

## 6.38 Soil mass movement

**Project Name:** OPERANDUM (Grant Agreement no. 776848)

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Soil mass movement	Natural and Climate Hazards
<b>Description and justification</b>	Soil mass movement indicates instability and existence of a range of natural hazards including landslides, rockfalls, avalanches, debris flows, and similar.
<b>Definition</b>	Soil mass movement, also called soil mass wasting comprises bulk movements of soil and rock debris down slopes in response to the pull of gravity, water or the rapid or gradual sinking of the Earth's ground surface in a predominantly vertical direction.
<b>Strengths and weaknesses</b>	+ : mass movement observation methods exist in a more or less standardised form for a very long time - : some movements are too slow to be observed with a naked eye, and some are too fast to allow appropriate reaction.
<b>Measurement procedure and tool</b>	Usually using some form of survey (photogrammetric, lidar, etc) at regular/irregular intervals, but also analysis of history of instability, photographic/media records. Local measurements of soil mass movement can be carried out using inclinometers and/or piezometers installed to a certain depth in the soil suspected of mass movement.
<b>Scale of measurement</b>	Micro to macro
<b>Data source</b>	
<b>Required data</b>	Quantitative, numerical values of velocity of movement, depth of movement, and/or profile of moving mass
<b>Data input type</b>	numerical
<b>Data collection frequency</b>	continuous
<b>Level of expertise required</b>	Medium to high
<b>Synergies with other indicators</b>	Soil type, soil strength, history of instability, moisture content, groundwater level, topography, rainfall, temperature
<b>Connection with SDGs</b>	11, 13, 15, 17

<b>Opportunities for participatory data collection</b>	Yes for data collection and reporting
<b>Additional information</b>	
<b>References</b>	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.

### 6.39 Velocity of occurred landslide

**Project Name:** PHUSICOS (Grant Agreement no. 776681)

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Velocity of Occurred Landslide	Natural and Climate Hazards
<b>Description and justification</b>	Indicators of Landslide Risk Resilience sub-criterion will assess the site response to landslide phenomena based on susceptibility indicators: slope angle, pore water pressure, groundwater depth, soil properties, land use, land cover.
<b>Definition</b>	Factor having significant relevance in the landslide classification. A velocity range is connected to the different types of landslides, on the basis of observation of either case histories or site observations (Cruden & Varnes, 1996).
<b>Strengths and weaknesses</b>	
<b>Measurement procedure and tool</b>	Model
<b>Scale of measurement</b>	m/s
<b>Data source</b>	
<b>Required data</b>	Geological and geotechnical information, topography (Model/Survey).
<b>Data input type</b>	Quantitative
<b>Data collection frequency</b>	