



## Soil Quality Indicator: a new concept

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During the last century, cultivated soils have been intensively exploited for food and feed production. This exploitation has compromised the soils' natural functions and many of the soil-mediated ecosystems services, including its production potential for agriculture. Also, soils became increasingly vulnerable and less resilient to a wide range of threats.

To overcome this situation, new and better management practices are needed to prevent soil from degradation. However, to adopt the best management practices in a specific location, it is necessary to evaluate the soil quality status first.

Different soil quality indicators have been suggested over the last decades in order to evaluate the soil status, and those are often based on the performance of soil chemical, physical and biological properties. However, the direct link between these properties and the associated soil functions or soil vulnerability to threats appears more difficult to be established.

This present work is part of the iSQAPER project– Interactive Soil Quality Assessment in Europe and China for Agricultural Productivity and Environmental Resilience, where new soil quality concepts are explored to provide better information regarding the effects of the most promising agricultural management practices on soil quality.

We have developed a new conceptual soil quality indicator which determines the soil quality status, regarding its vulnerability towards different threats. First, different indicators were specifically developed for each of the eight threats considered - Erosion, SOM decline, Poor Structure, Poor water holding capacity, Compaction, N-Leaching, Soil-borne pests and diseases and Salinization. As an example for the case of Erosion, the RUSLE equation for the estimate of the soil annual loss was used. Secondly, a reference classification was established for each indicator to integrate all possible results into a Good, Intermediate or Bad classification. Finally, all indicators were combined to return a single evaluation of the soil status, using different techniques that are dependent on the final use of the soil quality indicator.

Some of the advantages of this new concept include the evaluation of soil quality based on its vulnerability to threats, together with the evaluation of soil properties in a given context while also suggesting soil management practices that are directly capable to mitigate soil vulnerability towards specific threats.

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