

Use of Soil Spectral Indicators for Assessing and Monitoring Soil Quality

K. D. Shepherd, M. G. Walsh, A. Awiti.* Paper presented at ASA-CSSA-SSSA Annual Meetings, 2-6 November 2003, Denver, Colorado, USA. Annual Meeting Abstracts [CD-ROM]. ASSA, CSSA, and SSSA, Madison, WI, USA.

Email correspondence: k.shepherd@cgiar.org

Abstract

Assessment and monitoring of soil degradation over large areas is hampered by the lack of repeatable case and reference definitions of soil quality and the expense of analysing large numbers of soil chemical, physical and biological properties. Our previous work has shown that many soil properties can be predicted from a single non-destructive measurement of soil diffuse reflectance (350-2500 nm). Here we show how we are using spectral indicators to assess and monitor changes in soil quality in a large (3500 square km) river basin in Kenya. Soil quality classes were defined on the basis of multivariate analysis of soil properties.

A spectral screening test was developed which predicted soil quality class with a cross-validated efficiency of 89%. The spectral soil quality index was able to detect treatment differences in a long-term soil management experiment at an independent site. The spectral index was calibrated to Landsat TM reflectance (cross-validated prediction efficiency of 75%) and used to map out soil quality over the entire river basin. These tools should be used by soil survey agencies to map and monitor soil quality at national scale.

* Correct Citations: Shepherd KD, Walsh MG, Awiti A 2003. Use of soil spectral indicators for assessing and monitoring soil quality. Paper presented at ASA-CSSA-SSSA Annual Meetings, 2-6 November 2003, Denver, Colorado, USA. Annual Meeting Abstracts [CD-ROM]. ASSA, CSSA, and SSSA, Madison, WI, USA.