Africa among high rainfall-related soil erosion zones

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NEW DELHI, India - Regions in the tropical climate zones suffer the greatest rainfall-related soil erosion, says an international study.

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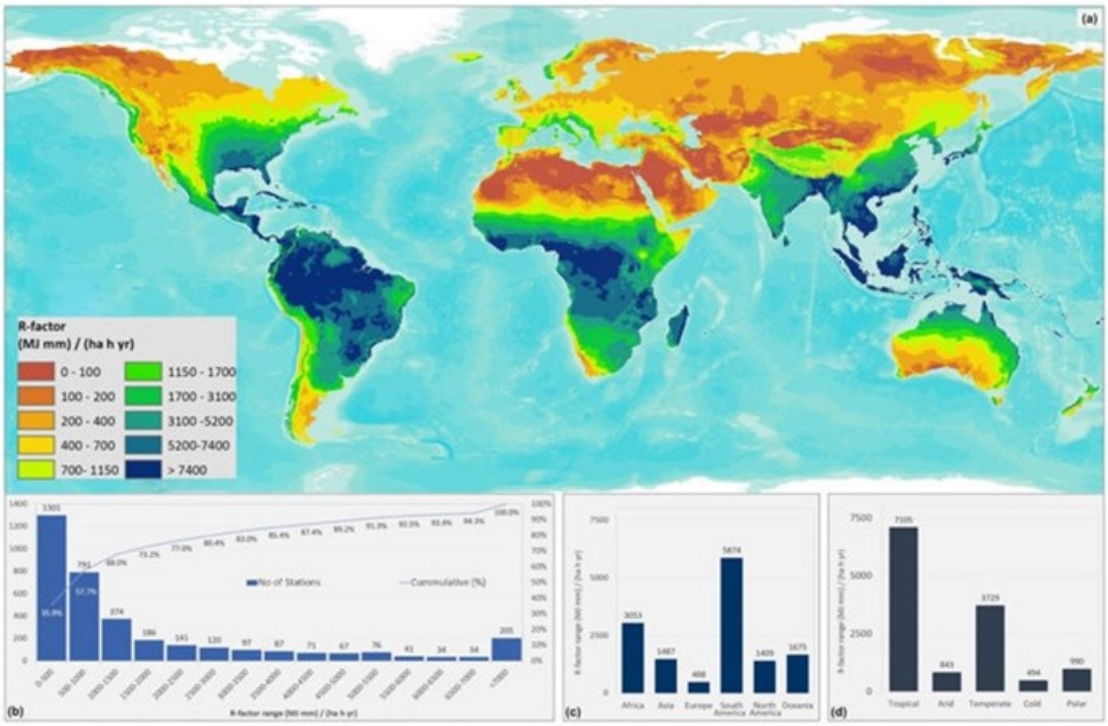
The study, published last month (July) in Scientific Reports, has developed the first ever Global Rainfall Erosivity Database and a Global Erosivity Map. It notes that while rainfall provides moisture critical for plant growth, it is also one of the prime causes of soil degradation, referred to as rainfall erosivity, and which threatens food and water sustainability. For experts, global erosivity model predictions are very important since it will help them assess risks, plan and implement effective soil mitigation and restoration strategies.

According to the study, water erosion attributable to rainfall remains poorly quantified despite its significance. This is because erosion by rainfall is complex and influenced by various factors including intensity, duration, amount and frequency, which are not captured in current erosivity estimates.

In modelling annual rainfall erosivity for different regions, the international team relied on rainfall data gathered from 3,625 stations scattered across 63 countries. Though the global average is about 2,190 mega Joule millimetres per hectare per hour per year, South America (particularly Brazil, Columbia and Peru), South-Eastern Asia (Cambodia, Indonesia, Malaysia, the Philippines and Bangladesh), the Caribbean, and Western and Central Africa have annual mean rainfall erosivities that are greater than 5,000 mega Joule millimetres per hectare per hour per year.

Cold and dry regions like Canada, the Russian Federation, Northern Europe, Northern Africa and the Middle East have the lowest annual mean rainfall erosivity.



(a) Global Rainfall Erosivity map (spatial resolution 30 arc-seconds). Erosivity classes correspond to quantiles. Map generated with ESRI ArcGIS ver. 10.4 (http://www.esri.com); (b) number and cumulative percentage of GloREDa stations grouped by erosivity; (c) mean erosivity by continent; (d) mean erosivity by climate zone.

“The tropical forests and the monsoon zones (covering Amazonia part of Brazil, Central Africa and Southeast Asia) have intense rainfall but also excess monthly precipitation (greater than 1,000 millimetres for two consecutive months),” says Panos Panagos, study leader and scientific officer, Joint Research Centre, European Commission. “The Mediterranean zone (a typical temperate climate zone) has seasonal rainfalls which are less intense than the ones in the tropical zones.”

“This is a great effort,” says Anton Vrieling, assistant professor, Faculty of Geo-Information Science and Earth Observation, University of Twente, the Netherlands. However, he observes that calculating rainfall erosivity at different times in a year would be more useful than having an annual average value.

“In a given year, there are rainstorms of different intensity and duration. Other factors like the protective vegetation also vary throughout the year,” Vrieling says.

With extreme rainfall events becoming more common as a result of changing climate, soil erosion is expected to increase impacting further on agricultural production, and contributing more to disaster-related risks such as flooding and landslides.

Panagos says the emerging situation can be managed through good agricultural practices like reduced tillage, cover crops, grass margins and contour farming.

Annual mean rainfall erosivity by geographical region

Region	Annual mean rainfall erosivity (in mega Joule millimeter per hectare per hour per year)
Global mean	2,190
Caribbean countries	8,000
South-East Asia	7,400
Western Africa and Central Africa	7,000
South America	5,874

This piece was originally produced by SciDev.Net's Asia & Pacific desk.