Compare How Much Water Different Soils Hold

You will need 2 cans of equal size (coffee cans will do); two 18-inch squares of cloth; some heavy string; a package or similar scale that weighs up to 64 ounces or 2,000 grams; and a container of water, such as a 2 or 3-gallon bucket.

Put equal volumes of soil in the two cans. Take the soil for one from a field or garden that has been cultivated for several years and that shows lack of organic matter. This sample should be hard and cloddy. Get the other from a well-managed field where grasses and legumes have been grown, or from a good pasture or similar location. This sample should be crumbly and free from clods.

First allow the soils to dry.

Empty the two soils samples on the cloth squares, pull the corners together, and tie with a heavy string. Weigh each sample and record the weight.

Saturate each bag of soil holding it in the water long enough to soak thoroughly. Remove the soil samples from the water and allow them to drain off the free water for a few minutes. Then weigh again and record the weights.

Calculate the difference in weight.

Interpretation

When organic matter is used up, soil packs together. Thus, a cloddy soil has fewer air spaces so particles do not cling together in granules, and the lack of organic matter means that it weighs more than an equal amount of crumbly soil from a well-managed plot.

Not only does a crumbly soil take in water faster than a cloddy one, it holds more. The thoroughly decomposed organic matter (humus) in a crumbly soil can absorb lots of water. On a dry-weight basis, this humus has a water-holding capacity of several hundred percent and may act like a sponge. In addition to the water held by the organic matter itself is the water held in the pores between the soil particles and between the soil granules. Hundreds of very fine soil particles are glued together by the organic matter into soil granules.

This increased water-holing capacity of soils high in organic matter under natural conditions makes a big difference in the intake of water. These well-managed soils can absorb most of the rain and snowmelt (if the soil is not frozen). This means there will be less erosion. Streams will run clear. Of course, when the soil is saturated by a long period of rainfall, any additional water then runs off. But until the soil is saturated it will store up water and let it go gradually. The result is that floods are less severe, water seeps to streams slowly and over a longer period of time, and water is stored in the soil for plats to use.

Crops use lots of water. Vegetables use an average of 2 acre-feet, or 650,000 gallons an acre. Cotton takes 800,000 gallons per acre. An acre of alfalfa needs over a million gallons. To produce one ear of corn it takes over a barrel of water. Organic matter helps soil store more water and thus helps prevent erosion and produce better crops.

Many field tests have shown the improved water-holding capacity of well-managed soils that have enough organic matter to keep them crumbly and granulated. One deep soil in Texas that was high in organic matter held 25 percent or 1 inch more water in the 1-foot surface layer, after the free water and drained off, than the same depth and type of soil in another field where the soil was low in organic matter. This made a difference of 27,000 gallons of water per acre in the first foot of soil.

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