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# Soil Quality Test Kit Guide



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## PREFACE

Soil quality is simply defined as “the capacity of a specific kind of soil to function.” It is generally assessed by measuring a minimum data set of soil properties to evaluate the soil’s ability to perform basic functions (i.e., maintaining productivity, regulating and partitioning of water and solute flow, filtering and buffering against pollutants, and storing and cycling nutrients). This guide describes a kit of selected field procedures to evaluate or indicate the level of one or more soil functions.

When measuring soil quality, it is important to evaluate the physical, chemical, and biological properties of the soil. Physical properties addressed by the kit include bulk density, water content, infiltration rate, aggregate stability, slaking, and morphological estimations. Biological properties measured include soil respiration and earthworms. Soil chemical properties measured include pH, electrical conductivity (EC), and soil nitrate levels. The chemical tests are also useful to evaluate water quality of well-water, tile drainage waters, and other water bodies related to farm activities.

Section I of this guide provides a list of supplies and instructions for conducting a number of on-farm tests to assess soil quality. Section II provides background and interpretive information for each test described in Section I. These tests, or indicators, are designed as a screening tool to provide immediate results for comparing management systems, monitoring changes in soil quality over time, and for diagnosing possible soil health problems due to land use and management.

These tests can be easily conducted on the farm by NRCS field personnel or by landowners themselves to assess the quality of their soil. Use of the kit allows NRCS staff to be an active participant with the landowner in the assessment of soil health. The assessment will provide the opportunity to discuss management options when the need arises.

The kit was developed by John Doran and associates, Agricultural Research Service, Lincoln, NE. The Soil Quality Institute has continued the development, enhancement and testing of the kit (with NRCS field staff) by adding tests, modifying the manual, and writing an interpretations guide. The NRCS Soil Quality Team in Akron, CO (Manuel Rosales, Josh Saunders, and Mike Sucik) were instrumental in the field testing of the test kit and this guide. The Soil Quality Test Kit Guide is a dynamic document. The Institute welcomes suggestions for additional tests and interpretive information to incorporate in future versions of the guide.

The Institute gratefully acknowledges the contributions of the following individuals: John Doran, USDA-ARS, Lincoln, NE, for the development of the original soil quality test kit from which this guide is based. Bob Grossman, USDA-NRCS, NSSC, Lincoln, NE, for the development of the soil structure index and penetration resistance tests. Jeff Herrick, USDA-ARS, Las Cruces, NM, for the development of the soil slake test procedure and aggregate stability test design. Dennis Linden, USDA-ARS, St. Paul, MN, for the development of the earthworm procedure. Bob Hanafin, Auburn University, for the development of the design and layout of this guide. Cathy Seybold and Lee Norfleet, USDA-NRCS, Soil Quality Institute, for the development of this guide and testing of kit procedures.

The mission of the Soil Quality Institute is to cooperate with partners in the development, acquisition, and dissemination of soil quality information and technology to help people conserve and sustain our natural resources and the environment.

For more information about the Soil Quality Institute and its products and services, visit our website at <http://www.statlab.iastate.edu/survey/SQI/>.

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