



# HOT NEWS

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➤ ISSUE 09 2023



## CONTENTS

<b>The director of the ICHARM visited IWHR and IRTCES</b>	<b>01-03</b>
<b>The Editor-in-Chief of ISWCR visited IRTCES</b>	<b>04-05</b>
<b>International Journal of Sediment Research: Open Access journal from January 2024</b>	<b>06</b>
<b>Centennial Celebration and Congress of the International Union of Soil Sciences</b>	<b>07</b>
<b>Multiple co-occurring erosion processes on global cropland</b>	<b>08-09</b>
<b>Database of EU Research projects in soils</b>	<b>10-11</b>
<b>Scientists help combat desertification woes, promote UN goals</b>	<b>12-14</b>
<b>Cover crops found to reduce carbon loss in the soil of Mediterranean olive groves by more than 75%</b>	<b>15-16</b>

**Editor: Pengfei DU**

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## The director of the ICHARM visited IWHR and IRTCES

Prof. Koike Toshio, the director of the International Centre for Water Hazard and Risk Management (ICHAHM) under the auspices of UNESCO, visited IWHR and IRTCES on October 19.

Entrusted by Prof Peng Jing, the President of IWHR, Prof. Liu Yi, the Vice President of IWHR, presided over the meeting, while relevant persons in charge and experts from International Cooperation Department, Flood Control, Drought Mitigation and Disaster Prevention Research Center and IRTCES took part in the meeting.

Prof. Liu Yi reviewed the good cooperation history between IWHR and ICHARM, and expressed his appreciation to ICHARM, as a UNESCO category II organization, for its ac-

tive role in international cooperation on water-related disaster mitigation. He introduced the new concept of disaster prevention, mitigation and relief of "two persistence, three transformation" put forward by General Secretary Xi Jinping, and the "four-point initiative" put forward by Minister Li Guoying at the UN Water Conference. He said that the IWHR is willing to rely on the platform of affiliated international organizations to further strengthen the dialogue and cooperation mechanism with the ICHARM and other United Nations agencies, and join hands to implement the United Nations Water Action Agenda, the Sendai Framework and other international initiatives, so as to jointly promote sustainable water-related disaster risk management.



Prof. Koike Toshio expressed his appreciation for the scientific research achievements and international partnership network of the IWHR, and agreed with China's concept and practice of coordinating the development of water conservancy and the elimination of water-related hazards. He pointed out that mitigating water-related disasters involves multi-disciplinary and cross-sectoral collaboration, and that raising public awareness of disaster prevention and preparedness is also a key part of water disaster risk management. In the face of the challenge of frequent and strong extreme weather events brought about by climate change, industry-wide and multi-disciplinary cooperation in disaster prevention and mitigation is imperative. He ex-

pressed his hope that the two sides would make use of domestic and international resources and work together to promote joint research, exchange and cooperation on international water hazards.

Subsequently, Prof. Koike Toshio visited the IRTCES. As members of the family of UNESCO category II centers, the two parties reviewed their cooperation since the signing of the Memorandum of Cooperation in 2009, and had in-depth exchanges on the implementation of UNESCO IHP flagship projects, project cooperation in areas of interest to UNESCO, organization of international conferences, international training, building of international journals, open science and open data, and so on.



Prof. Koike Toshio also gave a lecture on "An Integrated Challenge for Research, Education, and Information Networking" at the Global Vision Forum of IWHR.



## The Editor-in-Chief of ISWCR visited IRTCES

On October 24, Prof. Michael Maerker, the one of Editors-in-Chief of *International Soil and Water Conservation Research*, the official journal of WASWAC, Professor of Earth and Environmental Sciences Department, University of Pavia, Italy, visited the IRTCES. Prof. Jianli Zhang, the deputy director of IRTCES, Prof.

Duihu Ning, the president of WASWAC, and Prof. Yuehong Chen, the executive editor of the *International Journal of Sediment Research* attended the welcome meeting. Prof. Paige Chyu, the executive editor of the *International Soil and Water Conservation Research*, took part in the discussion online.



Subsequently, Prof. Michael Maerker gave a lecture with title of "Integrated Soil Erosion Assessment : Concepts, Methods, and Applications" at the Global Vision Forum of IWHR. The report reviewed the importance of soil, the monetary dimension of soil erosion, and

the global current soil water erosion situation, and proposes a distributed architecture process model based on erosion response units to assess and quantitatively simulate different soil erosion processes based on a comparative analysis of existing soil erosion models.



Taking the San Giorgio catchment in Imera River of Sicily, Italy, as an example, the report introduces in detail the current status of soil erosion, stochastic modeling methods, parameter rate-setting process and the comprehensive response of the watershed. Taking the Swaziland sub-watershed in South Africa as an example, the report explains the method of analyzing regional gully erosion by using remote sensing images and GIS, as well as the idea of constructing a comprehensive model of soil erosion including rill erosion, interrill

erosion and gully erosion.

Finally, Prof. Michael Maerker objectively analyzed the deficiencies of the existing research in the dynamic change of erosion response unit, regionalization of soil characteristics and precipitation patterns, and construction of early warning system, and put forward the research outlook on the incorporation of other soil erosion types, clarification of sediment migration process in the river channel, and enhancement of the real-time monitoring of water and sediment.

## International Journal of Sediment Research: Open Access journal from January 2024



Since January 2024, authors who publish in *International Journal of Sediment Research* will be able to make their work immediately, permanently, and freely accessible. International Journal of Sediment Research continues with the same aims and scope, editorial team, submission system and rigorous peer review.

This move will facilitate universal access to the high-quality research published in the International Journal of Sediment Research, ensuring it is freely available, readily accessible,

and without any restrictions. With this move to OA, the journals will no longer charge subscription fees and will instead be supported by Article Processing Charges (APC).

Please note: Authors who have submitted their paper on or before December 31, 2023, will have their accepted article published in *International Journal of Sediment Research* at no charge. Authors submitting their paper after this date will be requested to pay the APC.

*More about the International Journal of Sediment Research :*

<https://www.sciencedirect.com/journal/international-journal-of-sediment-research>



## Centennial Celebration and Congress of the International Union of Soil Sciences



The custodian of soil science will celebrate its centennial contribute to the nature and human wellbeing in 2024.

The event will also empower the linkages with different disciplines, policy makers, stakeholders, institutions, and associations to effectively address civil society needs within agriculture, forestry, environment, urban planning, energy, education, and other societal issues.

The celebration will occur on May 19th and will be followed by two intense days of congress, with plenary and parallel scientific sessions. Both soil scientists and specialists from other disciplines will participate to each session, focusing on past achievements and future challenges.

The congress will be followed by technical/scientific excursions that will range from short local to long trips, spanning from Alps to Sicily.

A pre-congress visit to Villa Lubin in Rome, the historical place where the IUSS was founded, is scheduled on May 18th.

We are looking forward to welcoming you in Italy,

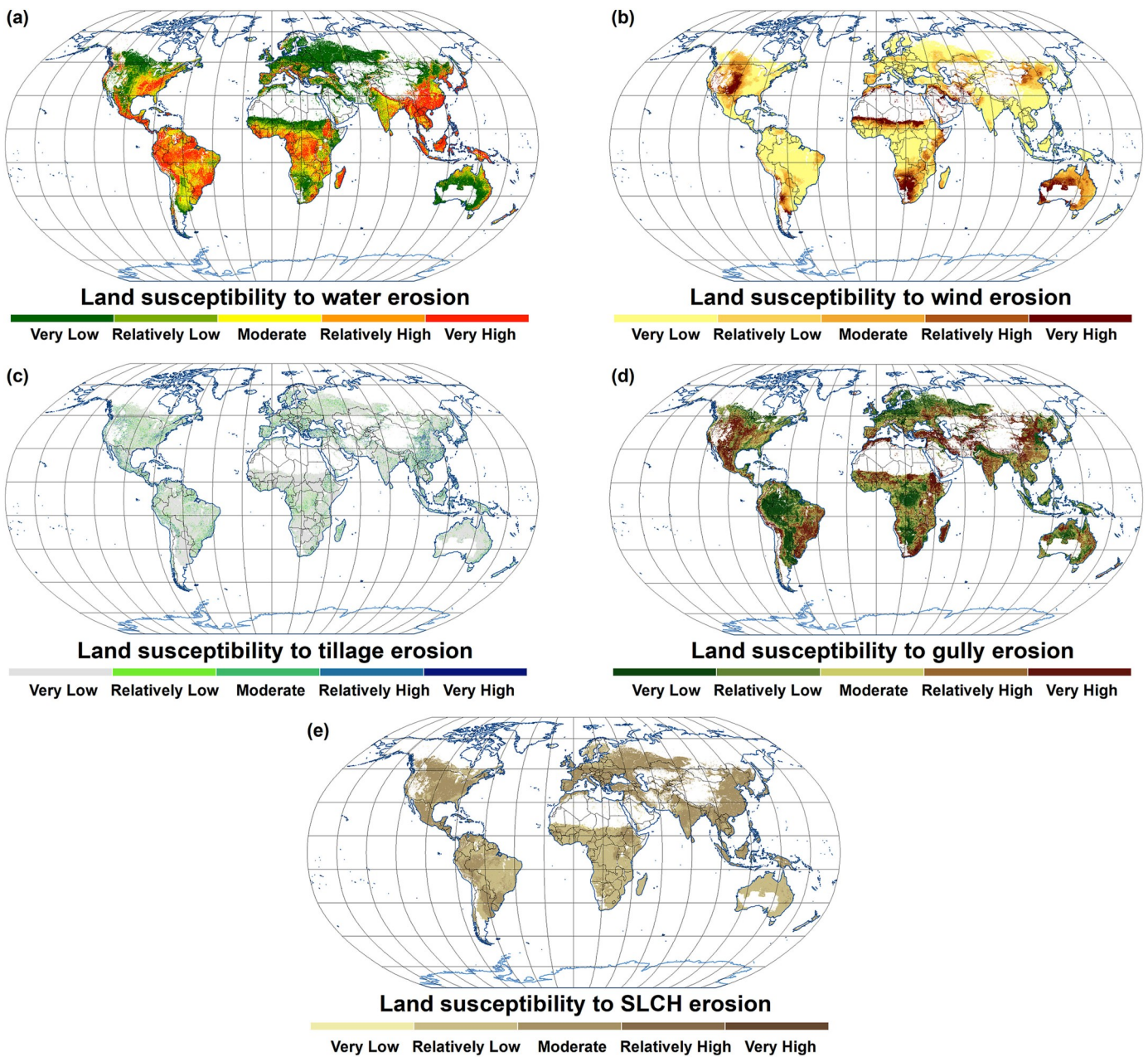
Sara Marinari

Giuseppe Corti

Edoardo A.C. Costantini

Details: <https://centennialius2024.org/>

## Multiple co-occurring erosion processes on global cropland



The five soil erosion processes that we considered are: (i) water erosion due to interrill and rill; (ii) water erosion due to gully; (iii) tillage erosion (iv) wind erosion and (iv) (root or tuber) crop harvesting erosion (in short SLCH). Of a modelled 1.48 billion hectares (B

ha) of global cropland, our results indicate that 0.56 B ha (~36% of the total area) are highly susceptible (classes 4 and 5) to a single erosion process, 0.27 B ha (~18% of the total area) to two processes and 0.02 B ha (1.4% of the total area) to three or more processes.

An estimated 0.82 B ha of croplands are susceptible to possible increases in water (0.68 B ha) and wind (0.14 B ha) erosion.

**Title:** Multiple co-occurring erosion processes on global cropland

**Description:** This dataset is the first-ever assessment at Global scale combining the threat of water, wind, tillage and harvesting to reveal the cumulative impact on arable land. We present the datasets for each of the erosion process (water, wind, tillage, harvesting root crops) and their cumulative effect at 1km resolution for Global croplands (1.48 Billion ha). Practically, includes the first ever global susceptibility assessment for wind, tillage and SLCH erosion.

**Spatial coverage:** Global Croplands (1.48 Billion ha )

**Pixel size:** 1km

**Measurement Unit:** Classes of susceptibility (1: Very Low; 2: Relatively Low; 3: Moderate; 4: Relatively High; 5: Very High)

**Projection:** ETRS\_LAEA

**Temporal coverage:** 2010-2020

**Reference:** Borrelli, P., Alewell, C., Yang, J.E., Bezak, N., Chen, Y., Fenta, A.A., Fendrich, A.N., Gupta, S., Matthews, F., Modugno, S., Haregeweyn, N., Robinson, D.A, Tan, F., Vanmaercke, M., Verstraeten, G., Vieira, D., Panagos, P. 2023. Towards a better understanding of pathways of multiple co-

occurring erosion processes on global cropland. *International Soil and Water Conservation Research*, 11(4), pp.713-725.

The data includes 4 groups of files

- ◇ Individual processes (Intrinsic scenario - farmable land - as Fig. 2 of the publication)
- ◇ Land suitable for crops (In actual scenario - as Fig. 3 of the publication)
- ◇ Co-occurrence of different soil erosion processes (by water, wind, gully, tillage and harvesting) (as Fig. 4 of the publication).
- ◇ Future Trends (Water, Wind) -(as Fig. 5 of the publication).

Details at:

<https://esdac.jrc.ec.europa.eu/content/multiple-co-occurring-erosion-processes-global-cropland>

## Database of EU Research projects in soils

The analysis of soil research is particularly relevant given the increased political attention on soils at EU and global levels. This dataset includes a collection of EU Research projects in soils (n = 1101 projects) funded by the successive European Commission Framework

Programs (FP) for research and innovation (from FP1 to H2020). The dataset has been created collecting information from the Community Research and Development Information Service and the official portal for European data.

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DOI: 10.1111/ejs.13423

**European Journal of Soil Science** WILEY

**REVIEW ARTICLE**

### Forty years of soil research funded by the European Commission: Trends and future. A systematic review of research projects

Cristina Arias-Navarro<sup>1</sup> | P. Panagos<sup>1</sup> | A. Jones<sup>1</sup> | M. J. Amaral<sup>2</sup> | A. Schneegans<sup>3</sup> | M. Van Liedekerke<sup>1</sup> | P. Wojda<sup>1</sup> | L. Montanarella<sup>1</sup>

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**Abstract**

The European Green Deal with its high ambition has set the European Union (EU) on a promising path towards greater soil protection. The EU Soil Strategy 2030, the Biodiversity Strategy 2030, the Farm to Fork Strategy, the Zero Pollution, the Nature Restoration Law and the European Climate Law, among others, include actions to protect our soils. Research and Innovation (R&I) will play a key role in developing new knowledge and tools enabling the transition to healthy soils. The main aim of this paper is to analyse past and near-future trends in EU's funding for R&I on soil-related issues. For this purpose, a review of EU-funded soil projects was conducted based on the data available in the Community Research and Development Information Service and the official portal for European data. Our analysis shows that over the past 40 years, the EU has invested significantly in developing integrated knowledge about the relationships between soil functions and ecosystem services and how human-induced pressures affect soil health. Following the adoption of the EU Soil Thematic Strategy in 2006, there was an increase in research funding for soil-related research. Furthermore, our analysis also illustrates an interesting interplay of permanent and changing soil themes. The Horizon Europe Mission 'A Soil Deal for Europe', which aims to establish a network of 100 living labs and lighthouses to lead the transition towards healthy soils and safeguard human and planetary health by 2030, provides a further incentive for soil research. Together with the EU Soil Strategy 2030 and the new proposal for a Directive on Soil Monitoring and Resilience (Soil Monitoring Law), and the EU Soil Observatory (EUSO), the three instruments set up the political framework, concrete measures, and a monitoring system needed for the protection, restoration and sustainable use of soils.

**KEYWORDS**  
EU research and innovation, EU soil observatory, EU soil strategy, horizon Europe, open science, soil Mission, soil policies

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*Eur J Soil Sci.* 2023;74:e13423. [wileyonlinelibrary.com/journal/ejs](https://doi.org/10.1111/ejs.13423) | 1 of 14

A keyword-based stocktaking of soil related research projects has been conducted, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. First, we used CORDIS (<https://cordis.europa.eu/>) to identify soil projects funded by the EC with the search terms 'project' AND 'soils' OR 'soil' in their CORDIS record. In a second step, we used [data.europa.eu](https://data.europa.eu/) (<https://data.europa.eu/data/datasets>) to obtain public grant information for each project identified (legal basis, topics, cost, coordinator, country, participants, etc.). After removing the duplicates, the projects were screened based on their title and summary. We discarded 2271 records, using automation tools, which are projects that did not include the word "soil" in the title or in the summary. We did not consider projects which have used other terms than soils as the purpose of the investigation was to determine trends over time, rather than to provide a comprehensive record of all projects on the topic. The rest of the projects (n = 1172) were manually assessed for eligibility. Authors inspected the title and the project summary and excluded those projects that were not related to soil science (n=57). Another 14 duplicated records were manually removed. Finally, n = 1101 projects were included in the study.

Reference data (countries, funding schemes/

types of action, subjects (SIC codes)) can be found in this dataset: <https://data.europa.eu/euodp/en/data/dataset/cordisref-data>.

CORDIS datasets are produced monthly. Therefore, inconsistencies may occur between what is presented on the CORDIS website and this dataset.

Our results need to be understood as a first attempt to develop a database of soil related research projects funded by the EU. This dataset will be refined in the future and expanded with projects funded under the current FP (Horizon Europe).

**Resource Type:** Soil Knowledge - Projects

**Registration is requested:** No

**Year:** 2023

**Reference:** C. Arias-Navarro, P. Panagos, A. Jones, M. J. Amaral, A. Schneegans, M. Van Liedekerke, P. Wojda, L. Montanarella 2023. Forty years of soil research funded by the European Commission: trends and future. A systematic review of research projects. *European Journal of Soil Science* 74(5): e13423, DOI:10.1111/ejss.13423

**Details:**

<https://esdac.jrc.ec.europa.eu/content/database-eu-research-projects-soils>

## Scientists help combat desertification woes, promote UN goals

By Wang Xiaodong in Kano, Nigeria | China Daily Global |

The great achievements made by Chinese scientists in curbing desertification have been extended to Africa, through the adoption of practices and technologies accumulated over the past decades for the prevention and control of desertification in the continent.

"Some research teams in China have already had successful experiences in the prevention and control of desertification, and restoration of desert and salt marsh areas, which are bad-

ly needed by some African countries," Zhang Linxiu, director of the United Nations Environment Programme-International Ecosystem Management Partnership, or UNEP-IEMP, said.

"Such international cooperation not only helps solve desertification faced by African countries, but also promotes the realization of the United Nations' goal for global sustainable development."



*People plant a sapling at the site of a desertification control project I  
n the Kunchi local government area in Kano. XINHUA*

Chinese scientists are cooperating with their counterparts in some African countries seriously impacted by desertification, such as Mauritania and Nigeria, in the research and control of desertification, and have made some progress, Zhang said.

In Mauritania, Chinese scientists have introduced tree and grass species that are suitable to grow in the desert, and efforts have been made to promote the use of unique techniques to fix shifting sand near the country's capital. Under the Ecosystem-based Adaptation (EbA) projects of UNEPIEMP, 450 hectares of desert in the country have been ecologically restored over the past 10 years.

#### Control and prevention

"We planned to promote the techniques we used in China to these countries for desertification control and prevention, but each country has its own climate and conditions, so we have made some effort to innovate and develop unique methods for the prevention and control of desertification for each country," he said.

In Ethiopia, some areas saw serious soil erosion due to land degradation, so Wang said researchers from the institute adopted water conservation techniques they used in China so water can be stored during the rainy season and used in the dry season.

The researchers also taught herdsmen how to

remove invasive bushes that are hostile to farm animals and how to nurture grass on degraded land, so that they can still rely on the land for a living while curbing desertification.

After years of working with the authorities in Ethiopia, 3,800 hectares of degraded land in the country has been restored, and grass have been restored on 50,000 hectares of land that previously had hostile bushes growing on it. This has benefited more than 40,000 locals, Wang said.

In Kano, a city in northern Nigeria on the southern edge of the Sahara Desert, the Chinese Academy of Sciences has been working on a project with villagers to try to stop desert sand from encroaching onto their homeland.

Launched last year, the project sits on about 4 hectares of land near Gwarmai village and is part of the African Union-led Great Green Wall Initiative in Nigeria. The plot of land, fenced with barbed wire and planted with various kinds of small trees, is intended for research and demonstration of desertification control in Kano. Eventually, the project is expected to expand so a green wall will be built between Kano and the Sahara, the world's biggest desert.

Bala Muhammad, a villager who works as a gardener for the project, said he fetches water twice a day, in the morning and afternoon, from a borehole about 1 kilometer away to

water the small trees planted on the land. Although the village is at least 20 km away from Sahara Desert, Muhammad fears it will eventually become part of the desert if nothing is done.

"In recent years, there is less rain due to climate change, and the land has become drier and yield has lessened," he said.

"I hope in a few years the trees will grow big and they will help to reduce the temperature

in the area and reduce land erosion and landslide."

Musa Haruna, another villager who lives near the project site, said there needs to be more support from the local government to prevent and control desertification, and much bigger areas should be planted with trees to prevent the desert from encroaching onto six nearby villages.



## Cover crops found to reduce carbon loss in the soil of Mediterranean olive groves by more than 75%

*By University of Córdoba*

Agricultural soils sustain life by producing food, but they also play an essential role in climate change, functioning as carbon sinks, storing large quantities of carbon and reducing its concentration in the atmosphere. Carbon is the main indicator of soils' fertility, so an increase in the concentration of this element means more nutrients and cleaner air.

Mediterranean olive groves feature high erosion rates due to a perfect storm: a climate with episodes of intense rainfall, the orography of many mountain olive groves, with steep slopes; and conventional tillage, which leaves the soil bare, leading to runoff, soil creep, and, with it, losses of the organic carbon associated with sediment.

With the aim of determining whether ground cover (sowing vegetation in olive grove rows, so as not to leave the soil bare) is a good strategy to avert the loss of organic carbon in soil due to erosion, a team coordinated by Francisco Márquez, a researcher with the AGR 126 'Mechanization and Rural Technology' research group at the UCO, analyzed, for four years, the effects of ground cover on the loss of organic carbon in soil compared to the use of conventional tillage.

"We studied the main olive-growing areas of Andalusia, with 8 plantations in the main olive-growing regions, with diverse soils, different types of olive groves (traditional, mountain and intensive), and with almost all types of ground cover, to also gauge the influence of these factors on carbon loss," explained Francisco Márquez. "We concluded that ground cover not only reduces erosion and runoff, but also losses of organic carbon in soil, by three quarters compared to tillage."

The data of the study, in which UCO researchers Adolfo Peña, Antonio Hayas and Emilio González; and IFAPA researcher Rafaela Ordoñez, also worked, reveal that ground cover in Mediterranean olive groves reduces runoff by 37.6%, and erosion by 85.6%, also slowing the loss of carbon by 76.4%. Thanks to conservative management, the olive groves' soil was 65.7% protected against rainfall on average over the course of each season, while with tillage soil protection dropped to 22.4%, on average.

Ground cover increases soils' carbon concentrations fourfold and fivefold, compared to tilled soil, and carbon loss is lessened because cover drastically reduces erosion and improve

the structure and cohesion of soil particles.

A notable finding of the study is how management systems are the main factor in controlling organic carbon loss in soils. The researcher explained, "The loss of soil and carbon depends on very specific factors, such as rainfall intensity. But, when we look at ground cover, we see that the loss of organic carbon in soil no longer depends on the intensity and characteristics of the rain, unlike with tillage, where the type of rain continues to mean more erosion and, with it, more carbon loss." This occurred in all the types of olive groves and cover types analyzed.

This work, then, supports the use of ground

cover to move towards healthier, more sustainable and profitable olive groves, ones functioning as carbon sinks. Soils with higher carbon concentrations have better structures, favoring the absorption of water and nutrients by plants, and making them more productive. They are also important resources in the fight against climate change, decontaminating the air by converting soil into carbon sinks, preventing it from being lost and ending up polluting water or the atmosphere.

The research is published in the journal *Soil and Tillage Research*.

**More information:** F. Márquez-García et al, Influence of cover crops and tillage on organic carbon loss in Mediterranean olive orchards, *Soil and Tillage Research* (2023). [DOI: 10.1016/j.still.2023.105905](https://doi.org/10.1016/j.still.2023.105905)

Details at:

<https://phys.org/news/2023-10-crops-carbon-loss-soil-mediterranean.html>

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