



# Understanding and Monitoring Chemical and Biological Soil Degradation

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## Abstract

Soil degradation is an exceedance of the capacity and resiliency of soil for providing functions and ecosystem services. It is a complex ongoing phenomenon threatening

humans' livelihoods and our future on earth. Knowledge gain can help to find solutions for monitoring, preventing and combating soil degradation. In this chapter we address the essence, causes, extent, features and implica-

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tions of various types of chemical and biological soil degradation. The aspects of chemical degradation, such as pollution, acidification, salinization, nutrient depletion and eutrophication are characterized shortly; for biological degradation, harm to soil microbiota and biodiversity, and soil organic matter depletion are considered. Progress in monitoring and modelling or forecasting these types of degradation is also shown. Soils of drylands, the Arctic and all man-made soils are hotspots of chemical and biological degradation. As chemical and biological degradation processes in the microscale are lingering and interacting, they need better awareness and monitoring approaches. Highly developed laboratory methods of soil chemical and biological analyses are existing, but screening methods that work under field conditions are comparatively rare. Biological soil degradation needs further evidence-based research and high-precision data for understanding and combating processes. Crucial questions such as calculation of carbon sequestration potential of agricultural soils and assessment of desertification processes should be better explored to bridge science-policy gaps.

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**Keywords**