



HOT NEWS

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SURE-SOIL Project Kicks Off: Advancing Sustainable and Resilient Soil Management in Europe

The SURE-SOIL project (Sustainable Use and Resilience of European Soils) officially kicked off on January 2026, marking the launch of a new European research and innovation initiative focused on addressing soil erosion and promoting sustainable sediment management across Europe.

Funded by the European Union under the Horizon Europe programme (Marie Skłodowska-Curie Actions) and coordinated by University of Warwick (UK), SURE-SOIL aims to develop integrated, sustainable and resilient solutions to tackle soil degradation and erosion hotspots across Europe. The project adopts a strongly interdisciplinary approach, combining advanced monitoring systems, nature-based solutions, territorial governance frameworks, policy development, and active engagement with local communities and decision-makers.

The kick-off meeting provided an important opportunity for project partners to align on the overall scientific vision, methodological framework and collaborative strategy. Discussions focused on coordination mechanisms, complementarities between work packages, and the need to effectively bridge technical

research with governance and participatory processes. Particular emphasis was placed on ensuring the transferability, scalability and long-term impact of project outcomes.

Within SURE-SOIL, the Institute for Research on Innovation and Services for Development of the National Research Council of Italy (Cnr Iriss) contributes expertise in socio-economic analysis, territorial governance, public policy and community engagement. The Institute plays a key role in strengthening the social and territorial dimensions of the project, supporting participatory approaches, stakeholder involvement and policy-oriented outputs aimed at sustainable soil management.

News Source

<https://www.cnr.it/en/news/14086/sure-soil-project-kicks-off-advancing-sustainable-and-resilient-soil-management-in-europe>

Central Asian Countries to Develop a Major Climate Project to Protect Soils



The region faces land degradation, desertification, and biodiversity loss, which threaten agriculture and food security.

The project will be implemented jointly with the German Agency for International Cooperation (GIZ), using scientific data, analytics, and artificial intelligence for forecasting.

The initiative will promote sustainable land use in Central Asia, integrating global best practices.

An application has been already submitted to the UN Green Climate Fund.

Kazakhstan, Uzbekistan, and Turkmenistan already struggle with soil degradation and salinization. The situation around the Aral Sea

highlights the urgent need for better water and land management.

Daniel Gericke, head of Germany's regional program on integrated land use, stressed that solutions must move from paper to practice, with implementation across Central Asia.

If the application to the UN Green Climate Fund is approved, the project may start early next year.

News Source

<https://qazinform.com/news/central-asian-countries-to-develop-a-major-climate-project-to-protect-soils-c3bc4a>

Planting Hope in the Sands



As spring winds sweep across the Gobi Desert in Northwest China, thousands of young people are heading into the sands with shovels, saplings and a shared determination to hold back the desert from March to May. It has become an unexpected destination for many Chinese Gen-Zers, not for sightseeing, but for planting trees and searching for a sense of purpose.

Over the past three years, more than 100,000 volunteer visits from across the country have helped restore about 1,000 hectares of desert through large-scale tree planting and sand-control efforts.

This year alone, more than 40,000 volunteers

have traveled to Minqin county in Gansu province, which is surrounded by China's third and fourth largest deserts, the Badain Jaran and the Tengger. For many of them, the journey began with an online invitation: "Come to Minqin and plant a tree".

Once known for its severe desertification, Minqin has long stood on the front line of China's battle against encroaching sands.

Since the 1950s, generations of locals have planted straw checkerboards, and drought-resistant shrubs such as suosuo to stabilize shifting dunes.

Despite these efforts, by the late 1990s, desert covered 94.5 percent of the county. Local peo-

ple once described life there with a bitter saying: "Sand climbs the walls, donkeys climb on to rooftops, and farmland is abandoned."

The latest statistics show the desertification rate in Minqin at 88.18 percent. The struggle against the desert is attracting new generations. Among them is Zhong Lin, 28, who has posted popular videos of planting trees online.

He first introduced the slogan "Come to Minqin and plant a tree" in 2023, which later became an official public welfare campaign launched by the Communist Youth League Committee of Minqin county in February 2025. By May 5 this year, the campaign had attracted more than 50,000 online registrations.

During the 2025 spring planting season, related hashtags generated more than 170 million views across online platforms.

The movement has attracted broad public support. Donors from across China have provided mobile toilets, prefab housing, solar power equipment, and daily supplies for volunteers. "Most of our funding comes from donations by companies and ordinary people," said Ma Junhe, a Minqin native who has participated in desert-control work for nearly two

decades.

According to local forestry authorities, by May 2025, Minqin had completed a fully enclosed protective green belt stretching 380 kilometers around the oasis, covering a total area of over 143,000 hectares. "This is the result of the wisdom and hard work of Minqin's people, as well as the selfless dedication of volunteers," said Jiang Liling, deputy director of Minqin's forestry and grassland bureau.

News Source

https://www.chinadaily.com.cn/a/202605/27/WS6a164167a310d6866eb4ae01_3.html

New USDA Program Funds Regenerative Conservation Practices

The group Rural Investment to Protect our Environment is applauding USDA's decision to provide \$700 million for the new Regenerative Pilot Program to help farmers improve soil health and water quality, and boost long-term productivity.

RIPE, a farmer-led organization that has been seeking more compensation for producers' conservation activities for nearly a decade, also released a detailed analysis quantifying the public benefits from the adoption of regenerative climate-smart agricultural practices.

"RIPE is excited about USDA's commitment to scaling regenerative agriculture," said Trey Cooke, RIPE executive director. "The program aligns with RIPE's approach. Our organization's priority is to remove barriers to effective conservation practices and engage farmers from across the country in conservation."

The program was announced jointly by USDA's Natural Resources Conservation Service, the Department of Health and Human Services, and the Centers for Medicare and Medicaid Services in late December.

In its press release, USDA said the program is building off the Make Our Children Healthy Again strategy released by HHS in September.

The release said the department is also investing in research on connections between regenerative agriculture and public health.

"Protecting and improving the health of our soil is critical not only for the future viability of farmland, but to the future success of American farmers," said Agriculture Secretary Brooke Rollins. "To continue to be the most productive and efficient growers in the world, we must protect our topsoil from unnecessary erosion and improve soil health and land stewardship."

Congress created the Soil Conservation Service, the forerunner of the Natural Resources Conservation Service, in the 1930s to stop massive soil losses from wind and water erosion. More recently, NRCS has become involved in soil health initiatives to improve productivity and enhance carbon sequestration in soils.

News Source

<https://www.farmprogress.com/conservation-and-sustainability/new-usda-program-funds-regenerative-conservation-practices>

Recovery of the Famara Peaks: The Titanic Effort to Avoid the Loss of Soil and Vegetation

One of the realities facing the northern area of Lanzarote is the degradation of the Famara peaks, motivated by soil erosion. This situation poses a serious problem for one of the areas with the greatest biodiversity in Lanzarote, as it is located at a high altitude and makes it one of the most humid places on the island. To carry out a solution and tackle this problem, the public company Gesplan and the Cabildo de Lanzarote have been developing since 2024 a project to recover and conserve this area.

Francisco Fabelo, head of the Environment area of the Cabildo de Lanzarote, explains that this soil loss is not only due to the action of climatic phenomena, but also "to the action of herbivores like goats". The rains, especially torrential ones, and the wind "have led to the dragging of soil from the highest to the lowest areas of the island". This project for the recovery of these peaks is being carried out on publicly owned land and has a budget of almost 900,000 euros.

The area of action is comprised between El Bosquecillo and Montaña Aganada, a place where the soil does not have the capacity to retain the earth due to insufficient vegetation.

And it is that the roots of shrubs, trees and other vegetation are the perfect tool to hold the soil and prevent the action of water from causing havoc. "During the rains, a kind of ravines are formed that become deeper and larger each time (called gullies), which means that when it rains, the water runs in the form of runoff that accentuates erosion more and more", points out Fabelo.

In fact, this type of soil, known in Lanzarote by many as "caliche", is a very calcareous and very impermeable soil that was even used to make lime. "It is a soil that lacks a lot of organic matter, so we make an amendment to correct its composition to make it more fertile," he asserts. These works are being carried out in three hectares divided into 18 different plots.

Although the planting of native vegetation is vital and is part of this initiative, the most important step is soil preparation, as it is very calcareous and rainwater does not penetrate the earth, but rather runs over the surface. "We do it by adding organic matter and other elements that increase permeability," he explains.

This is not only achieved by adding manure,

but also coconut fiber and with the placement of small meshes with pruning remains from other areas of the island such as vine shoots. "We introduce this into the deepest areas of the gullies and we keep adding a lot of organic matter," points out Francisco Fabelo. Therefore, the modification of the soil involves a physical and chemical transformation so that it retains more water, life begins to exist in it in terms of microbiota and when it receives the different species of vegetation, these have all the necessary nutrients.

At the same time as these works on the ground, from Environment they have been collecting different seeds of endemic flora species of the area. This seed bank has germinated in the Máguez nursery in a controlled manner. "We accelerate growth through techniques such as a controlled climate inside the greenhouse, but then we take them out of it so that they acclimatize and finally, we transfer them to the restoration plots, their definitive place", details the head of the Environment area.

The bejeque, lavender, tabaiba, Famara daisy or sow thistle are some of the more than thirty varieties of plants that are cultivated to reforest the peaks of this area. The sow thistle, spe-

cifically, is one of the species most attacked by herbivores goats or rabbits, since "it is very nutritious and palatable for the fauna". The planted species are protected by a fence to prevent attack by herbivores. In this way, the survival of this vegetation is ensured.

These works are being carried out to prevent soil loss which seriously affects many other areas of Lanzarote, such as Montaña de Guanapay. "The gullies in this area no longer have vegetation because any plant that tries to colonize this place is washed away by the effect of the rains and everything is lost," explains Fabelo. Therefore, it is very important to prevent water from running strongly.

The project, which is currently a little over a year from completion, is progressing favorably in a year that has coincided with abundant rainfall distributed over several months. "It has been a total guarantee for the plantation, there have been no failures of these crops," he celebrates.

Now, the initiative is in full process to create an access for a water tank that can supply the area to water the planted species, but the use of water through the fog collectors is also contemplated. "Given the heatwaves that may come for several consecutive years without

periods of rain in between, we will have to water," he points out.

Regarding the possibility of transferring this recovery project to other areas of Lanzarote, Francisco Fabelo points out that "we have an obligation, also on the part of the European Union, to increase our restored area, which has been punished by climate change and by erosion and that, if we do not take measures, the desertification of the island would grow by leaps and bounds and we do not want Lanzarote to become a desert in a few years".

Therefore, once the Famara peaks project finishes in the year 2027, he/she/it states that "it will be necessary to continue with the restoration of other plots".

Contrary to what many people may think, in Lanzarote there indeed exists a tiny group of Canarian pines (*Pinus canariensis*) in the area of the Malpaso curves, in the municipality of Haría. Formerly, there was a very important arboreal system formed by pines, cypresses and tamarisks in the area of the Elvira Sánchez Ravine.

However, would reforestation with this species be possible in some areas of the north of the island? The head of the Environment area explains that this arboreal vegetation is "very

sensitive to wind, but also to the very humidity of the area that causes a lichen to grow on the branches that does not help them to fully develop".

Therefore, these two factors represent a disadvantage for a possible reforestation with Canary pine in this area despite the fact that the few that exist remain alive.

News Source

https://www.lavozdelanzarote.com/en/news/more-news/recovery-of-the-famara-peaks-the-titanic-effort-to-avoid-the-loss-of-soil-and-vegetation_242478_102.html

SWCS 81st International Annual Conference “Gateway to Conservation”



The Soil and Water Conservation Society (SWCS) 81st International Annual Conference, taking place July 26-29, 2026, in St. Louis, Missouri, will bring together researchers, practitioners, industry leaders, farmers, and students from around the world. Centered on this year’s theme, "Gateway to Conservation," the conference will foster collaboration and the exchange of ideas to advance science-based solutions for soil, water, and natural resource management.

This year’s theme, Gateway to Conservation, embraces St. Louis’s historic and geographic significance. Located just south of the confluence of the Mississippi and Missouri rivers, the two largest moving bodies of water in North America, St. Louis has long been a meeting place for people, ideas, and opportunity.

The conference will feature the latest ideas, technologies, and practices and foster dialogue around their adoption. Through workshops, sessions, symposia, tours, exhibits, and demonstrations, cutting-edge research and practice developments in soil health, water quality, and resource management will be shared. Scientists, practitioners, and farmers will present their work at the field, farm, and watershed scale that span the private and public sectors. Applications of social theories and examples of successful outreach and education will enable attendees to identify ways to scale up localized successes. Participants will also hear about policy and economic developments that build a framework to increase conservation adoption and support future generations.

News Source

<https://www.swcs.org/events/conferences/26ac>

Spatiotemporal Prioritization of Soil Erosion Risk Using the RUSLE Model and CMIP6 Projections Under Future Climate Scenarios in a Mediterranean Watershed

Abstract

Projected shifts in the Eastern Mediterranean rainfall regime suggest fewer but more intense precipitation events, which are expected to alter soil erosion dynamics. This study evaluates the spatiotemporal variations in rainfall erosivity (R-factor) and soil loss in the Küçük Menderes River Basin, Turkey, using the Geographic Information System (GIS) based Revised Universal Soil Loss Equation (RUSLE). The most appropriate R-factor formula was selected through a comparative evaluation of ten empirical approaches. Projections were based on downscaled rainfall data from 13 General Circulation Models (GCM) under two Shared Socioeconomic Pathways (SSP2-4.5 and SSP5-8.5) scenarios from 2021 to 2100. The baseline period (1970–2000) corresponded to a mean soil loss of $29.56 \text{ t ha}^{-1} \text{ yr}^{-1}$ and a sediment yield of $6.81 \text{ t ha}^{-1} \text{ yr}^{-1}$. Under SSP2-4.5, soil loss exhibited small fluctuations forming a subtle U-shaped pattern, while SSP5-8.5 projected reductions driven by decreased precipitation. While climate projections influenced temporal variations in soil loss magnitudes, the spatial distribution of high-risk

zones remained predominantly controlled by the basin's steep topography. These persistent erosion hotspots highlight the need for targeted conservation strategies, aligning with efforts to mitigate land degradation Sustainable Development Goal 15.3 (SDG 15.3).

Study Area

The Küçük Menderes River Basin is located along the Aegean coast of western Türkiye and encompasses an area of approximately 352,871 ha. Agricultural land constitutes the dominant land use within the basin, followed by forested and semi-natural areas (GDWM, 2018). The basin exhibits a pronounced topographic gradient, transitioning from steep mountainous terrain in the eastern parts to low gradient plains toward the west. Approximately one-third of the basin consists of an east-west elongated plain, which is bordered by steeply rising mountain ranges and the Aegean Sea (Yagbasan, 2016). Within the basin, agricultural activities on sloping lands where forests have been converted to cropland particularly mixed and cultivated areas with low vegetation density are associated with moder-

ate to high erosion risk under current conditions (Gökçe Gündüzoğlu and Gündüzoğlu, 2025).

The region is characterized by a Mediterranean climate, with hot, dry summers and mild, rainy winters. The mean annual precipitation is 622 mm, corresponding to an average annual discharge of $11.45 \text{ m}^3 \text{ s}^{-1}$ at the basin outlet (GDWM, 2016). The combination of pronounced topographic variability, seasonal rainfall concentration, and the predominance of agricultural land use suggests that runoff generation and soil erosion processes may vary spatially across the basin. These characteristics make the Küçük Menderes River Basin a suitable case study for evaluating basin-scale soil erosion dynamics and their potential response to future climate change.

Conclusion

This study assessed the potential impacts of climate change on soil erosion dynamics in the Küçük Menderes River Basin by integrating the RUSLE model with CMIP6-based climate projections. Among the ten empirical models evaluated, the Torri et al. (2006) model demonstrated the superior performance with minimal bias. It proved particularly well-suited for Mediterranean climatic conditions,

offering a robust solution for R factor estimation in the absence of sub-hourly precipitation data required for direct EI30 calculation a common limitation in both observational datasets and climate projections.

The ensemble mean of 13 GCMs was utilized to project future climate variability under SSP2-4.5 and SSP5-8.5 scenarios across four periods: 2021–2040, 2041–2060, 2061–2080, and 2081–2100. The baseline R factor was estimated at $1250.4 \text{ MJ mm ha}^{-1} \text{ h}^{-1} \text{ yr}^{-1}$, corresponding to a mean soil loss of $29.56 \text{ t ha}^{-1} \text{ yr}^{-1}$ and a sediment yield of $6.81 \text{ t ha}^{-1} \text{ yr}^{-1}$ (SDR: 0.23).

Under the SSP2-4.5 scenario, both rainfall erosivity and soil loss exhibited only minor fluctuations with slight increases in the early and late century, forming a subtle U-shaped temporal pattern. This suggests that long-term variability, rather than a consistent directional trend, dominates the basin's response under intermediate emissions. In contrast, the SSP5-8.5 scenario projected substantial declines, particularly toward the late century, driven by marked reductions in precipitation and the frequency of erosive events. The strong divergence observed in the late SSP5-8.5 period highlights the scenario's representation of ex-

extreme climate change compared to the generally moderate fluctuations seen earlier. However, it is important to note that rising temperatures and associated shifts in evapotranspiration may negatively affect vegetation cover, indirectly heightening soil erosion risk despite the projected decrease in rainfall erosivity.

Despite projected reductions in soil loss magnitudes, the spatial distribution of erosion risk exhibited strong persistence, largely anchored by the basin's mountainous topography. Across the majority of scenarios, the "Very High" risk class maintained a stable range of 53.3%–56.7%, while the 'High' risk class fluctuated between 26.7% and 31.7%. This analysis reveals that while climate projections influenced temporal variations in soil loss magnitudes, the spatial distribution of high-risk zones remained predominantly controlled by the basin's steep topography. This persistence weakened only in the late 21st century under SSP5-8.5, where the share of "Very High" risk declined to 48.3%, suggesting that substantial transitions in risk classification occur only under extreme climatic forcing.

The persistence of high-risk zones in the steep, mountainous eastern subbasins, contrasted with lower risks in the western plains, sup-

ports the dominant role of the LS factor in determining spatial variability. Consequently, adaptive management strategies should not rely solely on favorable climate projections but should consider prioritizing structural interventions in these topographically constrained, erosion prone areas. Projecting future soil losses is of great importance from economic and environmental perspectives, particularly under climate change and other driving factors, in order to implement effective control measures in erosion-prone areas. Such projections may be carried out using the RUSLE model or developed models in future studies.

Article Source

<https://www.frontiersin.org/journals/environmental-science/articles/10.3389/fenvs.2026.1760569/full>

Application of Biochar in Agriculture for Effective Water Resource Conservation

Abstract

Biochar, a carbon-rich by-product of pyrolyzed biomass, has drawn increasing interest due to its ability to enhance soil moisture retention, improve water infiltration rates, and optimize water use efficiency. However, studies on biochar application for water conservation remain limited. This article examines the potential of biochar as a sustainable water conservation measure within agricultural practices under variable climate change conditions. It reveals that biochar may offer promising avenues for sustainable water management and agricultural development through its combined effects on soil structure, nutrient retention, and microbial activity. This paper emphasizes the need for an integrated approach to water and soil management. Integrating biochar with the existing water management practices could substantially reduce irrigation demand and improve agricultural sustainability in semi-arid regions. It also provides useful recommendations for policymakers, researchers, and practitioners to prioritize future research on biochar optimization, and emphasize the development of systematic guidelines for biochar application in agricul-

ture sector. Finally, it highlights the importance of promoting interdisciplinary collaborations to facilitate knowledge exchange and technology transfer for improved water conservation and agricultural sustainability in vulnerable water-scarce regions.

Role of Biochar in Water Retention and Soil Moisture Management

In agriculture, biochar amendments improve soil fertility, water retention, and crop productivity while sequestering carbon and mitigating greenhouse gas emissions. Biochar promotes aeration, root penetration, and water infiltration by enhancing soil structure and aggregation, improving soil water retention, and reducing nutrient leaching. Additionally, biochar amendments can increase soil pH, enhance CEC, and adsorb toxic contaminants, thereby improving soil quality and reducing environmental risks associated with soil degradation. These benefits highlight the potential of biochar as a sustainable soil amendment tool over traditional methods for enhancing agricultural resilience to climate change while mitigating its environmental impacts. It is possible to employ locally accessible biomass

and combine biochar production with renewable energy systems for decentralized pyrolysis units for biochar production in large-scale farms. This would be more useful in water-scarce areas while lowering costs and emissions. Application-specific biochar formulations and precision farming methods can maximize their efficacy in enhancing soil moisture retention and reducing water stress across diverse agricultural environments.

Conclusion

This study emphasizes the potential application of biochar as a sustainable approach to water conservation under changing climatic conditions. The study shows that biochar additives can improve soil moisture retention, water infiltration rates, and water use efficiency across various agricultural and environmental contexts. Biochar offers significant potential to reduce the negative effects of drought, soil erosion, and water shortage on crop productivity and ecosystem resilience by improving soil structure, enhancing nutrient retention, and fostering positive interactions with soil microbes. Policymakers, researchers, and practitioners are encouraged to prioritize future studies on the effectiveness and optimization of biochar. Such research would sup-

port the development of customized guidelines for the application of biochar and land management practices, while promoting interdisciplinary collaborations to facilitate knowledge exchange and technology transfer for sustainable water conservation and agricultural development in a changing climate. These recommendations highlight the importance of integrated soil and water management approaches.

Article Source

<https://link.springer.com/article/10.1007/s44378-026-00210-3>

Evaluating the Impact of Assisted Natural Regeneration and Afforestation on Soil Erosion Dynamics Using High-resolution Imagery in Semi-arid Ethiopia

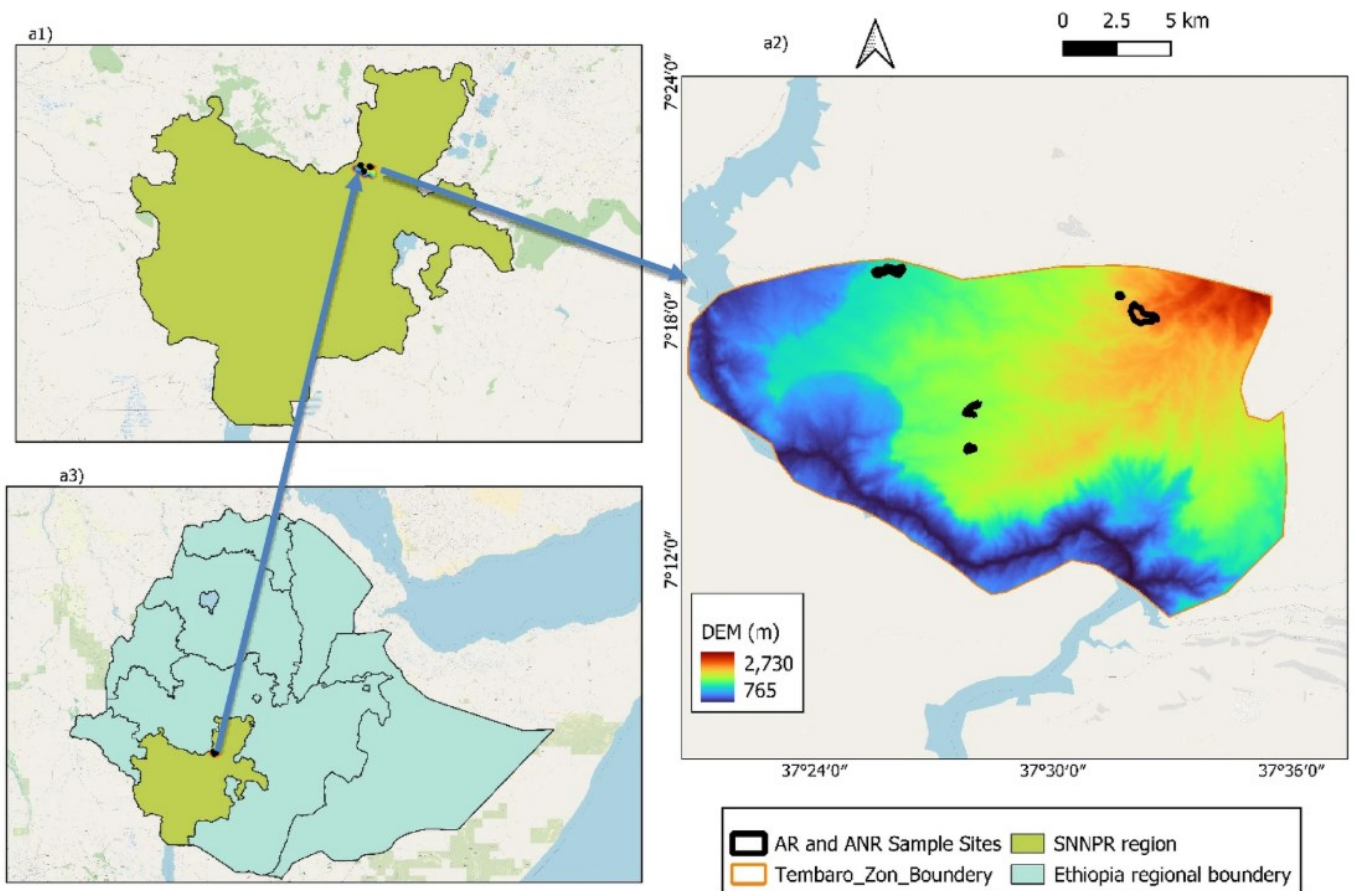
Abstract

Ethiopia's highlands face a serious degradation and soil erosion driven by unstable land use, climate variability, and rapid population growth. In response, the Reduced Emissions from Deforestation and Forest Degradation (REDD+) program has implemented various techniques, such as afforestation and assisted natural regeneration interventions in Ethiopia; however, the effectiveness of these practices has not been assessed yet. This study aimed to analyze the effects of afforestation and assisted natural regeneration practice on soil erosion dynamics, specifically in the Kembata Tembaro district. The study utilized high-resolution satellite imagery (4.77 m) from Norway's International Climate and Forests Initiative (NICFI), SRTM DEM (30 m resolution), and WorldClim. The land use and land cover change analysis was conducted in Google Earth Engine (GEE) utilizing a Random Forest (RF) classifier. In addition, the soil loss estimation was analyzed for six pilot sites (three afforestation and three-assisted natural regeneration) for two periods in 2015 and 2024 utilizing the Revised Universal Soil Loss Equation model, integrating rainfall erosivity, soil erod-

ibility, cover management, soil management practices, and topographic impacts. The study revealed that the forest cover notably increased across both sites, increasing from 1.9% to 22.18% in the assisted natural regeneration and from 8.5% to 34.92% for afforestation and reforestation sample sites. Consequently, the 2015 annual soil loss, which was 13.19 t/ha/y, declined to 9.49 t/ha/y in 2024 over the three ANR sites. In addition, the 2015 estimated annual soil loss for all AR sites, 43.37 t/ha/y, declined to 31.29 t/ha/y in 2024. The accuracy of the RUSLE-based soil erosion model, as calculated by the ROC curve analysis, demonstrated strong predictive performance with an AUC of 0.823. The key finding of the study revealed that both interventions have a critical role in preserving forest cover, mitigating erosion, and enhancing ecosystem resilience. Overall, the study's findings provide evidence for scaling up interventions to achieve Ethiopia's climate-resilient green economy goals.

Materials and Methods

The study was conducted in Kembata Tembaro district, located in the central Ethiopia regional state. The study specifically focuses



on a pilot test from three AR and ANR sites, covering a total area of 107.45 km². Geographically, the study site is located in longitudes 37° 22' 18" and 37° 33' 36" E and latitudes 7° 8' 24" and 7° 19' 12" N". The district is characterized by undulated topography of plateau, valleys, and rolling hills, with elevations ranging from 800 m to 2600 m above sea level, as shown in Fig. 1. This elevation variation creates a distinct agroecological zone; however, the majority of the REDD+ Investment Program (RIP) interventions (95%) are situated within the Kola (lowland) agroecology, with

smaller portions extending into the Weyna Dega (mid-highland) zones. In the Ethiopian context, Kola refers to the hot, lowland zones, typically found at altitudes below 1,500 m. The area is mainly dominated by diverse agricultural landscapes and serves as a critical zone for biodiversity and soil conservation efforts in the Ethiopian highlands.

Article Source

<https://www.nature.com/articles/s41598-026-40176-4>

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