	Gonzalez-Ollauri, A. and Mickovski, S.B., 2017. Hydrological effect of vegetation against rainfall-induced landslides. *Journal of Hydrology, 549*, 374–387.

4.42 Stemflow rate

Project Name: OPERANDUM (Grant Agreement no. 776848)

Author/s and affiliations: Slobodan B. Mickovski[1], Alejandro Gonzalez-Ollauri[1], Karen Munro[1]

[1] *Built Environment Asset Management Centre, Glasgow Caledonian University, Glasgow, Scotland, UK*

Stemflow rate	Water Management
Description and justification	Aboveground vegetation parts funnel rainfall around the plant stem and promote its infiltration preferentially into the soil. The volume of water funnelled around the stem is substantial and its infiltration into the soil may promote changes in the stress state of the soil. Also, when rainfall interacts with the canopy it becomes richer with nutrients and organic matter that will then be transported into the soil.
Definition	Proportion of rainfall that is funnelled around the plant stem and then into the soil. Funnelling ratio > 1 implies substantial concentration of rainfall around the plant stem.
Strengths and weaknesses	+: well established procedures exist for NBS that include trees; it can be related to tree architectural traits; easy-to-establish empirical models with incident rainfall; related to soil biogeochemical processes; opportunities to use soil temperature as an indicator of stemflow funnelling belowground -: requires significant effort and suitably qualified workforce for measurement/monitoring; difficult to measure effect in the soil
Measurement procedure and tool	Installation of small diameter gutters spiralling along the tree stem and collection of the volume of water flowing through the gutters. Measurement of rainfall volume beyond the canopy's influence. Linear regression between stemflow and gross rainfall. Data collection of tree architectural traits and implementation of multivariate statistics to relate both tree architecture and stemflow
Scale of measurement	Point (micro, individual) to field (meso)

Data source	
Required data	Water volume; tree architectural traits (canopy cover fraction, leaf area index, number of leaves, number of branches, branches inclination, tree basal area)
Data input type	Numerical, quantitative
Data collection frequency	During every rainfall event
Level of expertise required	Intermediate to high
Synergies with other indicators	Moisture content, soil temperature, matric suction, interception, throughflow, vegetation type, vegetation cover, precipitation
Connection with SDGs	11,13,15,17
Opportunities for participatory data collection	Yes
Additional information	
References	Gonzalez-Ollauri. A., Stokes, A., Mickovski, S.B., 2020. A novel framework to study the effect of tree architectural traits on stemflow yield and its consequences for soil-water dynamics. Journal of Hydrology, 582 (124448). Gonzalez Ollauri, A & Mickovski, SB 2017, 'Hydrological effect of vegetation against rainfall-induced landslides', Journal of Hydrology, vol. 549, pp. 374–387

4.43 Percolation rate under different rainfall events

Project Name: OPERANDUM (Grant Agreement no. 776848)

Author/s and affiliations: Slobodan B. Mickovski[1], Alejandro Gonzalez-Ollauri[1], Karen Munro[1]

[1] *Built Environment Asset Management Centre, Glasgow Caledonian University, Glasgow, Scotland, UK*

Percolation rate for different rainfall events	**Water Management**
Description and justification	After the precipitation reaches the soil (through throughflow, stemflow or directly on the soil surface), some of it will move through the soil and can create instability and erosion within the soil. Percolation may