Soils and their Relationship with Agriculture

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Cornell University Cooperative Extension

Soils are super important to Agriculture- It is the first step you need to determine when you want to start farming. You need to know what type of soils you have on your farm to determine what you can grow and how to treat them to get to that point.
Soil Characteristics Determine Use

- Sand
- Silt
- Clay
- Loams
- Muck
Sand and Gravel

- Particles not too sticky even when wet. Cannot be molded as can clay. Water holding capacity is low, large spaces between particles. Water and air pass between particles. Water and air pass through rapidly. These soils typically demonstrate good drainage and aeration but may be drought prone.

Crops with long roots

Particles are not too sticky even when wet. Cannot be molded as can clay. Water holding capacity is low, large spaces between particles. Water and air pass between particles. Water and air pass through rapidly. These soils typically demonstrate good drainage and aeration but may be drought prone.
Sand and Gravel

- Large particles, space for air.
- Good porosity for root development
- Fertilizer holding capacity minimal- leaching, early spring tillage.
- Poor water holding capacity-drought.
- Excellent response to lime-porosity.
- Fertility efficiency but not maintenance.

The effects of agricultural lime on soil are: it increases the pH of acidic soil (the lower the pH the more acidic the soil); in other words, soil acidity is reduced and alkalinity increased. ... it improves the uptake of major plant nutrients (nitrogen, phosphorus, and potassium) of plants growing on acid soils.
Silt

- Possesses an adhering film, stickiness, and adsorptive capacity similar to clay but not to such a degree.
- Average response to lime and fertilizer.
- Better fertility maintenance than sand or gravel, but still relatively poor.
- Smaller particle size than sand and gravel.

In between sand and clay
Clay

- Small particle size, very high surface area relative to other soil particles, some clay soils have 10,000 times the surface area of fine silt or sand. Easily molded when wet. Slow water and air movement. Becomes hard and cloddy when dry. Expands and contracts greatly on wetting and drying, high water holding capacity.
Clay

• Limited root potential compaction.
• Low nitrogen release and efficiency.
• Fall plowing often required.
• Water logged.
• Can grow perennial grasses well.
• Very poor response to lime.
• Maintains fertility well, hard to get there.

Crops with shallow roots- lettuce

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Loams

- A combination of sand, silt and clay for superior agricultural production.
- Well drained, adequate water holding capacity, great air water exchange.
- Can grow anything.
- Good response to lime.
- Good fertility maintenance.

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Muck

- Organic soils, contain at least 50% organic matter by volume.
- Found in wetland areas such as swamps, bogs and marshes.
- Extremely productive.
- Dark in color

Muck soils are defined by the USDA NRCS as sapric organic soils that are saturated more than 30 cumulative days in normal years or are artificially drained. In other words, it is a soil made up primarily of humus from drained swampland.
Muck
Field Conditions

- Very typically a combination of sand, silt, clay, and loam.
- Sands, loamy sands, sandy loam, very fine sandy loam, loam, silt loam, silt sandy clay loam, silty clay loam, clay loam, sandy clay, silty clay, clay.
- Soils have names-Burdette (Bu), Colonie (Co), Howard (Ho), Wellsboro (Wr).
- Burdette silt loam, Colonie loamy fine sand, Howard gravely silt loam, and Wellsboro silt loam.
Are Certain Soils More Suited for Agriculture than Others?

Should Agricultural land be Assessed Based on its Ability to produce?
How Can You Assess Soils to Determine Values?

The Soil Survey
NYS Ag Land Classification
by County

https://websoilsurvey.nrcs.usda.gov/app/
The Soil Survey

- Most counties in NYS have a soil survey book. If your county doesn’t, the Soil and Water Office will have soil maps with descriptions.
- Locate your area of interest on the index to map sheets and go to sheet number.
- Use soil legend to determine soil name.
- Once soil name is determined, work through tables for desired information.
- Note soil descriptions in the front of the book
Soil Survey of Albany County, New York
How To Use This Soil Survey

General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section General Soil Map Units for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section Detailed Soil Map Units for a description of the soils in your area.

The summary of Tables shows which table has data on a specific land use for each detailed soil map unit. See Contents for sections of this publication that may address your specific needs.
Soil Survey - Tables

- Soil Acreage
- Prime Farmland
- Land Capacity & Yields Per Acre
- Capability Classes & Sub Classes
- Woodland Management & Productivity
- Recreational Development
- Wild Life Habitat
Soil Survey - Tables

- Building site development.
- Sanitary facilities.
- Construction materials.
- Water management.
- Engineering index properties.
- Physical & chemical properties.
Ag Land Classification

- County Soil and Water provides.
- Provides map symbol to determine soil type.
- Soils ranked 1-10, 1 being prime Ag land.
## 2018 Agricultural Assessment Values per Acre

**Established January 2018**

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The Agricultural Assessment Values per acre are for each respective classification of land. This table presents the Agricultural Assessment Values per acre in the following agricultural assessment, subject to its applicability. For any adjustment in the application of the most Recent Agricultural Value to each existing unit, refer to the relevant table or classification for the respective classification of land. The values are subject to review and approval by the appropriate governmental body. For more information, refer to the Agricultural Assessment Policies for each existing unit.

The values presented for Mineral Soil Types are based on the Agricultural Assessment Values per acre. For Mineral Soil Types, there are no indications of market values for these types of land. The assessment is not for sale, lease, or transfer, and the assessment value for each existing unit is fixed.
## Comparison of Agricultural Assessment Values Per Acres 2008 - 2017

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## Organic Soil

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Thank You

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