Understanding Soils: Their Functions, Use and Degradation

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Elmira Saljnikov, Frank Eulenstein, Anton Lavrishchev, Wilfried Mirschel, Winfried E. H. Blum, Blair M. McKenzie, Linda Lilburne, Jörg Römbke, Berndt-Michael Wilke, Uwe Schindler, and Lothar Mueller

Abstract

Soils, the thin skin of the earth, a living body, are the basis of all highly developed life and have ensured human existence and culture since millennia. Their functions and ecosystem services are crucial for the survival of humanity. Increasing pressure on soils through overuse and mismanagement has exceeded their capacity to perform, which is considered as soil degradation. To meet the mission of the Sustainable Development Goals of the United Nations, soil degradation must be stopped and reversed. We reviewed framework conditions of soil degradation, scientific concepts of research and status and trends of their operationalization. Soil performance and degradation processes must be understood, monitored, mitigated and combated in the context of different categories and scales such as ecosystems, land and landscapes. Approaches to the assessment and monitoring of soil dynamics, degradation and desertification show inconsistencies and knowledge gaps at several levels. Concepts of soil health and ecosystem services of soil

E. Saljnikov (✉)
Institute of Soil Science, Teodora Drajzera 7, 11000 Belgrade, Serbia
e-mail: elmira.saljnikov@soilinst.rs

E. Saljnikov · F. Eulenstein · U. Schindler
Mitscherlich Academy for Soil Fertility (MITAK), GmbH, Prof.-Mitscherlich-Allee 1, Paulinenaue, 14641 Brandenburg, Germany
e-mail: feulenstein@zalf.de

U. Schindler
e-mail: schindler@mitak.com

F. Eulenstein · W. Mirschel · L. Mueller
Leibniz-Centre for Agricultural Landscape Research (ZALF), Eberswalder Str. 84, 15374 Müncheberg, Germany

A. Lavrishchev
St. Petersburg State Agrarian University, Peterburgskoye Ave. 2, 196601 St. Petersburg, Pushkin, Russia

W. E. H. Blum
Institute of Soil Research, University of Natural Resources and Life Sciences, Peter-Jordan-Str. 82, 1190 Vienna, Austria
e-mail: winfried.blum@boku.ac.at

B. M. McKenzie
Geography and Environmental Science, University of Dundee, D1 4HN Dundee, Scotland, UK
e-mail: b.mckenzie@dundee.ac.uk

L. Lilburne
Manaaki Whenua—Landcare Research, PO Box 69040, Lincoln, Canterbury, New Zealand
e-mail: lilburnel@landcareresearch.co.nz

J. Römbke
ECT Oekotoxikologie, GmbH, Böttgerstr. 2–14, 65439 Flörsheim, Germany
e-mail: j-roembke@ect.de

B.-M. Wilke
Department of Ecology, TU Berlin, BH 10-1, Ernst-Reuter-Platz 1, 10587 Berlin, Germany
e-mail: bmwilke@tu-berlin.de

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should be backed by "hard data" based on field and landscape indicators and measurements. Participatory approaches to mediate conflicting demands of stakeholders are crucial for a broad understanding of soil and its long-term sustainable use. This requires an advanced field diagnostic system of soil performance based on reliable on-site measurement technology in combination with expert-based knowledge and assessment methodologies. Strengthening field soil science is essential for progress in reducing and reversing soil degradation.

Keywords

Soil degradation · Soil functions · Ecosystem services · Soil quality · Indicators · Field methods