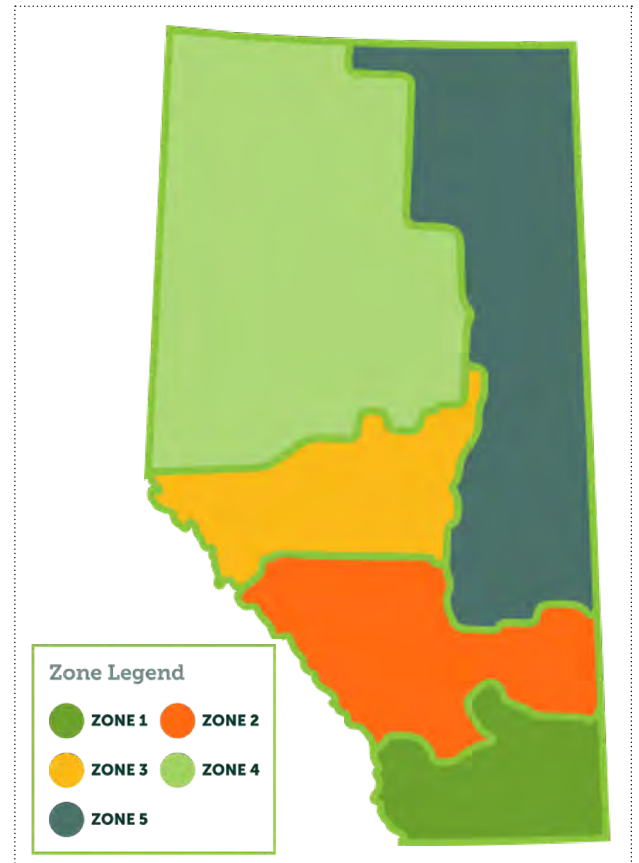
There are more varieties of special crops grown in the brown soil zone than in the cooler zones because of its longer growing season and higher number of growing degree-days.

Dry beans are a warm season crop and are grown mainly in the irrigated fields of Southern Alberta, surrounding Bow Island, Taber, and Vauxhall. Southern Alberta is the largest, northern commercial bean growing area in North America. Some field peas and lentils are also grown in these dryland fields.

Chickpeas are a relatively small pulse crop in Alberta and are grown across the southeastern part of the province, where the growing season is longest.

Soybeans are a warm weather crop that likes lots of moisture and are also grown in the brown soil zone. Faba beans can be grown in different types of soils and some of these pulse crops are found in irrigated areas of southern Alberta.

Use the soil zone and pulse growing zone maps to identify the growing areas of dry beans, chickpeas, soybeans and faba beans that are found in the brown soil zone .



PULSE GROWING ZONES IN WESTERN CANADA



DRY BEANS IN AN IRRIGATED FIELD



IRRIGATING A FIELD NEAR COWLEY, ALBERTA

## DARK BROWN SOIL ZONE

The **dark brown soil zone** has less frequent droughts than the brown soil zone and warm dry winds. The natural vegetation is mixed prairie grasses.

### CROPS IN THE DARK BROWN SOIL ZONE

Hard red spring and durum wheat are the most commonly grown wheat types in the drier regions. Other cereal crops such as malt or feed barley are grown in crop rotation. Many farmers include pulse crops, such as field peas, and oilseeds, such as canola or mustard, in their crop rotation.

Lentils are a cool season crop and are grown across the province, but primarily in the dark brown soil zone of the south. Soybeans are also grown in the dark brown soil zone.

## BLACK SOIL ZONE

The **black soil zone** has more annual precipitation than the brown and dark brown zones. The natural vegetation is mainly fescue grasses. This area is also referred to as parkland. These soils are the most fertile in the prairie region.

### CROPS IN THE BLACK SOIL ZONE

Wheat, barley, canola, and **forages** – plants mostly eaten by grazing livestock, such as cattle – are the most commonly grown crops, along with pulse crops.

Field peas are a cool season pulse crop. Field pea is the most widely grown pulse crop in Alberta and is grown in the black soil zone in southern and central Alberta. About 90 percent of field peas grown in Alberta are dry yellow peas, while 10 percent are dry green peas.

Faba beans are also a cool season pulse crop that like cool moist growing conditions. They are grown in areas of the black soil zone that have longer frost-free periods.



DARK BROWN SOIL FROM LETHBRIDGE



In what ways do the growing needs of pulse crops vary? Find two examples.

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BLACK SOIL FROM RED DEER

## GREY AND DARK GREY SOIL ZONE

The **grey and dark grey soil zones** have lower annual precipitation. The natural vegetation is mainly woodland with both coniferous and deciduous trees. In the grey soil zone, this vegetation is mixed with moss and sedge bogs, called **muskeg**. **Sedges** are a type of grass plant that grows in wet ground or near water. Grey soils are less fertile.

### CROPS IN THE GREY AND DARK GREY SOIL ZONE

Wheat, barley, canola, and forages for hay and pasture are the most common crops. Winter wheat can be grown in grey soil zones. Field peas and faba beans are grown in the Peace River region. Longer growing days in this area can help faba beans mature faster, but the shorter growing season can cause challenges.

In some northern areas, the growing season is too short for wheat crops to grow well. The land is normally cropped continuously – this means that the same crops are repeated on the same land.

The use of the practice of summerfallow has become less common. **Summerfallow** is a dated farming practice in which no crop is grown during a growing season, using either tillage or herbicides to manage weeds. Resting the land was thought to replenish moisture reserves, however advancements in agriculture have resulted in more sustainable soil practices. Zero and reduced tillage practices limit soil disturbance and increase crop residue, which helps preserve soil structure, nutrients and water.



WINTER WHEAT FIELD IN THE SPRING



GREY SOIL FROM ROCKY MOUNTAIN HOUSE



DARK GREY SOIL FROM ATHABASCA



How are crop needs for water met in different soil zones?

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