snapAG FARMING BASICS

SOIL

WHAT is soil?

Soil is a natural resource made up of minerals, organic matter and living organisms.[1] Soil contains spaces to accommodate air and water. It also teems with life such as bacteria, fungi, small mammals (mice and gophers), earthworms and insects.

Healthy soil contains a balance of minerals, air, water and organic matter that makes it suitable for growing crops, as well as providing a home for diverse soil organisms.

Do all farms have the same soil?

No. Soil types vary from region to region in Canada. For example, soil on a Prince Edward Island farm is different from soil on an Ontario farm. Soil on a farm near Saskatoon is different from soil on a farm in southwestern Saskatchewan.

WHAT SOIL LOOKS LIKE

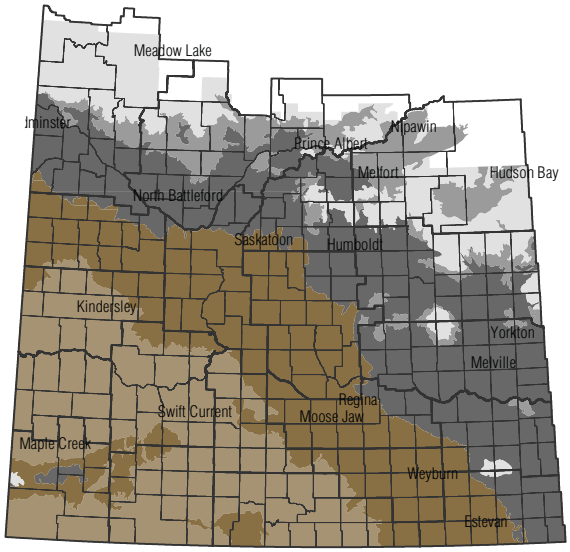
Soil is made up of parallel horizontal layers called **horizons**. Each soil horizon differs from the one above or below it due to variations of colour, structure, texture and mineral composition. **Soil structure** is determined by how soil particles cling together. **Soil texture** is determined by proportions of sand, silt and clay.

The first horizon is the surface layer called **topsoil**. It is about 10-25 cm deep and is essential for growing plants. It contains a large amount of organic matter, nutrients and water that are vital for sustaining a healthy environment for soil life.

SOIL ZONES

Soil zones are land areas that are described by the colour of their topsoil due to different amounts of soil organic matter. In Saskatchewan, for example, soil zones are classified as **brown**, **dark brown, black** or **dark gray**.[2]

Certain crops and vegetation grow best in particular soil zones. The black soil zone is very productive because the topsoil contains high amounts of organic matter.



Soil Zones of Saskatchewan

Soil is alive!

5 ml of healthy soil contains more microorganisms than there are people on earth.

HOW DO SOIL TYPES AFFECT FARMERS?

The type of soil on a farm may influence what crops are grown. Root crops such as potatoes and carrots grow best in sandy textured soil and grain crops are well suited to many soil textures.

How farmers build better soil

- **Testing soil** for soil composition and to find out which nutrients need to be added to grow crops.
- **Minimizing soil disturbance** by practicing **conservation tillage** in which the ground is covered with plant residues. This helps keep the soil in place and stop soil erosion, as well as improves soil water-holding capacity and the ability of soil to take up water and move it throughout the soil. This is important for plant growth, particularly during dry spells.
- **Increasing soil organic matter** by leaving the remnants of last year's crop (**crop residues**) in the field. Some farmers add manure or compost to fields in fall.
- **Adding nitrogen to the soil** by growing legumes (e.g., alfalfa, soybeans, lentils - also called **nitrogen-fixing** plants)

  Planting trees or shrubs in **shelterbelts** around fields to reduce soil erosion and help build organic matter

  Growing another crop (called a **cover crop**) with or after the main crop to hold soil together and prevent soil erosion. Legumes (e.g, peas, beans, lentils) are often used as cover crops.

Healthy soil is important for growing plentiful, high quality food.

Plants help soil!

FACTORS AFFECTING SOIL FORMATION[3]

Climate – precipitation, temperature, wind, sunlight

Organisms/vegetation – organisms in the soil and vegetation (influenced by climate)

Topography – shape of the land surface (hilltops, side slopes, depressions, or flat areas)

Parent material – type of sediments or rocks in which soils form (e.g., In Saskatchewan, parent material is mostly **glacial till** sediment left behind from the passage of glaciers over the earth's surface.)

Time – As soils age, minerals change from one form to another and organic matter accumulates

Seeding using conservation tillage

Soil structure **refers to how soil particles (sand, silt and clay) are clumped together and arranged. Conservation tillage helps improve soil structure.**

Lentil crop