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Soil systems as critical infrastructure: do we know enough about soil system resilience and vulnerability to secure our soils?

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Soils provide us with multiple essential services, such as food production, water flow regulation, and climate regulation. The loss of soil function endangers provision of these services, in turn endangering the local, regional and global societies and economies that rely on these. Soils, therefore, are in effect a critical infrastructure, which can be defined as an asset, system or process, the loss or compromise of which could result in a major detrimental impact on the availability, integrity or delivery of essential services, with significant economic or social impacts. Conceptualising soil as a critical infrastructure changes the way we as a society need to approach its management. For example, government authorities have a responsibility to reduce the vulnerability of critical infrastructure, and strengthen their security and resilience. To meet this responsibility there is a need to assess infrastructure resilience, identify critical vulnerabilities, and identify and implement strategies for increasing resilience. There has been growing interest and research on soil resilience, particularly drawing on ecological resilience concepts. In this contribution, we will consider our current understanding of soil system resilience from a critical infrastructure perspective and discuss where further science is needed.