



## FAO calls for actions to reduce global soil erosion

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Soil is a finite resource which is vital for producing food, sequestering carbon, regulating water and nutrients, filtering contaminants, enhancing biodiversity, storing heritage, and regulating climate (Arshad and Martin 2002). Global soils are continuously degraded because of population growth, economic development, and climate change (Montanarella et al. 2016). Soil erosion is a major form of soil degradation as more than 1 billion hectares globally are affected by some form of erosion (e.g., water, wind, and gully) (Lal 2003). Human activity and the related land use changes (deforestation and cropland increase) are the main reasons for a 2.5% increase of soil erosion by water between 2001 and 2012 (Borrelli et al. 2017).

The Status of the World's Soil Resources Report (FAO and ITPS 2015) found that soil erosion represents the greatest global threat to soil functions (Montanarella et al. 2016), risking food security, water quality, and climate change mitigation. New estimates indicate the annual loss to global GDP at ~\$8 billion, reducing yields by 33.7 million tonnes, and increasing water abstraction by 48 billion m<sup>3</sup> (Sartori et al. 2019). In its recent policy report, the Intergovernmental Panel for Climate Change (IPCC) highlights the impact of global mean temperature increase on desertification, land degradation (soil erosion, vegetation loss), and food security (IPCC 2019). While the problem of soil erosion is acknowledged by such international bodies (IPCC, UNCCD, and IPBES), political action at a global level is still missing (Panagos et al. 2016).

In one response, the United Nations brought together a group of more than 500 participants with scientists from over 100 countries calling for a community global soil erosion assessment. The call was made at the FAO Global Symposium on Soil Erosion in May 2019 (FAO 2019); organized by the United Nations Food and Agriculture Organization, the Global Soil Partnership and the Inter-governmental Technical Panel on Soils (ITPS). The aim is to connect science and policy to tackle the challenges of soil erosion mitigation.

The symposium was organized under 3 themes with the objective to bring science into action, based around the following: (1) use of data and assessment tools in soil erosion control;

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(2) policy in action to address soil erosion; and (3) the economics of soil erosion control and restoration of eroded land. This effort marks a substantial step toward the implementation of the Voluntary Guidelines for Sustainable Soil Management and advances progress toward the sustainable development goals.

The future actions which will be spread over the next 3 years (2019–2021) and organized around the 3 themes (FAO 2019). An expert group has developed a methodology to prepare global soil erosion sensitivity datasets and then incorporates national scale maps for vegetation coverage and management practices with the objective to produce a global soil erosion map. Another working group will develop a database of best management practices for soil erosion control and will propose an implementation plan at different levels. Finally, the costs of soil erosion control and benefits for applying best management practices will be assessed in a cost-benefit analysis.

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## References

- Arshad MA, Martin S (2002) Identifying critical limits for soil quality indicators in agro-ecosystems. *Agric Ecosyst Environ* 88(2):153–160
- Borrelli P, Robinson DA, Fleischer LR, Lugato E, Ballabio C, Alewell C, Meusburger K, Modugno S, Schütt B, Ferro V, Bagarello V, Oost KV, Montanarella L, Panagos P (2017) An assessment of the global impact of 21st century land use change on soil erosion. *Nat Commun* 8(1):2013
- FAO (2019) Global Symposium on soil erosion, 15–17 May 2019, FAO, Rome. Outcome Document. Available online: <http://www.fao.org/3/ca5697en/ca5697en.pdf>
- FAO & ITPS (2015) Status of the world's soil resources (SWSR) – main report. Food and agriculture Organization of the United Nations and Intergovernmental Technical Panel on soils, Rome, Italy. Available online: <http://www.fao.org/3/a-i5199e.pdf>
- IPCC (2019) Climate change and land. Intergovernmental Panel on Climate change. Available online: [https://www.ipcc.ch/site/assets/uploads/2019/08/4.-SPM\\_Approved\\_Microsite\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2019/08/4.-SPM_Approved_Microsite_FINAL.pdf)
- Lal R (2003) Soil erosion and the global carbon budget. *Environ Int* 29(4):437–450
- Montanarella L, Pennock DJ, McKenzie N, Badraoui M, Chude V, Baptista I, Mamo T, Yemefack M, Singh Aulakh M, Yagi K, Young Hong S, Vijarnsom P, Zhang GL, Arrouays D, Black H, Krasilnikov P, Sobocká J, Alegre J, Henriquez CR, de Lourdes Mendonça-Santos M, Taboada M, Espinosa-Victoria D, AlShankiti A, AlaviPanah SK, Elsheikh EAEM, Hempel J, Camps Arbertain M, Nachtergaele F, Vargas R (2016) World's soils are under threat. *SOIL* 2:79–82
- Panagos P, Imeson A, Meusburger K, Borrelli P, Poesen J, Alewell C (2016) Soil conservation in Europe: wish or reality? *Land Degrad Dev* 27(6):1547–1551
- Sartori M, Philippidis G, Ferrari E, Borrelli P, Lugato E, Montanarella L, Panagos P (2019) A linkage between the biophysical and the economic: assessing the global market impacts of soil erosion. *Land Use Policy* 86: 299–312

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