UW Extension
Dunn County

Ag101: Soil Properties

Soil Properties

Spectacular advances in the use of fertilizers, pesticides and other agricultural chemicals since the 1950s have placed a great deal of emphasis on the use of chemistry in agriculture. In the process, the importance of physical properties of soils and their effect on growth have often been overlooked.

The range of physical properties of soil are measured in order to understand the productivity of soil as well as the soil's nutrient needs. **Soil sampling** is used to determine the nutrient levels of fields so nutrient applications can be efficiently put on the fields. However, soil sampling does not provide information about many other characteristics of soil.

Physical Properties of Soil

Soil texture indicates the proportion of soil particles (sand, silt, clay) in the soil.

Soil structure is the arrangement of the primary soil particles into aggregates of a defined shape (blocky, platy, granular).

Organic matter is the organic portion of the soil. It is extremely important because it stores plant nutrients, improves the water-holding capacity of soil, reduces the harmful effects of raindrop impact, and improves soil structure.

Mineral matter is a naturally occurring inorganic substance which has definite physical properties. Some minerals contain no elements essential for plant growth (quartz), while others provide significant sources of elements (mica).

Soil Factors Affecting Soil Management

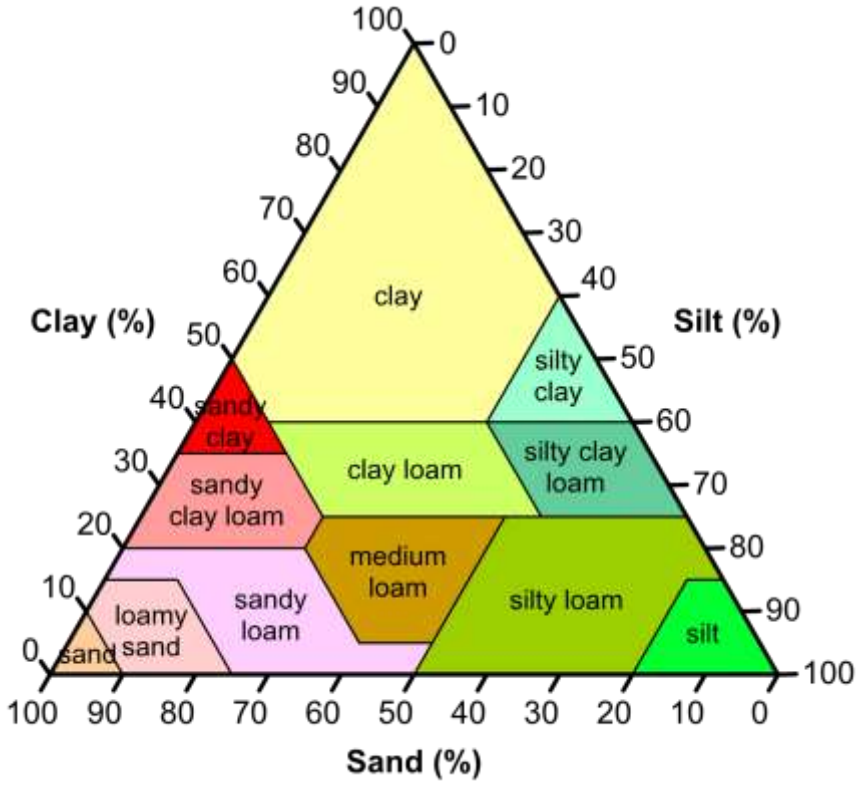
- **Soil slope**– Steepness, length, and direction the slope faces.
- **Soil depth**– Determines how deep a plants roots can grow.
- **Soil drainage**– Ability of water to leave the soil.

Land Capability Class

Land capability classes are given to soils to reflect the land's suitability for crops, grazing, forestry, and wildlife. The classes are measured from I to VIII, with I being the widest range of use (with the least risk of being damaged) and VIII being land that is not suited to economic crops. Field land capability classes are guides to choosing the appropriate land use for different soils and recommended management practices that are needed for each capability class.

What Soil Does Dunn County Have?

Dunn County soils consist of sand, sandy loam, loam, and silt loam soils. Soil texture and physical property are important factors for crop growth. The graph below is a soil textural triangle that shows the percentage of sand, silt, and clay associated with different soil textures.



Sand

When dry, there are loose single grains that feel gritty. If you squeeze it in your hand it will fall apart. If moist, squeezed soil will cast or mold but crumbles when touched.

Sandy Loam

Aggregates are crushed easily. It feels faintly velvety when rubbing but when continued, becomes sandy. When moist it forms a cast that breaks relatively easily.

Loam

Moderate pressure is needed to crush aggregates. Clods can be quite firm. Loam also feels velvety when rubbed, but becomes gritty with continuous rubbing. When moist, loam casts and can be handled freely without breaking.

Silt Loam

Aggregates are firm but may be crushed under pressure. Clods are firm or hard. The soil is smooth and flour like when destroyed. If moist, silt loam casts can be freely handles without breaking with slight tendency to ribbon.

Source: Schulte and Walsh. *Management of Wisconsin Soils. UW Extension publication A3588, P7 to 18*

For more information please visit Dunn County UW-Extension website at dunn.uwex.edu