

• Soil health: a holistic and transdisciplinary approach

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Background

Over 30% of the world's soil and 70% of European soil are considered to be degraded and/or in poor health. In agricultural areas, 80% of this degradation is due to intensive farming practices. This degradation raises issues of food security and the preservation of biodiversity, particularly for tropical soils, which are the most fragile. Introducing more sustainable farming practices such as agroecology is seen as one possible way of rehabilitating soils. However, this approach requires the ability to qualify and quantify the condition of soil, which explains the recent emergence of the concept of soil health.

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Further reading

JANZEN H. H. et al., 2021 – The “soil health” metaphor: Illuminating or illusory? *Soil Biology and Biochemistry*, 159: 108167.

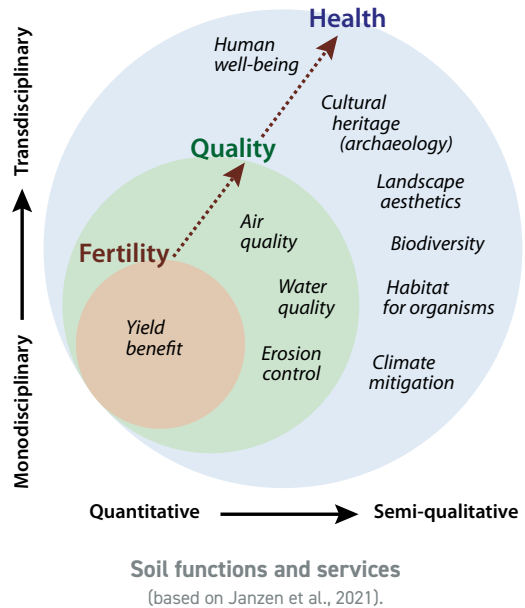
ROCHELLE L., 2019 – *De la fertilité des sols à la santé de la terre*. Thèse, université de Namur.

What is soil health? A brief history of the concept

The concept of soil health is linked to developments in our relationship with soil (see illustration). The dominant agronomic view initially considered soil as a simple support for plant production (the concept of soil fertility). This view was partially superseded in the 1990s by a more environmental approach, with the concept of soil quality. This is based on a functionalist approach to soil linked to the conceptual framework of ecosystem services. Between 2000 and 2010, more attention was paid to the biotic component of soils, and the concept of soil health has been increasingly used since then. There is no established consensus on the concept of soil health, but most definitions are based on the definition of soil quality, leading to confusion between the two terms. However, the concept of soil health also conveys a more holistic, ecological and sustainable approach to the “soil” system, and it is worth highlighting this. By 1990, a number of scientists had recognised the transformative potential of the concept of soil health, associating it with “sustainability”, “alternative or sustainable agriculture”, “resilience” and the health of the ecosystem as a whole.

Criticisms and views on the concept of soil health

The concepts of soil quality and soil health, and even soil fertility, remain controversial within the soil science community. The main criticism is that these simplifying concepts do not take into account the inherent complexity



of the soil ecosystem, which is characterised by the interaction of its biotic component (soil hosts one quarter of the earth’s biodiversity) with its physical and chemical component. Soil health, as a metaphorical concept, is criticised because it likens soil to a supra-organism, downplaying its mineral component. The idea of assessing soil quality or health is also criticised because, while it is possible to assess air or water quality, soil quality is more subjective. There is no such thing as a universally healthy soil: its condition depends on the use to which it is put (crops, livestock), the service it is intended to provide (carbon sequestration, crop production), the type of soil, and so on. However, the term “soil health” has given soil a higher profile in society (see <https://www.fao.org/soils-2015/news/news-detail/>

en/c/277682) and politics (see European Union, *Soil Strategy for 2030*) and has led to a fruitful interdisciplinary (soil science, agronomists, ecologists, social sciences) and transdisciplinary (academia and agriculture) dialogue. Health is a useful metaphor that transcends groups and cultures, because it is widely recognised that healthy soil is the basis for healthy food. This metaphorical concept may be viewed by the scientific world not as a problem, but as an opportunity to co-construct an operational concept with stakeholders in the agricultural world.

Societal significance of the concept of soil health

There is a particular focus on the human component of soil health, echoing many popular views on soil, and it is often compared to the human body. Health conjures up a semantic field that includes the terms “to care” (in line with recent conceptual and methodological developments around care), “to regenerate”, “to nourish” or “to look after”, terms that are not found in other more technical or productivist views on soil. This notion of care directly raises the issue of the impact of farming practices on soil health. Viewed in this way, soil health refers to the balance of the soil environment, emphasising its living component and making agriculture a goal to strive for in order to ensure the sustainability of the production system and, by extension, the entire food system. This approach means recognising the societal significance of this concept and questioning our modern society’s relationship with living things and the productivist and

reductionist aims of the agro-industrial system. Soil therefore brings together the life of the soil and the cultural and social dimensions of agriculture in one fell swoop.

Pooling scientific and farming knowledge to assess soil health

Because the concept of soil health is so familiar to the farming world, it facilitates dialogue between the concepts and knowledge of scientists and farmers. This dialogue is happening in a favourable and relatively recent context of transdisciplinary openness, particularly as part of the widespread agroecology movement, which sees it as a necessary way of tackling contemporary socio-agroecological challenges. Today, we need to highlight the practical relevance of this wide-ranging knowledge and to cultivate this diversity of knowledge through ongoing experimentation with agricultural practices adapted to each environment (the concept of context-specific solutions). Dialogue between different forms of knowledge involves not only recognising the legitimacy of each of these forms of knowledge (Kebede Y., 2023 – “Recherche en agroécologie: notre attitude plus que notre aptitude détermine notre altitude”. In: *Science de la durabilité*. Marseille, IRD, vol. 2: 100-103), but also co-constructing a common language and shared objectives, within a given context. The assessment methods and indicators must be chosen in such a way that they can be shared with the farming community and used to monitor the state of soil health over the medium and long term in order to assess the

impact of practices (for example, <https://view.genial.ly/6113dcd58140450dac525bc5/presentation-biofunctool>). From this perspective, the concept of soil health cannot be defined in a

standardised and universal way; it is a situated and contextualised concept and needs to be co-constructed so that relevant indicators can be defined that are adapted to local conditions.

KEY POINTS

Assessing soil health is a central issue in the agroecological transition. Despite the debates surrounding this concept and the absence of a consensus definition, it is proving to be a catalyst for change in the way we understand the “soil” ecosystem and in the process of co-constructing knowledge. We propose a contextualised approach to soil health, involving a vision of soil as a socio-ecosystem and leading to transdisciplinary dialogue to support farmers in their practical experimentation with agroecology.

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