

# Conceptual framework underpinning management of soil health – supporting site-specific delivery of sustainable agro-ecosystems

## Abstract

The need for sustainable intensification of agricultural production has ushered in a growing awareness of soil health and a requirement to identify with some certainty how changes to land management will affect soil. From an agricultural perspective, the active management of soil health needs to balance the production of a healthy and profitable crop with environmental protection and improvement. However, the extreme spatial and temporal heterogeneity of soils, and the complexity of biological, physical and chemical interactions therein, makes predicting management effects on soil health challenging. Although the general principles underlying effects on soil health are well understood, they still need interpretation in a local context and the inclusion of site-specific details. Approaches from landscape ecology provide a potential framework to integrate consideration of the structural (pools, patterns), dynamic and functional (processes, flows) aspects of the soil system. These approaches allow the crucial transition from a “descriptive and general” understanding toward a “detailed and site-specific” prediction to be made. Using this conceptual framework, we have taken knowledge of the effects of fixed site factors (soil type and climatic zone), cropping systems and farm management practices on a range of soil physical, chemical and biological parameters for UK lowland agricultural systems, and have developed a predictive framework that shows semi-quantitatively the effects of typical management choices on soil health and crop yield.

## Access the full article

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