Scale of measurement	Micro / point measurement
Data source	
Required data	Laboratory and in situ test results
Data input type	Category/type and value (particle size distribution, soil organic matter, soil pH, and electric conductivity)
Data collection frequency	Once (very low frequency)
Level of expertise required	Low
Synergies with other indicators	Soil temperature, aggregate stability, soil matric suction, soil strength, soil water flux
Connection with SDGs	11, 13, 15, 17
Opportunities for participatory data collection	Yes.
Additional information	
References	Gonzalez-Ollauri, A. and Mickovski, S. B., 2017. Plant-best: A novel plant selection tool for slope protection. Ecological Engineering, 106 (154-173) Mickovski, S B and Thomson, C S. 2016. Innovative Approach in the Stabilisation of Coastal Slopes. Engineering Sustainability, 171(1): 15–24

6.30 Soil strength

Project Name: OPERANDUM (Grant Agreement no. 776848)

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Soil strength	**Natural and Climate Hazards**
Description and justification	Different soil types would have different strengths and resistance against erosion or sliding. Soil strength is a key variable in slope stability analysis.
Definition	Soil strength depends on the angle of internal shear (mostly granular soils) and cohesion (mostly fine grained soils)

Strengths and weaknesses	Strengths: standard lab and in situ testing methods exist (e.g., BS1377-9); intrinsically related to soil type and soil-water content Weaknesses: high resolution intrusive investigation is needed
Measurement procedure and tool	Trial pits or boreholes excavated and samples taken. Strength tests in situ or in laboratory done to existing European Standards (e.g., Eurocodes). Tools include: shear vane, shearbox, triaxial apparatus, cone penetrometer, static penetration.
Scale of measurement	Micro / point measurement
Data source	
Required data	Laboratory and in situ test results
Data input type	Value (units of pressure for cohesion; decimal degrees for friction)
Data collection frequency	Once for the baseline and sporadic (after a rainfall event or after a landslide) thereafter
Level of expertise required	Medium
Synergies with other indicators	Soil temperature, soil type, aggregate stability, soil matric suction
Connection with SDGs	11, 13, 15, 17
Opportunities for participatory data collection	Yes.
Additional information	
References	Mickovski, B. S.2018. Risk-based framework accounting for the effects of vegetation in geotechnical engineering. CE / Papers. 2, 2-3, p. 377-382. Gonzalez-Ollauri, A. and Mickovski, S. B., 2017. Plant-soil reinforcement response under different soil hydrological regimes. Geoderma, 285 (141-150)