



Natural Resources Conservation Service  
101 SW Main Street; Suite 1300  
Portland, Oregon  
Phone: (503) 414-3247 Fax: (503) 414-3277

---

## Soil Moisture Measurement

---

### Introduction

- The material provided in this section is intended to serve as a framework for soil moisture measurement training.
- Trainers should modify the training material referenced as necessary to achieve the planned skill level for the trainees.
- Trainers are encouraged to include locally developed training materials to complement and/or supplement the referenced material.
- As new training materials are developed by trainers, they are encouraged to furnish copies to the National Employee Development Center for inclusion in future versions of the Toolbox.

### Suggested Objectives

1. Determine appropriate method of soil moisture measurement for given specific site conditions.
2. Specify methods and procedures to obtain accurate measurements
3. Perform soil measurement using applicable procedures and tools.

### Suggested Outline

- I. Introduction  
Identify advantages and performance limitations of existing soil moisture measuring devices and techniques.
- II. Body
  - A. Evaluate local soils, and water user objectives and select appropriate soil moisture measuring equipment./techniques.
  - B. Select best measuring device.
  - C. Install and operate soil moisture measurement devices.
- III. Summary

### Soil Moisture Measuring Methods

1. "Feel" Method.
2. Tensiometers.
3. Electrical Resistivity.
4. Speedy Moisture Meter.



Natural Resources Conservation Service  
101 SW Main Street; Suite 1300  
Portland, Oregon  
Phone: (503) 414-3247 Fax: (503) 414-3277

---

## Soil Moisture Measurement

---

5. Laboratory (Gravimetric) Method.
6. Neutron Gauge and 7, Dielectric Constant Method. (Time Domain Reflectometry).

### 1. "Feel" Method

#### Reference Material

- Irrigation Guide, Chapter 9.
- NEH 15.

#### Toolbox Materials

- Publication "Estimating Soil Moisture by Feel and Appearance", Water Management Note, High Plains Underground Water Conservation District No. 1, TX.
- Publication "Soil Water Measurements: An Aid to Irrigation Water Management", Irrigation Management Series, Kansas State University, Cooperative Extension Service.
- Publication "The Montana Irrigators' Pocket Guide", Montana Department of Environmental Quality, MT.
- Video "Reflections: Soil Moisture Monitoring", NRCS, NM.



Natural Resources Conservation Service  
101 SW Main Street; Suite 1300  
Portland, Oregon  
Phone: (503) 414-3247 Fax: (503) 414-3277

---

## Soil Moisture Measurement

---

### 2. TENSIOMETERS

#### Reference Material

- Irrigation Guide, Chapter 9.
- NEH 15 .

#### Toolbox Material

- Publications "Soil Water Measurements: An Aid to Irrigation Water Management", Irrigation Management Series, Kansas State University, Cooperative Extension Service, KS.
- Publication "Tensiometer Use in Scheduling Irrigation", Irrigation Management Series, Kansas State University, Cooperative Extension Service.
- Publication "The Montana Irrigators' Pocket Guide", Montana Department of Environmental Quality, MT.
- Publication "Tensiometers: A Gauge for Measuring Soil Moisture", Water Management Note, High Plains Underground Water Conservation District No. 1
- Video "Agricultural Irrigation Scheduling, The Irrrometer Story", Irrrometer Company.
- Video "Reflections: Soil Moisture Monitoring", NRCS, NM.



Natural Resources Conservation Service  
101 SW Main Street; Suite 1300  
Portland, Oregon  
Phone: (503) 414-3247 Fax: (503) 414-3277

---

## Soil Moisture Measurement

---

### 3. Electrical Resisity

#### Reference Material

- Irrigation Guide, Chapter 9.
- NEH 15.

#### Toolbox Material

- Publication "Irrigating By The Block: Soil Moisture Blocks and Resistance Meters", Water Management Note, High Plains Underground Water Conservation District No. 1.
- Publications "Soil Water Measurements: An Aid to Irrigation Water Management", Irrigation Management Series, Kansas State University, Cooperative Extension Service.
- Publication "The Montana Irrigators' Pocket Guide", Montana Department of Environmental Quality, MT.
- Video "Agricultural Irrigation Scheduling, The Irrrometer Story", Irrrometer Company.
- Video "Reflections: Soil Moisture Monitoring", NRCS, NM.



Natural Resources Conservation Service  
101 SW Main Street; Suite 1300  
Portland, Oregon  
Phone: (503) 414-3247 Fax: (503) 414-3277

---

## Soil Moisture Measurement

---

### 4. Speedy Moisture Meter

#### Reference Material

- Irrigation Guide, Chapter 9.
- NEH 15, Chap 1.

#### Toolbox Material

- None

### 5. Laboratory (Gravimetric) Method Of Soil Moisture Measurement

#### Reference Material

- Irrigation Guide, Chapter 9.
- NEH 15.

#### Toolbox Material

- Publication "The Montana Irrigators' Pocket Guide", Montana Department of Environmental Quality, MT.
- Publication "Soil Water Measurements: An Aid to Irrigation Water Management", Irrigation Management Series, Kansas State University, Cooperative Extension Service.



Natural Resources Conservation Service  
101 SW Main Street; Suite 1300  
Portland, Oregon  
Phone: (503) 414-3247 Fax: (503) 414-3277

---

## Soil Moisture Measurement

---

### 6. Neutron Gauge

#### Reference Material

- Irrigation Guide, Chapter 9.3.3.
- NEH 15.
- Michigan NRCS Neutron Software and User's Guide (Campbell-Pacific only).
- NRCS "Neutron Gauge Training Session".

#### Toolbox Material

- Publication "Neutron Moisture Meters: The Scientific Approach to Monitoring Soil Moisture", Water Management Note, High Plains Underground Water Conservation District No. 1.
- Publication "Soil Water Measurements: An Aid to Irrigation Water Management", Irrigation Management Series, Kansas State University, Cooperative Extension Service.
- Publication "The Montana Irrigators' Pocket Guide", Montana Department of Environmental Quality, MT.



Natural Resources Conservation Service  
101 SW Main Street; Suite 1300  
Portland, Oregon  
Phone: (503) 414-3247 Fax: (503) 414-3277

---

## Soil Moisture Measurement

---

### 7. Dielectric Constant Method (Time Domain Reflectometry)

#### Reference Material:

Irrigation Guide, Chapter 9.

#### Toolbox Material

None

#### ALLL Methods

#### Facilitation Options

- Self-paced,
- Facilitator guided, or
- Formal training course.

#### Evaluation

Each state should develop an evaluation procedure which addresses the level of competence before and after training is provided.

#### Overview

Extension Circular EC 89-724.