Soil Quality Indicator: a new concept

Lúcia Barão[1,*] & Gottlieb Basch[1]

1 Instituto das Ciências Agrárias e Ambientais Mediterrânicas (ICAAM), University of Évora

Contacting author * email: lbarao@uevora.pt

During the last century, soil under agricultural practices has been intensively exploited for food and feed production. This exploitation has compromised soil natural functions and ecosystems services, including its fertility potential for agriculture. Also, soils became more vulnerable 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 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 is most of the time difficult.

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 most promising agricultural management practices effects 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 *Good*, *Intermediate* and *Bad* classification. Finally, all indicators were combined together to return a single evaluation of the soil status, using different techniques that are dependent on the soil quality indicator final use.

Some of the advantages of this new concept include the evaluation of soil quality based on soil vulnerability to threats, together with the evaluation of soil properties in a context and also the possibility to link directly soil management practices that are able to ameliorate soil vulnerability towards specific threats.

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