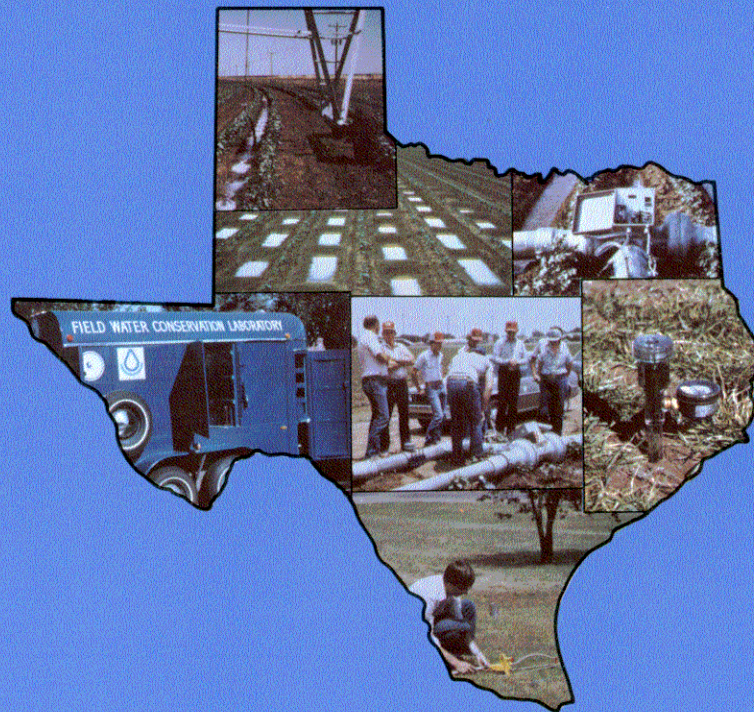
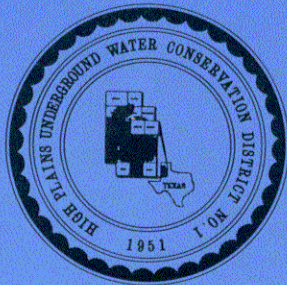


WATER MANAGEMENT NOTE



ESTIMATING SOIL MOISTURE BY FEEL AND APPEARANCE

GUIDE FOR JUDGING HOW MUCH MOISTURE IS AVAILABLE FOR CROPS

Dominant Texture	Fine Sand and Loamy Fine Sand	Fine Sandy Loam	Sandy Clay Loam and Loam	Clay, Clay Loam or Silty Clay Loam
Inches of water per foot soil will hold at field capacity	.60 - 1.25	1.2 - 1.5	1.4 - 1.9	1.5 - 2.3
Available soil moisture as a percent	Soil moisture deficit in inches per foot when the feel and appearance of the soil is as described			
0 to 25 percent	Dry, loose, single grained, flows through fingers. 1.25 - .60	Dry, loose, flows through fingers. 1.5 - 1.0	Powdery dry, sometimes slightly crusted but easily broken down into powdery condition. 1.9 - 1.4	Hard, baked, cracked, sometimes has loose crumbs on surface. 2.3 - 1.5
25 to 50 percent	Appears to be dry, will not form a ball with pressure. .60 - .45	Appears to be dry, will not form a ball. 1.0 - .65	Somewhat crumbly but holds together from pressure. 1.4 - 1.0	Somewhat pliable, will ball under pressure. 1.5 - 1.0
50 to 75 percent	Tends to stick together slightly, but crumbles easily, will not form ball. .45 - .20	Tends to ball under pressure but seldom holds together. .65 - .30	Forms a ball somewhat plastic, will sometimes slick slightly with pressure. 1.0 - 0.5	Forms a ball, ribbons out between thumb and forefinger. 1.10 - .55
75 to 100 percent	Tends to stick together slightly, sometimes forms a very weak ball under pressure .20 - 00	Forms weak ball, breaks easily, will not slick. .30 - 00	Forms a ball, is very pliable, slicks readily if relatively high in clay. 0.5 - 00	Easily ribbons out between fingers, has slick feeling. .55 - 00
At field capacity (100 percent)	Upon squeezing, no free water appears on soil but wet outline of ball is left on hand. 00	Upon squeezing, no free water appears on soil but wet outline of ball is left on hand. 00	Upon squeezing, no free water appears on soil but wet outline of ball is left on hand. 00	Upon squeezing, no free water appears on soil but wet outline of ball is left on hand. 00

ESTIMATING SOIL MOISTURE BY FEEL AND APPEARANCE

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An estimate of the amount of moisture in storage in the plant root zone at any root depth can be determined by using the "feel and appearance method" of monitoring soil moisture.

The feel and appearance method of determining soil moisture conditions involves the physical collection of soil samples and firming of the samples with the hand. Soils of similar texture react and appear differently if squeezed when they contain various amounts of moisture. By comparing the appearance of the sample to the photographs and descriptions below, an indication of soil moisture content can be determined.

It is recommended that irrigators who choose to use this method to estimate their soil moisture conditions take at least one sample at each one-foot depth interval in the plant root zone (usually to a depth of four feet). Samples should be taken at several locations in the field each time they wish to determine their current soil moisture conditions.

Prior to taking a soil sample to determine soil moisture content, it is important that the irrigator determine his soil type and its water-holding capacity. The reason for doing this is that soils of different textures such as sand, loam or clay hold different amounts of water per foot of soil depth.

Appearance and Feel of Sandy Clay Loam and Loam Soils at Various Soil Moisture Conditions



0 to 25 PERCENT AVAILABLE MOISTURE:
From powdery dry and hard, to easily crumbled material, which holds together only slightly upon squeezing, breaks easily.



25 to 50 PERCENT AVAILABLE MOISTURE:
From somewhat crumbly and non-pliable, to material which almost balls under pressure, but breaks easily, will not ribbon.



50 to 75 PERCENT AVAILABLE MOISTURE:
Forms a ball readily, slightly sticky and pliable, will ribbon between thumb and forefinger.



75 to 100 PERCENT AVAILABLE MOISTURE:
Easily forms a somewhat sticky and pliable ball, ribbons easily, will slick with pressure.

Irrigators who are unsure of their soil type and its water-holding capacity should consult the U.S. Department of Agriculture-Soil Conservation Service County Soil Survey for this information. Copies of county soil surveys are available at the local USDA-SCS office, USDA-ASCS office, county extension office, and county and public libraries.

Pocket-sized "soil moisture guides" which provide the approximate water-holding capacity in inches of water per foot of soil depth for the major soil types in each county served by the Water District are available at the Water District and Soil Conservation Service county and district offices.

Once the irrigator has determined his soil type and its water-holding capacity, he needs the proper tools for collecting soil samples. Soil augers or soil sampling tubes are available for collecting soil

samples and are the tools recommended for this management practice. Sharp shooter spades and shovels can be used to collect soil samples, although they require more effort and there is greater difficulty in obtaining soil samples at the three and four foot depths.

The next decision is to determine the location in the field for collecting the soil samples. It is recommended that the irrigator collect three sets of soil samples in each field to be monitored. Measuring from either end of the field, the first set of soil samples should be collected one-fourth the distance of the field from the starting end. The second set should be collected near the middle of the field, and the third set should be collected three-fourths of the way through the field.

Appearance and Feel of Clay, Clay Loam or Silty Clay Loam Soils at Various Soil Moisture Conditions



0 to 25 PERCENT AVAILABLE MOISTURE:
From powdery dry and hard, to soil which crumbles readily, will hold together only with difficulty and breaks easily.



25 to 50 PERCENT AVAILABLE MOISTURE:
Somewhat crumbly, holds together slightly upon squeezing, but will not ball or ribbon.



50 to 75 PERCENT AVAILABLE MOISTURE:
Forms a durable ball and is slightly to moderately sticky and plastic (pliable), will easily ribbon out between thumb and forefinger, slicks slightly with pressure.



75 to 100 PERCENT AVAILABLE MOISTURE:
Forms a soft, sticky, plastic (pliable) ball, easily ribbons out between thumb and forefinger, slicks readily.

After determining the sample collection locations, the next step is to collect and evaluate the soil samples for moisture content. A written record should be made of the moisture condition for each site and for each depth sampled. These readings can be used for later calculations and future reference.

After taking soil samples and evaluating the samples for moisture content at all sites in the field being monitored, it is recommended that the irrigator add the total water available in inches for all sites, then divide the sum by the total number of sites evaluated. By doing this, the irrigator obtains a field average of the soil moisture available at the date the samples were collected. Also, the average for the field can be subtracted from the total available water-holding capacity of the soil to obtain

an estimate of the quantity of water which needs to be added to bring the soil to field capacity in the soil root zone area.

The decisions about the date to begin irrigation and the amount of water which needs to be applied depend largely on the amount of soil moisture found in the upper two feet of the root zone area. As a good rule of thumb, the irrigator should begin irrigating before the soil moisture level in the upper two feet of the root zone profile falls below fifty percent available moisture. Irrigation should be completed before the available soil moisture level falls below twenty-five percent in the upper two feet.

Soil moisture in the three- and four-foot levels could be compared to a savings account. It will be utilized when moisture is in short supply in the upper two feet and later in the growing season when more water is needed to support a heavy fruit load.

Appearance and Feel of Fine Sand and Loamy Fine Sand Soils at Various Soil Moisture Conditions



0 to 25 PERCENT AVAILABLE MOISTURE:
Dry, loose, flows through fingers.



25 to 50 PERCENT AVAILABLE MOISTURE:
Looks and feels dry, will not form a ball, but will hold together very weakly with pressure.



50 to 75 PERCENT AVAILABLE MOISTURE:
Will almost form a weak ball, but will not hold together even with easy handling, sand grains cling slightly to fingers.



75 to 100 PERCENT AVAILABLE MOISTURE:
Forms a weak ball which will withstand careful handling, feels wet, sand grains cling fairly strongly to fingers.