WASWAC

HOT NEWS

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Editor: Pengfei DU

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ISWCR Holds Special Editorial Board Meeting

On March 30, a special meeting of the Editorial Board of the International Soil and Water Conservation Research (ISWCR), the official journal of WASWAC, was held at the Secretariat of WASWAC. The current Editor-in-Chief of ISWCR, including Prof. Michael Maerker, Chief Scientist at the Leibniz Centre for Agricultural Landscape Research of Germany and Prof. Baoyuan Liu of Beijing Normal University, and the founding Editor-in-Chief, Prof. Rui Li, the Honorary President of WASWAC, attended the meeting.

The meeting was chaired by Prof. Paige Chyu, Executive Editor of the journal. Prof. Duihu Ning, President of WASWAC, delivered a welcoming address, expressing gratitude to the editorial board team led by the Editors-in-Chief for their hard work and fully affirming the achievements of the journal. Prof. Rui Li reviewed the development history of the journal and extended thanks to all parties that have long cared for and supported the advancement of soil and water conservation as a discipline and the growth of the journal. Prof. Paige Chyu reported on the recent progress of the journal. With the chairmanship of Prof.

Welcome address by Prof. Duihu Ning, President of WASWAC

Remarks by Researcher Rui Li, Founding Editor-in-Chief and Honorary President of WASWAC

Prof. Baoyuan Liu, Editor-in-Chief of ISWCR, chaired the editorial board meeting

Remarks by Lijuan Xu, China Water Power Press

Remarks by Prof. Chunmei Wang, Northwest University (China)

Remarks by Dr. Ying Zhao, IRTCES

Remarks by Dr. Chunyang Song, IRTCES

Baoyuan Liu, the participants had in-depth discussions on key topics including the high-quality development of the journal, the expansion of international cooperation, and the enhancement of academic impact. Prof. Michael Maerker spoke highly of the journal's performance in recent years, stating that it is in a "highly influential developmental stage" and commending the remarkable improvement in the quality of submissions over the past year. Ms. Lijuan Xu, Associate Senior Editor of China Water & Power Press Co., Ltd., the publisher of the journal, emphasized that the press would continue to provide strong support, work with the editorial board to optimize the publication process, and fully promote the high-quality development of the journal.

Prior to the special meeting of the Editorial Board, Prof. Michael Maerker delivered a lecture at the "Global Vision Forum" of the China Institute of Water Resources and Hydropower Research (IWHR). His presentation was entitled "Agroecological Transitions in Agricultural Landscapes and Their Implications for Soil Erosion". The lecture was moderated by Prof. Pengfei Du, the Executive Deputy Secretary-General of WASWAC.

Prof. Michael Maerker, Editor-in-Chief of ISWCR, delivered a report

The lecture was chaired by Prof. Pengfei Du, Executive Deputy Secretary-General of WASWAC

The report elaborates on the connotation and basic principles of agroecology. Based on the framework of FAO, it clarifies that its core lies in integrating ecological principles and social concepts into the design and management of sustainable agriculture and food systems, with a focus on key areas such as regenerative agriculture, soil health management, biodiversity enhancement, and nutrient recycling. It provides theoretical guidance for achieving the synergistic goals of environmental health, economic sustainability, and social equity. Against the reality of global agricultural development, the report analyzes the severe current situation of land degradation and soil erosion. Citing relevant research data, it points out that soil loss has reduced global agricultural food production by more than 30 million tons, which in turn has driven up global food prices by up to 3.5%. The annually economic losses caused by water erosion alone amount to as high as 8 billion US dollars.

Prof. Michael Maerker also presented the achievements of the AGRECO4CAST project

led by his research team. Funded by the European Union, the project has established a standardized evaluation framework to promote the application of agroecological practices in perennial cropping systems across Europe, such as vineyards, olive orchards and fruit orchards. By combining customized monitoring schemes and tailored transition pathway design, the project provides scientific support for agricultural development in Europe.

In the discussion, participants from the Beijing Normal University, Northwest University (China), the Institute of Soil and Water Conservation of Northwest A&F University, the Institute of Tibetan Plateau Research of Chinese Academy of Sciences, China Water & Power Press Co., Ltd., and other institutions had an in-depth exchanges with Prof. Michael Maerker on topics including agroecological support mechanisms in Europe and practical pathways for the implementation of soil and water conservation measures.

"Restoring Land, Restoring Hope" Announced as Theme for Landmark UN Land Conference

Ulaanbaatar/Bonn, 5 February 2026 – Mongolia and the United Nations Convention to Combat Desertification (UNCCD) today announced the theme of the 17th session of the Conference of the Parties (COP17) to the UNCCD as preparations intensify for the landmark global conference on desertification, land degradation and drought taking place in Ulaanbaatar, Mongolia, from 17–28 August 2026. The theme – "Restoring Land, Restoring Hope" – was announced during high-level meetings between UNCCD and Mongolia's leadership to advance UNCCD COP17 preparations.

As the first of the three Rio Conventions' COPs taking place in 2026 – on land, biodiversity and climate change, UNCCD COP17 aims to catalyze collective action to protect land-based livelihoods and strengthen resilience through a people-centered approach.

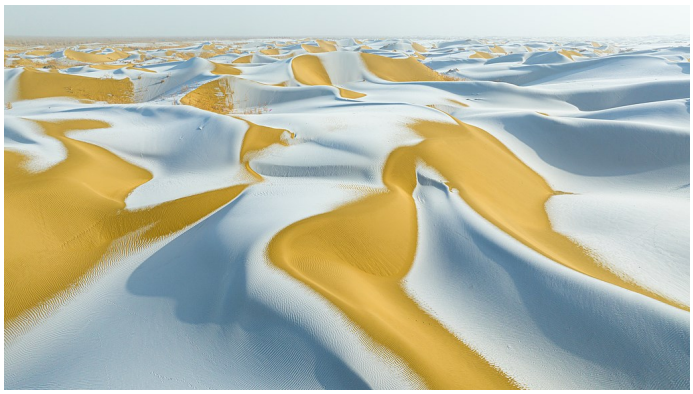
COP17 is expected to bring together delegates from UNCCD's 197 Parties, alongside leaders from government, business and civil society, as well as scientists, youth, Indigenous Peoples, pastoralists and smallholder farmers, to forge solutions to the interconnected challenges of desertification, land degradation and drought, recognizing that restoring land is also essential to reducing instability, preventing displacement, and strengthening human and national security in vulnerable regions.

In preparation for COP17, Mongolia has launched national initiatives linking land restoration with livelihoods and rural development, including the President-led "Billion Trees" National Campaign, initiated in 2021 and aiming to plant one billion trees by 2030. Mongolia has also expanded public engagement and youth participation through national dialogues and outreach activities, including the "Youth4Land" National Forum. Through the Mongolia Business Council, the COP17 Presidency has been engaging the country's private sector in support of UNCCD's Business 4 Land Initiative that aims to accelerate private sector action for sustainable land management.

News Source

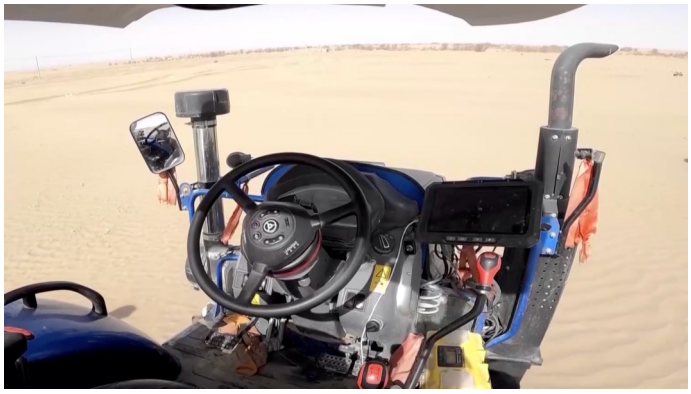
https://www.unccd.int/news-stories/press-releases/restoring-land-restoring-hope-announced-theme-landmark-un-land

Machinery Accelerates Green Expansion in Taklimakan Desert in China's Xinjiang



This year, Hotan Prefecture in northwest China's Xinjiang Uygur Autonomous Region plans to rehabilitate over 2.23 million mu of desertified land, including the planting of 266,900 mu of artificial forest, with 150,700 mu scheduled for spring planting. At present, regions in Xinjiang have fully launched the green barrier expansion project along the edges of the Taklimakan Desert.

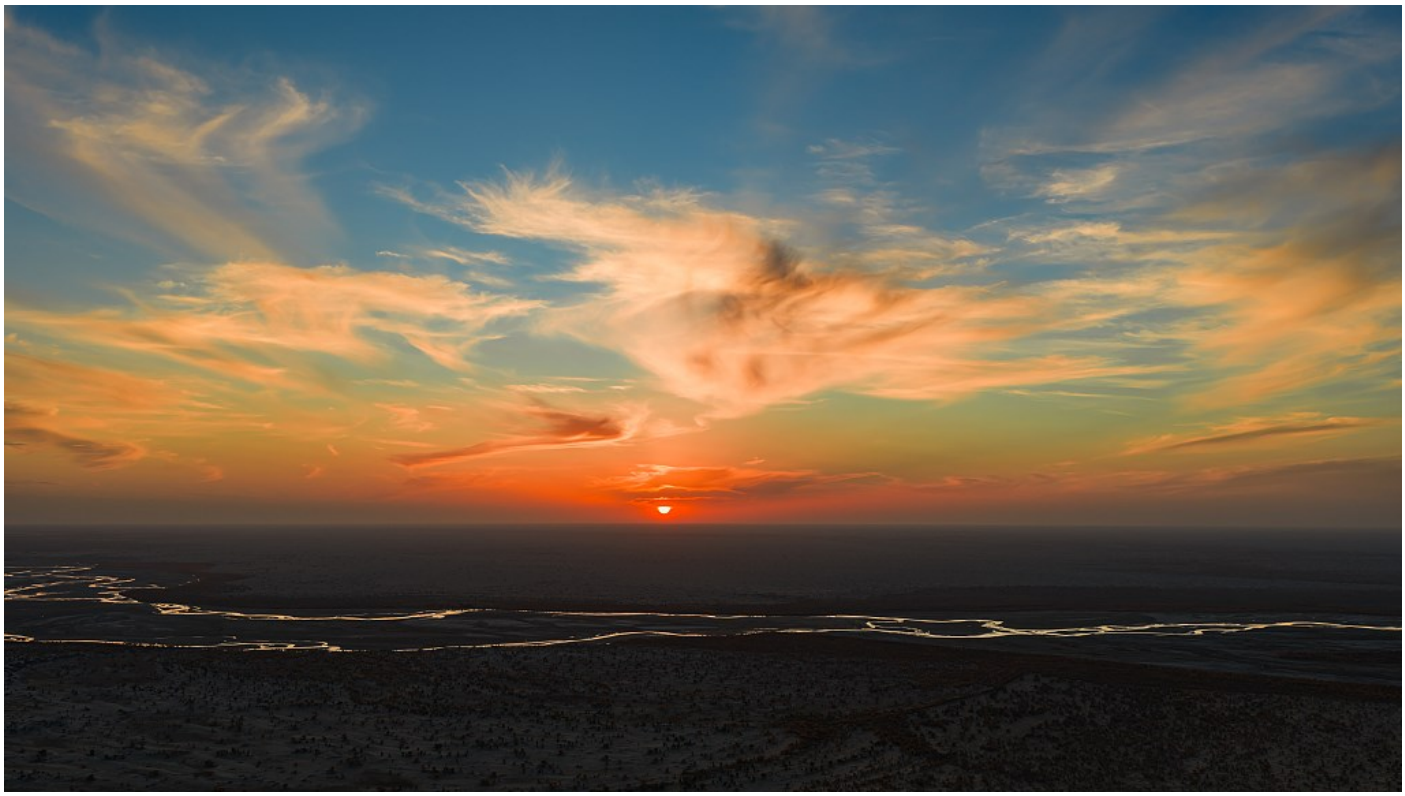
At a desert control site in Hotan, towering sand dunes – some reaching four to five meters high – stretch across the landscape. Before any planting can begin, heavy machinery moves in to reshape the terrain. Bulldozers level the dunes by shaving off the peaks and filling in the depressions, while graders follow to smooth and compact the surface. This approach helps prevent loose sand from drifting,



creating more stable conditions for planting.

Tree-planting machines, now widely used in the region, can plant seedlings and lay drip irrigation tapes simultaneously. A single dual-track machine can plant more than 13,000 trees per day, over ten times the efficiency of traditional manual methods.

Some of these machines operate autonomous-



ly, guided by China's BeiDou Navigation Satellite System. Moving at a steady pace, they leave behind straight rows of newly planted saplings, spaced about five meters apart.

The gaps between rows are not left unused. Seeders follow behind, distributing alfalfa and rapeseed into the gaps. This intercropping method allows the land to serve multiple purposes, stabilizing soil while also supporting vegetation growth.

News Source

https://news.cgtn.com/news/2026-04-06/Machinery-accelerates-green-expansion-in-Taklimakan-Desert-in-Xinjiang-1M7vFPqZGy4/p.html

Florida Farmers Face Rising Climate Risks from Extreme Weather

In the last decade, extreme weather has become a greater economic liability for Florida farmers. From freeze-damaged crops to hurricane losses and rising insurance premiums, increasingly volatile conditions are reshaping agriculture's financial foundation in a state that produces more than 300 commodities.

Farmers and agricultural leaders say these events are part of a pattern disrupting both production and long-term viability.

"Agriculture is affected by climate change, and it's a major threat multiplier because it disrupts production," said Ernest Shea, president of Solutions from the Land, a nonprofit group that promotes sustainable farming practices to address environmental challenges. "It's become increasingly obvious that the frequency of abnormal weather and extreme weather is rising."

Florida's average annual temperature has increased by 3.5 degrees F since 1950, according to the Florida Climate Center at Florida State University. The state is experiencing more extreme heat days and more frequent heavy rainfall events — trends that have contributed to significant harvest losses in recent years.

For specialty growers, including those who plant fruits and vegetables during the state's mild winters, climate volatility can be especially costly. A freeze can destroy an entire harvest. A false spring can disrupt pollination. Intense rainfall — dropping 4 to 6 inches in less than an hour — can flood fields, erode soil and wash away expensive fertilizers.

"The water management systems and soil conservation practices that we're using today were designed to meet conditions 20, 30, 40 years ago," Shea said. "They're not designed to deal with the conditions of today."

Crops such as citrus, berries and leafy greens are among the most vulnerable. Citrus acreage has declined in recent years, and other sectors could face similar pressures if crop losses persist.

Fruits and vegetables often lack strong risk management tools compared with other agricultural sectors, said Rachael Smith, communi-

cations director for the Florida Farm Bureau, the state's largest agricultural advocacy group.

Saltwater intrusion presents another challenge, altering soil chemistry and forcing farmers to reconsider which crops they can grow. Heavy rainfall also increases nutrient runoff, contributing to declining water quality.

Rising temperatures intensify competition for limited water resources, increase irrigation demand and raise operating costs.

"Farmers farm because they love what they do, but it's a business, and they have to make a profit," Shea said.

Major storms have driven up insurance rates, and in high-risk areas, including Tampa, securing coverage has become more difficult. Federal disaster relief and crop insurance programs provide support, Smith said, but they "rarely make producers whole." In severe years, those payments can determine whether farms continue operating or shut down.

Florida's rapid population growth further intensifies competition for land. If farms become unprofitable, agricultural acreage is often converted into residential and commercial development, reducing the state's capacity to produce food and fiber.

Shea described climate pressures as an economic force multiplier.

"If you're not economically viable and you go out of business, that land is likely going to turn into something else," he said.

In response, farmers are adopting practices designed to reduce long-term costs and improve resilience.

Cover crops planted between growing seasons protect soil from flooding and erosion. Others are shifting from conventional tillage to no-till systems to retain moisture and improve soil health. Such strategies, Shea said, can strengthen farm operations while providing environmental benefits.

food purchasing programs in 2025.

News Source

https://www.theinvadingsea.com/2026/03/18/florida-farmers-climate-change-agriculture-extreme-weather-hurricanes-heat-irrigation-insurance/

Statistical Method More Accurately Predicts Landslide Risk

Strategy formulated by Brazilian researchers objectively defines the weight of each contributing factor and was validated based on inventories of landslides that killed 65 people on the northern coast of São Paulo.

A relatively simple statistical analysis method can more accurately predict the risk of landslides caused by heavy rain, according to a study coordinated by Brazilian researchers affiliated with the Institute of Mathematical and Computer Sciences at the University of São Paulo (ICMC-USP) in São Carlos and the National Institute for Space Research (INPE). The researchers validated their strategy based on a real event. In February 2023, the municipality of São Sebastião, on the northern coast of São Paulo, experienced unprecedented storms – 683 millimeters (mm) of rain fell in less than 15 hours, compared to a monthly average of 300 mm – which killed 65 people and left hundreds homeless.

In an article published in the journal Scientific Reports, the team compared the efficiency of their approach with the traditional method used for these types of analyses. Overall, the evaluated technique performed slightly better, with a more accurate classification of areas that may be affected by disasters.

"Although the quantitative gains are modest, the method has significant advantages. It reduces ambiguities and is more aligned with the actual behavior of landslides in the territory," explains Rômulo Marques-Carvalho , a doctoral student at the ICMC-USP and first author of the study.

One of the most commonly used methods in assessments of this type of risk is called AHP (analytical hierarchy process). This approach uses a list of relevant variables for the phenomenon under investigation. In this study, the list includes 16 items, such as elevation, terrain steepness and ruggedness, proximity to rivers and roads, and land cover (vegetation and buildings).

In the "classic" AHP, these factors are compared in pairs to determine the importance of each variable. This process also involves the opinions of experts regarding the relative im-

portance of each factor in triggering the event.

In the new study, the team applied Gaussian AHP, which, according to Marques-Carvalho, uses statistical methods that "completely replace the paired comparisons of the traditional AHP."

To validate the method, the researchers used data from São Sebastião, one of the municipalities most susceptible to landslides in the state of São Paulo according to an analysis by the authors based on the Index of Vulnerability to Natural Disasters Related to Landslides. The team relied on an inventory of aerial images taken after the February 2023 disasters, with a resolution of 10 cm. This inventory was supplemented with photos from the Google Earth and PlanetScope platforms.

The main structures cataloged in the images include 983 crown points of landslides, which are located at the top of a slope where the process begins. Additionally, there are 1,070 "scar polygons," which delineate the entire area affected by the landslide.

Based on this data, Gaussian AHP classified 26.31% of the analyzed area as having very high susceptibility to landslides, compared to an estimate of 23.52% using traditional AHP. This demonstrates that the predictive power of the new method is superior.

Supported by FAPESP (projects 24/02748-7 , 21/11435-4 , and 20/09215-3), the work also assigned different weights to the main variables. In traditional AHP, the most important factors are variation in slope inclination and position, while in the Gaussian AHP analysis, the most important factors are geomorphology (surface relief forms) and distance from the affected area to rivers and roads.

"The proximity of roads is important because constructing them in rugged terrain requires earthworks, such as cuts and embankments, which generally lead to slope instability," explains Almeida.

According to André Ferreira de Carvalho , the current advisor of Marques-Carvalho, the approach has the potential to monitor and prevent environmental problems such as fires, deforestation, soil subsidence, and desertification. "Due to climate change, the frequency and intensity of these disasters will increase in the coming years," he notes.

News Source

https://www.preventionweb.net/news/statistical-method-more-accurately-predicts-landslide-risk

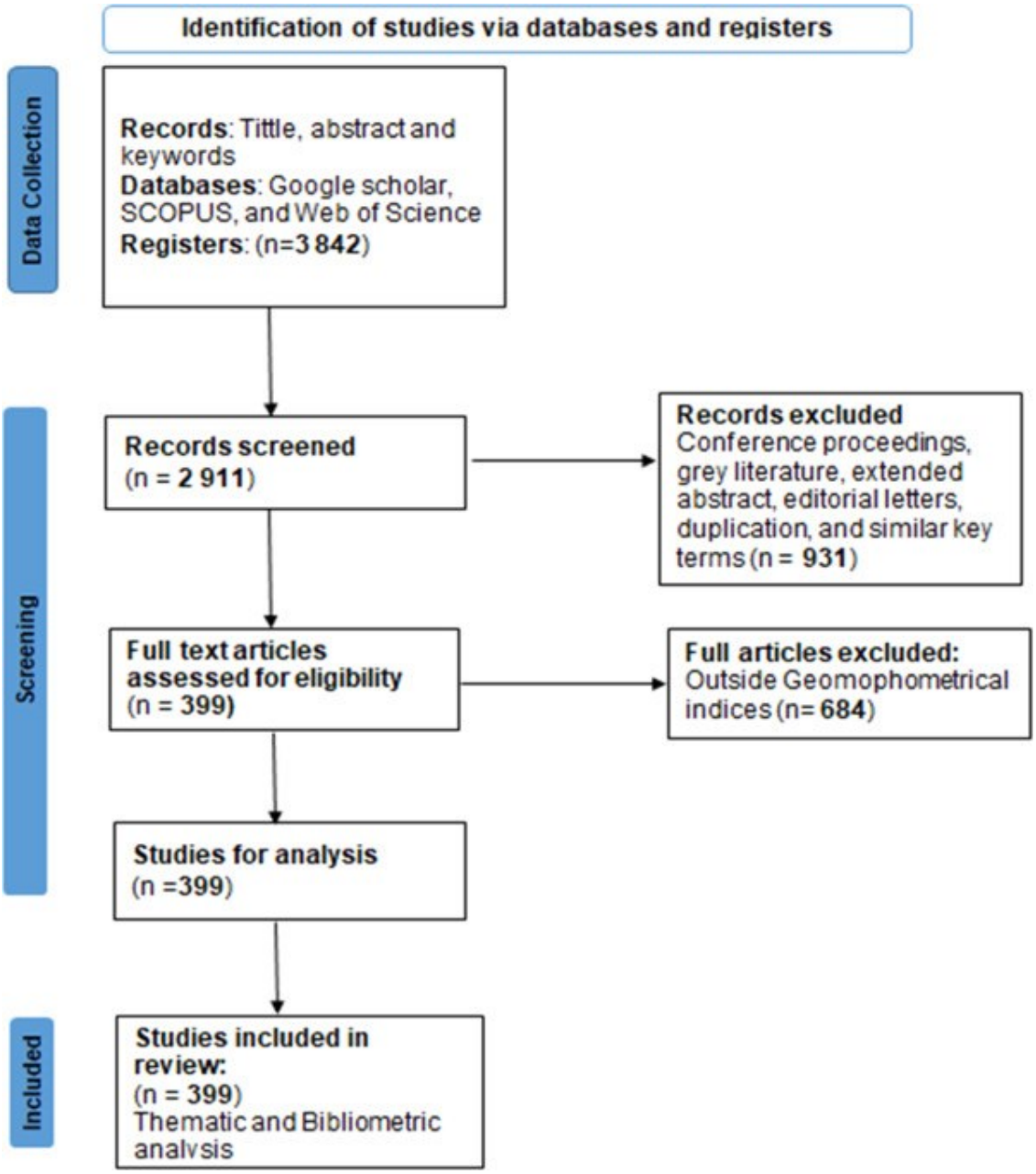
Geomorphometric Soil Erosion Modelling in Sub-Saharan Africa: A Systematic Review of Model Applicability, Validation Gaps, and Policy Integration

Abstract

Soil erosion poses a fundamental threat to sustainable development in Sub-Saharan Africa (SSA), where ~490 million hectares of agricultural land are already degraded. Here we present a PRISMA-guided systematic review of 399 peer-reviewed studies (2000–2024) that evaluates the applicability, performance, and policy relevance of geomorphometric soil erosion models in SSA's data-scarce, topographically complex landscapes. Empirical models (chiefly RUSLE and its derivatives) dominate the literature ~68 %, followed by physically-based (WEPP, KINEROS2, EUROSEM) and emerging hybrid/machine learning frameworks. Although high resolution DEMs and multi-temporal satellite imagery (Landsat and Sentinel) have markedly improved spatial prediction of erosion hotspots, critical limitations persist: (i) widespread absence of field based-validation, with most studies relying on indirect proxies or qualitative checks; (ii) underrepresentation of Central and Southern African semi-arid catchments, producing a strong East African bias and (iii) negligible integration of model outputs into national or sub-national land use policy, spatial development frameworks, or climate adaptation strategies. Hybrid and data-driven models consistently outperform traditional empirical and process-based approaches (mean AUC 0.83–0.86 vs. R^2 ~0.55 for RUSLE type models), yet their adoption remains marginal owing to calibration and computational barriers. We identify an urgent need for regionally calibrated ensemble models, continent-wide validation networks using UAV/LiDAR ground truthing, and institutional mechanisms to translate geomorphometric risk maps into actionable policy. To counter these gaps, there is a need to deliver reliable, policy-ready erosion assessments capable of guiding sustainable land management and safeguarding agricultural productivity in one of the world's most erosion vulnerable and food insecure regions.

Research Method and Literature Search

This study employed the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines to systematically identify, appraise, and synthesise empirical studies published between 2000 and 2024 on the application of geomorphometric approaches and GIS-based models for soil ero-



sion quantification in semi-arid regions of SSA. Included studies were evaluated for methodological rigour, model calibration and validation techniques, data quality, and relevance to data scarce environments, following established quality assessment criteria.

Article Source

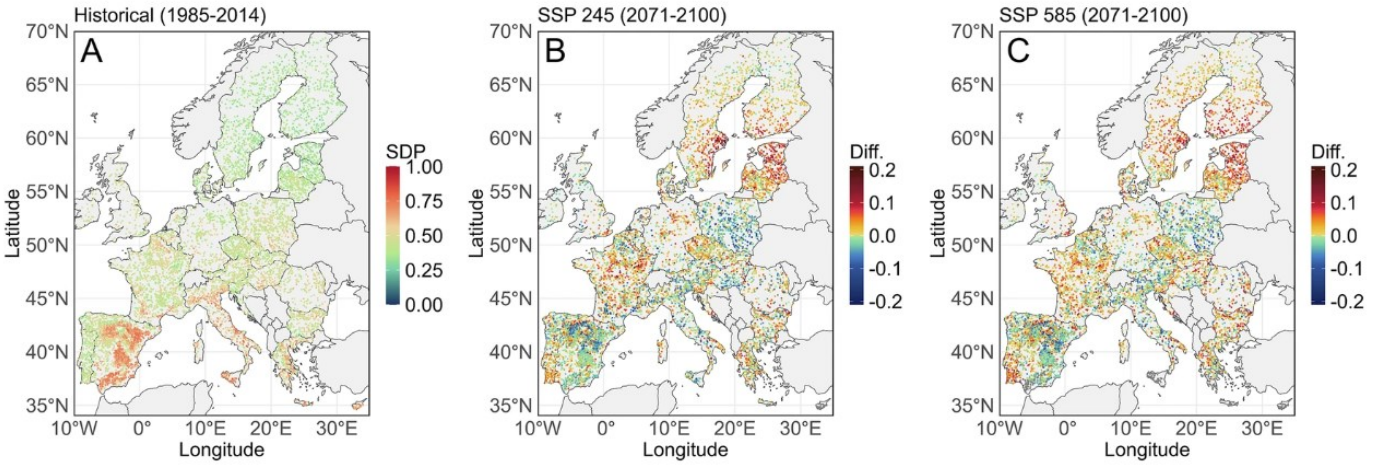
https://www.sciencedirect.com/science/article/pii/S246822762600061X

Soil Degradation in Europe is Projected to Accelerate Under Changing Land Use and Climate

Soil degradation threatens food security and environmental sustainability, yet future projections of it are rare. Using projections from 18 global climate models under two Shared Socioeconomic Pathways (SSP2-4.5 and SSP5-8.5) and land-use projections from the Land Use and Climate Across Scales Land Use Change (LUCAS LUC) dataset, we assess future soil vulnerability to degradation by linking a Soil Degradation Proxy (SDP) to climate, land-use, soil characteristics, and socioeconomic factors at 7433 observation sites across Europe. We project that by 2071–2100, ~59% of sites may become more vulnerable under the high-emission scenario. Cold forest regions in northern Europe are projected to face increased degradation pressure by ~+0.04SDP. However, some European croplands may improve locally through conversion to secondary lands, reduced human pressures, and natural recovery processes. These regionally specific trends highlight that, while soil degradation remains a major threat, proactive land management can mitigate soil vulnerability under future climate trajectories.

This study addresses current gaps in understanding how the combined impacts of climate change and land-use transition influence the relative vulnerability of soil to degradation across Europe. By integrating climate projections with land-use scenarios, we assess how environmental drivers interact to shape soil susceptibility to degradation across the land-use/cover area frame survey observations (LUCAS). We use a machine learning modeling approach (i.e., random forest; RF) to predict the relative vulnerability of soil to degradation under different shared socioeconomic pathways (SSP2-4.5 and SSP5-8.5) for both near-future (2031–2060) and far-future (2071–2100) periods. Through this quantitative assessment of future soil vulnerability, we identify the main covariates governing projected changes and the key drivers of soil degradation, thereby providing insights for sustainable land management strategies and climate change mitigation efforts.

The spatial distribution of the SDP across Europe under historical conditions (i.e., between years 1985 and 2014) reveals regional patterns in relative vulnerability of soil to degradation. Mineral soils with lower SDP values, indicating more resilient soil conditions, are predominantly located in the northern regions of Eu-



rope (shown in dark blue). Countries, such as Estonia and Finland, exhibit some of the lowest SDP values, averaging 0.34 and 0.35, respectively. In contrast, higher SDP values, shown in dark red, are concentrated in southern Europe, particularly in Cyprus, Spain, and Italy (with average historical SDP values of 0.66, 0.60, and 0.59, respectively). Across sites, the historical distribution has an interquartile range of 0.16 and a ninetieth-percentile level of 0.68.

We observed a northeast-to-southwest gradient in the SDP distribution37. However, part of this north-south contrast reflects climatic erosivity and relief that are embedded in the erosion component, which implies that higher erosion scores in the south do not by themselves represent poorer management. Meanwhile, natural gradients in soil processes also contribute to regional contrasts in SDP, as inherent soil characteristics can lead to higher or lower index values even under undisturbed conditions. These natural differences, however, may further amplify vulnerability in certain regions when combined with anthropogenic pressures.

Article Source

https://www.nature.com/articles/s44458-026-00064-4

A Data-Driven Indicator for Assessing the Evolving Impact of the EU Common Agricultural Policy on Soil Erosion Mitigation

Abstract

The data presented here correspond to the updated LAND Use and Management (LANDUM) model, a core component of the European Commission's RUSLE-based soil erosion risk assessment framework. LANDUM functions as a data-driven indicator for evaluating the effects of regional land use and agricultural management practices, including measures promoted under the Common Agricultural Policy, on soil erosion intensity at the NUTS2 level within the European Union. The approach relies on spatially explicit estimates of the cover-management (C) factor, a key component of the (R)USLE family of models. In the latest revision presented here, data from the 2023 EU Farm Structure Survey were incorporated to capture the extent of conservation practices such as reduced tillage, the use of cover crops, and the retention of crop residues. These data were processed to assess changes in the C-factor across Europe between 2016 and 2023. Collectively, the four versions of the LANDUM data-driven indicator here reported enable tracking of the European Union's (EU) Common Agricultural Policy (CAP) effects, from the no-management, pre-GAEC (Good Agricultural and Environmental Condition, introduced with the 2003 CAP reform) baseline in 2000 through the years 2010, 2016, and 2023. The insights gained from the data illustrate both overall and regional trends in how soil conservation measures promoted under the EU CAP contribute primarily to the mitigation of water-driven soil erosion, as well as to the reduction of wind erosion and other related soil degradation processes. These data can support further research in soil erosion and related fields and are available for reuse, reprocessing, or integration to enhance modelling applications that incorporate soil cover and management practices as input variables.

Value of the Data

The LAND Use and Management (LANDUM) model is a core component of the EU agri-environmental soil-erosion indicator, used to monitor the mitigating effects of the Common Agricultural Policy (CAP). This dataset provides a policy-relevant and spatially explicit resource for assessing soil-erosion mitigation potential across the 27 EU Member States from 1990 to 2023. By combining regional land

use, crop statistics, and actual management practices (reduced or zero tillage, cover cropping, residue retention) with RUSLE C-factor parameters from LANDUM, it enables quantification of how management decisions influence erosion risk at NUTS2 level. The dataset also supports the analysis of long-term trends in management-driven mitigation and more robust forecasting of future erosion risk under evolving agricultural practices.

Researchers can use the dataset to analyze temporal trajectories of erosion-mitigation potential and track how conservation practices have changed under the CAP. Its spatial resolution allows comparison across regions to identify hotspots of mitigation potential or persistent erosion risk, informing region-specific conservation strategies. The dataset can also be integrated with soil, climate, or ecosystem-services data to assess broader implications or proxies for soil health, water regulation, nutrient retention, and long-term land productivity.

For policymakers and regional land managers, the dataset offers actionable insights into the effectiveness of agri-environmental measures, supports the targeted design of soil-conservation policies, and helps prioritize regions where management interventions would yield the greatest benefit. In doing so, it strengthens evidence-based decision-making for sustainable land management and soil preservation across the EU.

Article Source

https://www.sciencedirect.com/science/article/pii/S2352340925011035?via%3Dihub

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