Ericksen, P. J., and K. McSweeney. 1999. Fine-scale analysis of soil quality for various land uses and landforms in central Honduras. *American Journal of Alternative Agriculture* 14, no. 4: 146-157.

20 sites in a catchment ar4ea of Honduras (Central America) were sampled at field scale, 100 to 400 m^2 plots, along within-site transects aligned with surface water flow direction, at intervals of 0, 5, 10, 15, & 35m. to test land form, land use, and 5 main soil functions from 14 attributes: (Table 1, p.149): infiltration rate, bulk density, microtopography & vegetative cover, soil structure, soil macrofauna, % clay, SOC, surface stoniness, soil N, P & K, pH, and A horizon 'thickness' (dseptn?). --Soil attributes were scored & weighted by function, following Karlen et al. (1997); summing scored attributes to a "value of unity". (for assignment of weights, see p.151.) --Used analysis of variance and means; land use, landform were important qualitatively but noty quantitatively (p.153). --Scoring soil quality functions displayed complexities and diversity; study's SQIndices were inconclusive & did not account for the variability found (p.154).

Farquharson, R. J., G. D. Schwenke, and J. D. Mullen. 2003. Should we manage soil organic carbon in Vertosols in the northern grains region of Australia? -- Application of sustainability indicators to the management of soil and catchment health. *Australian Journal of Experimental Agriculture* 43, no. 3: 261-270.

"... the results and associated discussion give some support to the use of soil organic carbon as a sustainability indicator for soil health. There was a consistent correlation between crop input decisions (fertilisation, stubble management, tillage), outputs (yield and profits) and outcomes (change in soil organic carbon content) in the short and longer term. And this relationship depended to some extent on whether the existing soil organic carbon status was low, medium or high. A stock dynamics relationship is one where the change in a stock (such as soil organic carbon) through time is related not only to the management decisions made and other random influences (such as climatic effects), but also to the concentration or level of the stock itself in a previous time period. Against such a requirement, soil organic carbon was found to be a reasonable measure. " *--Authors' abstract excerpt.*

Fernandez-Pozo, L., J. Labrador, A. Florentino, and R. Ballesteros. 2002. Agroecological indicators to evaluate soil quality under Mediterranean conditions. In: *Man and soil at the Third Millennium;* Proceedings [of the] International Congress of the European Society for Soil Conservation, Valencia, Spain, 28 March 1-April, 2000; Volume 1: 1911-1922. J. L. Rubio, R. P. C. Morgan, S. Asins, and V. Andreu, editors. Logrona, Spain: GEOFORMA Edicions, S.L.

This abstract discusses the need for soil quality assessment based upon soil functions, and a philosophy re crop productivity. A project in Spain exists, to examine farmer perceptions re SQ in the context of sustainability.

Filip, Z., and J. Berthelin. 1999. Development and application of ecologically based indicators of soil quality. *Scientia Agriculturae Bohemica* 30, no. 3: 209-223.

This article provides a summary/overview of a project by five European Community countries to derive comparisons from 49 sites for soil quality in undisturbed vs. 'anthropogenically-stressed' soils, by laboratory testing of established indicators. Field samples were taken from 5 countries, 49 locations (See Table 1 on p.170). The study is dynamic, with ongoing tests/comparisons. Parameters were: microbial biomass, composition and abundance of microbial communities (bacteria, fungi, microbes), and biochemical activities (respiration (CO_2 release-0ATP, substrate, & post-fumigation), ammonification (NH_4 release--cations), nitrification/denitrification, dehydrogenase, and humification (humic & fulvic acids); also some aquatic testing). Graphs of results are presented. Findings include wide variability across test sites, which points to need to establish critical limits of soil quality. The article gives the preliminary results, with more to be reported by individual authors from the five countries (gives names of involved researchers in bibliography).

Firestone, Mary K., Teri C. Balser, and Donald Herman. 1998. Defining soil quality in terms of microbial community structure. From URL:
http://www.cnr.berkeley.edu/~gsposito/Kearney/Proposals/firestone.html

The purpose of this work was to refine the methods used to determine microbial diversity and community structure in soil and to begin to establish a relationship between microbial community composition and soil function. We investigated the usefulness of a commercially-prepared substrate utilization profile method (BiOLOG indices) in providing a functional index of microbial community processes. We find that the method correlates very well with observed soil processes. *--Authors' Introduction.*

France. 2002. Mesures de la qualite des sols: la France se dote d'un reseau. *Chambres D'Agriculture* 908: 37-39.

Factors that can influence soil quality are discussed, and elements involved in the French Soil Quality Measurement System are outlined. ... A systematic network has been established to provide measurement of soil quality indicators... The national system is based on routine testing of soil samples taken from approximately 2000 sites spread uniformly across France in a 16 km grid pattern. The sampling and testing mechanisms used as part of this national system are described. --*CAB Abstracts.*

Francis, G. S., and M. H. Beare. 2002. The Land Management Index: A potential pressure indicator [progress report]. In: *Soil Quality and Sustainable Land Management Conference Proceedings*; Pp.87-93. Peter Stephens, Jemma Callaghan, and Anne Austin, editors. Wellington, NZ: Ministry of Agriculture and Forestry.

Regional councils in New Zealand have a statutory obligation to ensure that the life-supporting capacity of soil is maintained. Councils undertake state of the environment monitoring and reporting to meet this obligation, using a number of soil state indicators. However, councils may prefer to use a pressure indicator. ... This paper contains results from work aimed at developing an improved pressure indicator -- the land management index. --*Authors' Introduction, p.87*

Franco-Vizcaino, E. 1997. Comparative soil quality in maize rotations with high or low residue diversity. *Soil Biology and Biochemistry -- Biology and Fertiliity of Soils* [Oxford : Elsevier Science Ltd.] 24, no. 1 (Jan): 32-38.

This study assessed differences in soil quality linked to differences in the diversity of residues returned to the soil in nine pairs of farm fields in central Michigan. To assure that management was the main difference within pairs, study sites were selected that mapped to the same soil series. Analysis of variance using subsamples as replicates for all nine comparisons revealed significantly higher maize (Zea mays L.) yield and total and mineralizable N for the high diversity fields. Manuring history reported by farmers was difficult to reconcile with levels of total C and extractable P. To account for uncertainty in manuring histories, comparisons were separated into four subsets on the basis of residue diversity (DVS) and extractable P (high DVS high P, low DVS low P, high DVS low P, and low DVS high P). For these segregates, analysis of variance (ANOVA) using subsamples as replicates revealed significant improvements in 6 of 21 soil quality indices in the high DVS P subset. For all nine comparisons, correlation analysis revealed moderately strong relationships between total C, extractable P, as well as their ratio (Ctot/Pext), and both bulk density and log (infiltration time). When the data were segregated as before, these relationships were much stronger for the high DVS high P subset. and their slopes differed significantly from those of the other subsets, indicating that the data points originated from different populations. These results suggest a strong interaction between residue diversity, and P likely applied in manure, that influenced soil quality. *--Authors' Abstract, from Science Citation Index and from Agricola databases.*

Freudenschuss, Alexandra, Sigbert Huber, Martin Schamann, and Martha Wepner. 2001. "EIONET technical workshop on indicators for soil contamination." *Workshop proceedings*, Technical report no.79. European Environment Agency, 2002 Project Report. From URL:
http://www.reports.eea.eu.int/technical_report_2002_78/en/technical_report_78.pdf

Freudenschuss, Alexandra, Sigbert Huber, Martin Schamann, and Martha Wepner. 2002. Assessment of data needs and data availability for the development of indicators on soil contamination. [8pp.]. Technical report no.81. European Environment Agency, 2002 Project Report. From URL: http://www.reports.eea.eu.int/technical_report_2002_81/en/tech_81.pdf

Freyenberger, Stan, Rhonda Janke, and David Norman. 1996? "Indicators of sustainability in whole-farm planning: Literature review." Kansas State University, Kansas Sustainable Agriculture Series, Paper no.2. From URL: http://agecon.uwyo.edu/wire/Reports/KSUSustAgPaper2.htm

This Kansas State University extension paper surveys the 'grey literature' for indicators of agricultural sustainability; reviews several 'framework' conferences and biophysical indicator papers (pp.8-11), as well as papers on socio-economic and international-scale indicators. Soil quality studies are primarily in the biophysical category.—Advocates a whole-farm planning model.

Frielinghaus, M., H. Petelkau, D. Deumlich, R. Funk, L. Muller, and B. Winnige. 2001. Soil indicator system to minimize the risk of soil degradation in northeastern Germany. In: *Sustaining the global farm—Selected papers from the 10th International Soil conservation Organization Meeting (ISCO99.)*. D. E. Stott, R. H. Mohtar, and G. C. Steinhardt, editors. West Lafayette, IN: International Soil Conservation Organization in cooperation with the USDA and Purdue University. From URL:
http://topsoil.nserl.purdue.edu/nserlweb/isco99/pdf/isco99pdf.htm/

Fu, Bo Jie, Shi Liang Liu, Yi He Lu, Li Ding Chen, Ke Ming Ma, and Guo Hua Liu. 2003. Comparing the soil quality changes of different land uses determined by two quantitative methods. ***Journal of Environmental Sciences*** **15, no. 2: 167-172.**

Sichuan Province in SW China, on Wolong Nature Reserve land, this study examined land use changes and effects upon soil quality through use of an integrated SQ Index, from principal components analysis and analysis of variance, using field-level data. Compared 79 soil samples collected from 6 land use types at 0-30cm depth on soil properties of: bulk density, SOC, total N, P, K, available N, K, P using the "China Standard method" (1996); and also considered land use succession. Assumed forested soils were in the most 'natural' state and other land uses had caused 'deterioration'; developed a Deterioration Index. But, static study and land use types used to 'represent' land use succession/change (ch notes). Findings were that cultivation caused disturbance and loss of soil nutrients at statistically significant levels. Sampling details are not given (ch notes). SQ Indices values are compared here as "membership functions" of land use type (p.170).