Food and Agriculture Organization of the United Nations

ITPS | SOIL LETTERS
INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS
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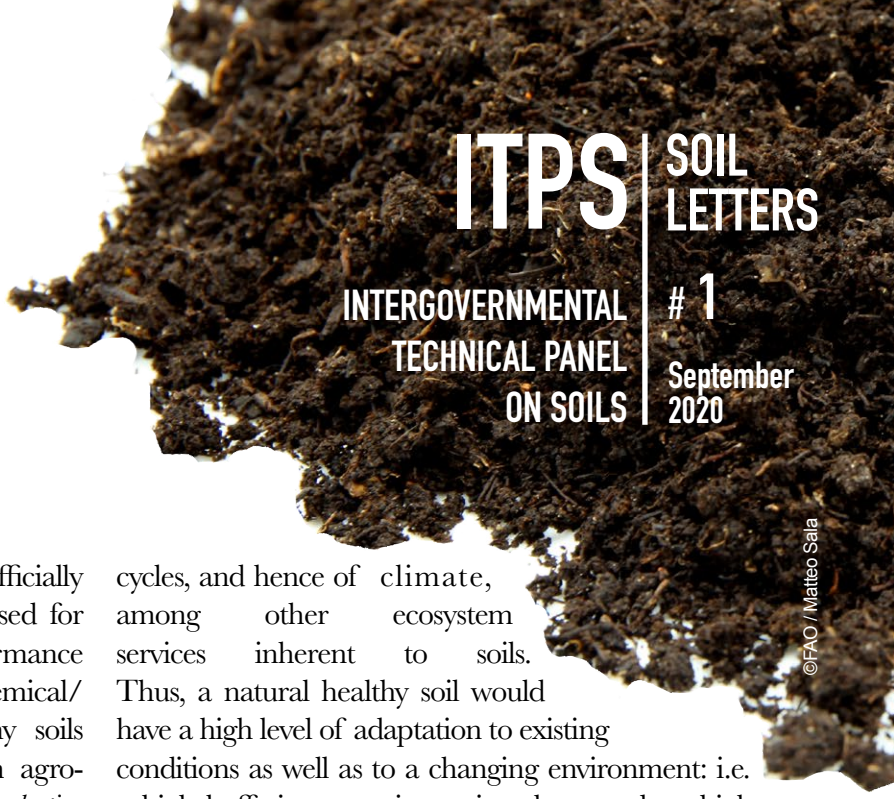
September 2020



TOWARDS A DEFINITION OF SOIL HEALTH

The concept of what is a healthy soil has not been officially defined until now, although it has been widely used for more than a decade. Soil health refers to the performance or functioning of a soil, not its intrinsic physical/chemical/biological properties. Early definitions of healthy soils are rather anthropocentric and focus on soils in agro-ecosystems, such as *those capable of supporting adequate production of biomass (food and fibre) for human needs, while maintaining other ecosystem services, such as climate regulation or biodiversity conservation* (Kibblewhite, Ritz and Swift, 2008). Doran, Stamatiadis and Haberern (2002) have highlighted some of the ecosystem services, which are not limited to services provided to humans, by defining soil health as synonymous with soil quality, which is *the constant ability of soil to function as a living system that determines land use systems and boundaries to support biological productivity, promote air and water quality, and maintain plant, animal, and human health.* Although these two terms are strongly related, Lal (2016) makes a distinction between soil quality, which refers to soil functions or what the soil does, and soil health, which presents the soil as a finite and dynamic living resource.

One of the complexities in defining soil health is the lack of agreement on indicators and threshold values due to the singularities and high spatial variability of global soils (Cardoso *et al.*, 2013; Fine, Es and Schindelbeck, 2017; Seaton *et al.*, undated). In addition, soil health indicators should be sensitive to management practices and reflect changes in resilience and adaptation (Stott, 2019; Zornoza *et al.*, 2015). The most recent proposals include biological indicators as key players in soil health and functioning (Franzluebbers, 2016; Gupta, 2020; Hermans *et al.*, 2017).

Soil health, as a dynamic concept, should also be applicable to natural and unmanaged soils, as they present different degrees of preservation of below- and aboveground biodiversity, regulation of water and of biogeochemical cycles, and hence of climate, among other ecosystem services inherent to soils. Thus, a natural healthy soil would have a high level of adaptation to existing conditions as well as to a changing environment: i.e. a high buffering capacity, or in other words, a high resilience, maintaining the ability to sustain those services in the face of environmental alterations.

ITPS DEFINITION OF SOIL HEALTH

The Intergovernmental Technical Panel on Soils (ITPS) defines soil health as **"the ability of the soil to sustain the productivity, diversity, and environmental services of terrestrial ecosystems".** In managed systems, soil health can be maintained, promoted or recovered through the implementation of sustainable soil management practices. As with human health, there is no single measure that captures all aspect of soil health. The preservation of these soil services requires avoiding and/or combating all types of soil degradation.

The ITPS coins this definition of soil health and hopes to be widely used and adopted by international organizations, institutions, governments, academia, etc. In line with the call for action issued by Lehmann *et al.* (2020), clear and comparable indicators should be defined to ensure that the world's soils are managed sustainably and that the ecological and socio-economic benefits of healthy soils are preserved for future generations. Consequently, the ITPS and the Global Soil Partnership are working on the selection of indicators and harmonized laboratory methodologies that are applicable in all countries and enable the assessment, promotion, conservation and restoration of soil health.

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INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS

The Intergovernmental Technical Panel on Soils (ITPS) is composed of 27 top soil experts representing all the regions of the world. ITPS members have a 3-year mandate and provide scientific and technical advice and guidance on global soil issues to the Global Soil Partnership primarily and to specific requests submitted by global or regional institutions. Created in 2013 at the first Plenary Assembly of the Global Soil Partnership held at FAO Headquarters, the ITPS advocates for addressing sustainable soil management in the different sustainable development agendas.