10.13 Soil food web stability

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Soil Food Web Stability	**Biodiversity**
Description and justification	This indicator assesses the stability of the soil communities and derived environmental services.
Definition	The community of organisms living wholly or partially within the soil. It describes a complex living system in the soil and how it interacts with the environment, plants, and animals.
Strengths and weaknesses	+ In a long-term scenario, the Indicator could be re-assessed, monitoring, through a direct survey, if the NBS implementation has produced impact on soil web stability. - It is quite difficult to collect the data needed for its complex calculation.
Measurement procedure and tool	To determine food web stability, Jacobian matrices, or interaction strength matrices (May 1972), are built from the system of generalized Lotka-Volterra differential equations that describe the dynamics of each food web (de Ruiter et al., 1995; Neutel et al., 2007). The off-diagonal elements, a_{ij}, or the interspecific interaction strengths, represent the per capita effects of species *j* (i.e., trophic group j) on species *i*. The effects of consumers *j* on resources *i* are given by $\alpha_{ij} = -\frac{F_{ij}}{B_j}$, and the effects of resources *i* on consumers *j* are given by $\alpha_{ji} = \frac{e_j F_{ij}}{B_i}$. The diagonal element, α_{ii}, quantifies the food web stability (Neutel et al., 2002). They are defined as: $\alpha_{ii} = -sd_i$, where *s* is the fraction of deaths caused by density dependence (Neutel et al. 2002). *s* could be used as a measure for stability, defined by Neutel et al. (2002) as the minimum value needed for the interaction strength matrix to be stable, i.e., it is the value where the maximum real part of all eigenvalues is equal to zero. The lower the value of *s*, the 'more stable' the food web means that the food web requires less self-damping to remain stable (van Altena et al., 2016)

Scale of measurement	-
Data source	
Required data	Ecological data
Data input type	Semi-quantitative
Data collection frequency	Annually
Level of expertise required	High
Synergies with other indicators	
Connection with SDGs	2
Opportunities for participatory data collection	
Additional information	
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