

8.18 Soil water holding capacity (field capacity)

Project Name: OPERANDUM (Grant Agreement no. 776848)

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Soil field capacity	Green Space Management Water Management
Description and justification	Soils that can hold water effectively can support more plant growth and are less susceptible to leaching losses of nutrients and pesticides. All of the water held by soil is not available for plant growth i.e., for the success of the NBS. Field capacity marks the boundary between the saturated and transitional hydrological regimes in the soil. When this transition occurs, air begins entering the soil-pore space and the soil strength changes.
Definition	Field capacity is the amount of soil moisture or water content held in the soil after excess water has drained away by gravity (usually 24 hours after rainfall) and the rate of downward movement has decreased.
Strengths and weaknesses	<p>+: standardised procedures for determination exist; databases based on soil type exist; can be determined through soil pedotransfer functions; related to water available to plants; related to soil strength; related to root spread in the soil</p> <p>-: direct measurement requires significant time and effort from suitably qualified personnel</p>
Measurement procedure and tool	<p>In the laboratory: using a pressure plate to apply a suction of 1/3 atmosphere to a saturated soil sample. When water is no longer leaving the soil sample, the soil moisture in the sample is determined gravimetrically and equated to field capacity.</p> <p>In the field: irrigating a test plot until the soil profile is saturated to a depth of one metre. Then the plot is covered to prevent evaporation. The soil moisture is measured each 24 hours until the changes are very small, at which point the soil moisture content is the estimate of field capacity.</p>
Scale of measurement	Micro to plot scale
Data source	
Required data	Moisture content
Data input type	Quantitative, numerical

Data collection frequency	Once as a baseline and then periodically or sporadically during the growth/life of the NBS
Level of expertise required	Low to intermediate
Synergies with other indicators	Soil type, degree of saturation, moisture content, soil stability (FoS), organic matter content; soil water retention capacity, wilting point
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-soil reinforcement response under different soil hydrological regimes. <i>Geoderma</i> , 285 (141-150) Gonzalez-Ollauri, A. and Mickovski, S.B., 2017. Plant-Best: A novel plant selection tool for slope protection. <i>Ecological Engineering</i> 106 (2017) 154–173.

8.19 Plant-available water

8.19.1 Plant available soil water

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Soil water retention capacity	Water Management Green Space Management
Description and justification	Soils can store water in their matrix and skeleton depending on their structure, texture and mineral composition. There is an intrinsic relationship between the amount of water stored in the soil and the matric suction, which is established through the soil water retention function. This function defines field capacity and wilting point, which difference establishes the water available to plants in the soil. Soil water retention is also related to soil strength and bridges soil hydrology with mechanics.