Islam, K. R., and Raymond R. Weil. 1997. Stability of soil quality indices across seasons and regions. American Society of Agronomy, Soil Science Divisions -- Abstracts of Annual Meeting 1997, Anaheim, California; p.215.

In this study, researchers sampled field-moist, air-dried / microwaved soils; measured soil quality attributes / indicators; and used 'normalized averages' of the ranges measured. S.Q. indicators measured were: microbial biomass and activity, enzyme activity, respiration, metabolic quotient, mineralized N, & aggregate stability.

Islam, K. R., and Raymond R. Weil. 2000. Land use effects on soil quality in a tropical forest ecosystem of Bangladesh. Agriculture, Ecosystems & Environment 79, no. 1: 9-16.

The effects of land use changes on soil quality properties in a tropical forest ecosystem of Bangladesh were assessed by collecting soil samples from adjacent well-stocked Shorea robusta natural forest, land reforested with Acacia, grassland and cultivated land. Land use/land cover changes (degradation of natural forest and subsequent cultivation of soils) resulted in surface compaction and significant decreases in silt and clay contents, porosity and aggregate stability, N, fulvic and labile C, and microbial biomass C. Maintenance respiration rates increased in comparison to the soils under natural forest. Use of **soil deterioration index** showed that soil quality deteriorated significantly (-44%) under cultivation, while in sites revegetated with fast-growing Acacia or grasses, it improved by 6-16%. --Authors' Abstract.

Islam, K. R., and Raymond R. Weil. 2000. Soil quality indicator properties in mid-Atlantic soils as influenced by conservation management. Journal of Soil and Water Conservation (Ankeny) 55, no. 1: 69-78. [N.B.: See also: Shepard, R. and Weil, R. for identical title....].

The authors see soil indicators as ephemeral, intermediate or permanent properties respective to their sensitivity to management practices, and therefore, utility as soil quality parameters. A solid, balanced, analysis of soil quality indexing in perspective is given in this paper. 14 management systems are replicated in field experiments, in the Mid-Atlantic USA (organic or conventional; no-till, tillage; crop rotations); attributes were: pH, organic C, N, C/N ratio, % clay, bulk density, soil texture; microbial biomass; aggregate stability, soil respiration. Soil sampling was done in April and May 1994, from field plots. Statistical analyses: ANOVA using SAS; 22 paired comparisons; some conservation-managed experimental field box-plot sites (part of NCRS program and data sets). The authors mentioned using the "SQIndex Determiner software" by Norfleet et al. (1997) .
Conclusions: Soils under conservation management had a larger and more active microbial biomass, higher assimilation, and geater accumulation of organic C, lower specific respiration, and higher aggregate stability than did conventionally-managed soils. Three parameters that showed the most promise for inclusion in an index of SQ were C-TMB, C-AMB and qCO_2; so that these authors advocate further study of microbial biomass (both total and active), specific respiration rate, and aggregate stability (and similar organic matter related parameters) as indicators of agricultural soil quality and as candidates for inclusion in minimum data sets for generating SQ indices.(p.77).

Jaenicke, Edward C., and Laura L. Lengnick. 1999. A Soil quality index and its relationship to efficiency and productivity growth measures: two decompositions. American Journal of Agricultural Economics [Ames, Iowa: American Agricultural Economics Association] 81, no. 4 (Nov): 881-893.

This is a thorough review of soil quality literature to 1999. It is also a theory paper regarding the use of economic indexes to "decompose" into the factors most relevant in determining soil quality. The authors see "static" models for Doran & Parkin, Karlen & Stott, & "comparative-static" for Larson & Pierce [all definitive authors on the topic--ch notes]. --Used linear regression equations to examine model "outputs" with respect to productivity or 'technical efficiency'; --examined C to N ratio, bulk density, water-holding capacity, available P & K, acidity & available Mg as soil quality "inputs", & influence on no-till corn yield (in ?location or field?--ch notes) to derive a reduced-data set. A 10,700 kg/ha corn yield baseline was used, with high correlation for cropy yields & soil quality. --Approximated a soil quality index "by a linear weighting of individual soil attributes by an OLS regression" & correlation coefficients for P, acidity, C/N density, K, Mg & water-holding capacity. --Uses 1994 field data, growing season; --Found water-holding capacity, then acidity, M-g, P, C/.N, K, to be significant for SQ (in descending order of importance).--ch (2003). The paper deals with Weighting indicators; discussion is very good (jw notes, 2001)

Jambor, Pavel. 2002. Soil quality indexes in the catena of hilly land (Trnaska pahorkatina, Slovakia). Poster presentation at COST 623: Soil Erosion and Global Change, Working Group 2; Brussels, Belgium, 7-9 March 2002. Section: Socio-economic factors and soil erosion. From URL: http://www.soilerosion.net/cost623/brussels_mar00.html

Jastrow, J. D., R. M. Miller, and J. Lussenhop. 1998. Contributions of interacting biological mechanisms to soil aggregate stabilization in restored prairie. Soil Biology and Biochemistry [Oxford : Elsevier Science Ltd.] 30 no.7 (Jul): 905-916.

> Soil aggregation processes, as part of soil structural properties, are examined. Root development on reclaimed tall-grass prairie is this paper's theme. Microbial biomass, total C, SOC, & microbial biomass C were measured in mollisols on 4 plots in Illinois in 1985. This static study was undertaken on 4 different ages of reclaimed soils; with 1- sample stations per plot from 0.5m^2 circular quadrets via stratified random sampling design. Estimated microbial biomass C by fumigation-extraction was done in-lab. The analysts used path analysis on root length & size measurements; tested correlations & goodness of fit; used a **Tucker-Lewis index**. This is a study of roots; rhizosphere, Carbon.

Jesinghaus, Jochen. 1998. A European system of environmental pressure indices. Environmental change: Valuation methods and sustainable indicators. Steven Loiselle, and Claudio Rossi, editors. European Commission, 1998.

> This context paper discusses Europe's Environmental Pressure Indices project, uses the Pressure-State-Response analytical framework to examine indicators of environmental sustainability and indices of socio-economic stability. Examples of indices in general are given, and how an index may be used as a performance measure; e.g. Welfare Index, GDP measures. See Also the case study at URL: http://www.iisd.org/measure/scipol/case1.doc

Jesinghaus, Jochen, and European Commission. 1999. Functions of indicators and indices. Section 1.2 In: A European system of Environmental Pressure Indices. First Volume of the Environmental Pressure Indices Handbook: The Indicators, Part I: Introduction to the political and theoretical background European Commission [for Environmental Pressure Indices].

> This web link provides some useful 'awareness' of index development; for example, from Table of Contents: Indicators for Decision-Making, at URL: http://esl.jrc.it/envind/idm/idm_e_.htm
>
> 1. Goal: better decisions
> 2. How do indicators influence decision-making?
> 3. The product: a **Policy Performance Index (PPI)** at URL: http://esl.jrc.it/envind/idm/idm_e_10.htm
>   - 3.1 Are we allowed to aggregate "apples and oranges"?
>   - 3.2 Performance indices should encourage politicians to make good decisions
> 4. The process: How to replace GDP as the "welfare indicator"
> 5. Some interesting consequences for the system "democracy"
> 6. Annexes
>
> Contents at : 1.6 -- "Linkages to other International Indicator Initiatives"
> Two standard questions on indicator workshops are " Are you aware of the indicator project of.. " or " Aren't you duplicating the work of... ". Standard answers are " Yes, we are aware of all international indicator initiatives " and " We hope we are not duplicating the work of xyz, but in any case we are grateful for any good indicators that might fit in our framework ". *(to be developed) : OECD UN CSD EEA*
> *From URLs:* http://esl.jrc.it/envind/theory/Handb_03.htm ; http://esl.jrc.it/envind/idm/idm_e_.htm ; http://esl.jrc.it/envind/idm/idm_e_10.htm

Johansson, M., and B. Stenberg. 2000. Multivariate techniques for presentation, interpretation and evaluation of soil quality data. In: Soil stresses, quality and care; Proceedings from NJF seminar 310, As, Norway, 10-12 April 2000, Pp.63-72. Tjele , Denmark: Danmarks Jordbrugs Forskning.

The complex nature of soil quality allows it to be assessed only if the physical, chemical and biological components are evaluated simultaneously. Univariate correlations and correlation matrices are normally used to study the relation between variables or indicators. However, these correlations will not reveal the structure of the variation of all soil quality indicators needed to assess soil quality. Thus, we need an integrated approach to evaluate a set of relevant soil-quality indicators. The commonly used **index approaches** have drawbacks, as an index is not directly related to any specific function or indicator, which causes problems when interpreting the reasons for a high or low index.
Multivariate analyses have the capability of giving information regarding the relation between indicators and can therefore be an alternative to index approaches as it also reveals the functional structure of the soil. In this paper, our experiences using multivariate techniques for the presentation, interpretation and evaluation of soil quality data will be presented. They include (i) the integrated evaluation of the relationship between soil quality indicators and their influence on the formation of soil quality groups, (ii) the evaluation of the capacity of soil quality indicators to separate soils with different N and sewage sludge amendments, and (iii) the relationship between soil quality indicators and productivity potentials. From these experiments it is concluded that principal component analysis and partial least-square regression can give interpretable quality groupings and separations between soils. Discriminant function analysis is a powerful technique to identify important variables for group distinctions.
It is shown that microbiological indicators have a straightforward relevance, especially when soil functions of concern are related to cycling of nutrients or degradation of chemicals. Together with their integrative response and sensitivity to changes in the soil environment this strongly suggests that microbiological indicators should be included in a set of variables to assess soil quality. --*CAB Abstracts*