Issue 24
March 30, 2025

NEWSLETTER

Smart & Net-Zero Project

The Smart Net-Zero (SNZ) project team under the Food and Fertilizer Technology Center (FFTC) for the Asian and Pacific Region regularly collects and shares information related to sustainable agrifood systems and climate-smart agriculture, including research, news, policy, data and event updates around the world on the project website.

Overview

Optimizing Agricultural Management for Sustainability

Intensive farming often causes nitrogen pollution, soil degradation, and greenhouse gas emissions. By improving how we manage inputs and farming practices, we can maintain productivity while protecting the environment and ensuring long-term food security. This issue's **Research** shows that optimized nitrogen management can reduce losses to air and water without compromising yields. A China-focused study underscores the need for region-specific strategies to balance emissions and productivity. Additional studies reveal that diversified crop rotations enhance food output and soil health, microbial insights improve nitrification control, and biochar boosts soil quality while lowering emissions. Together, these findings highlight the value of integrated, site-specific solutions for sustainable farming.

The **Policy** features technical guides from FAO, the U.S., and the U.K. on sustainable soil practices and carbon sequestration. The **Open Data** presents soil datasets from Canada and the EU as critical tools for land management. Meanwhile, the **News** spotlights how digital innovation is accelerating the shift toward net-zero agriculture.

Content

RESEARCH

01 THEME: GHG Emission Reduction

Optimized agricultural management reduces global cropland nitrogen losses to air and water

November 12, 2024 | Nature Food | Source |

Introduction: While nitrogen (N) inputs are essential for crop productivity, N losses from croplands contribute to major environmental issues, including climate change, air pollution, and water eutrophication. The effectiveness of N management in reducing these losses depends on both site-specific factors—such as land use, climate, and soil properties—and tailored field practices in nutrient, crop, and soil management. An international research team led by China Agricultural University and Wageningen University conducted a meta-analysis of 1,065 studies with 6,753 observation pairs to quantify the impact of optimized agricultural practices on N losses to air (N_2O and NH_3 emissions) and water (run-off and leaching) while accounting for site-specific conditions.

Key findings: Optimized N management practices significantly reduced losses, with reductions of 3–39% for N_2O emissions, 16–68% for NH_3 emissions, 21–37% for N run-off, and 19–52% for N leaching. Among these, enhanced efficiency fertilizers (e.g. controlled-release fertilizers, slow-release fertilizers) were the most effective, reducing all N losses by 28–35%, while optimized fertilizer application rates further improved efficiency. Other strategies, including organic fertilizers, biochar, and 4R-based fertilizer strategies (applying the right fertilizer rate, type, timing, and placement), reduced losses by up to 68%.

Regression analysis revealed that site conditions and crop type strongly influenced N losses, with nutrient management proving more effective than crop or soil management. Furthermore, trade-offs existed: while crop management reduced N leaching, it increased N_2O emissions, and zero tillage tripled NH_3 emissions due to limited incorporation techniques. After adjusting for local conditions and existing agricultural practices, estimated global reductions were 31% for N_2O, 23% for NH_3, 18% for N run-off, and 17% for N leaching.

These findings underscore the importance of integrated strategies to balance trade-offs and maximize nitrogen loss reduction. They also highlight the need for region-specific management strategies to maintain agricultural productivity while ensuring environmental sustainability. Future research should focus on refining site-specific models, addressing trade-offs, and developing robust upscaling approaches for more precise global impact assessments.

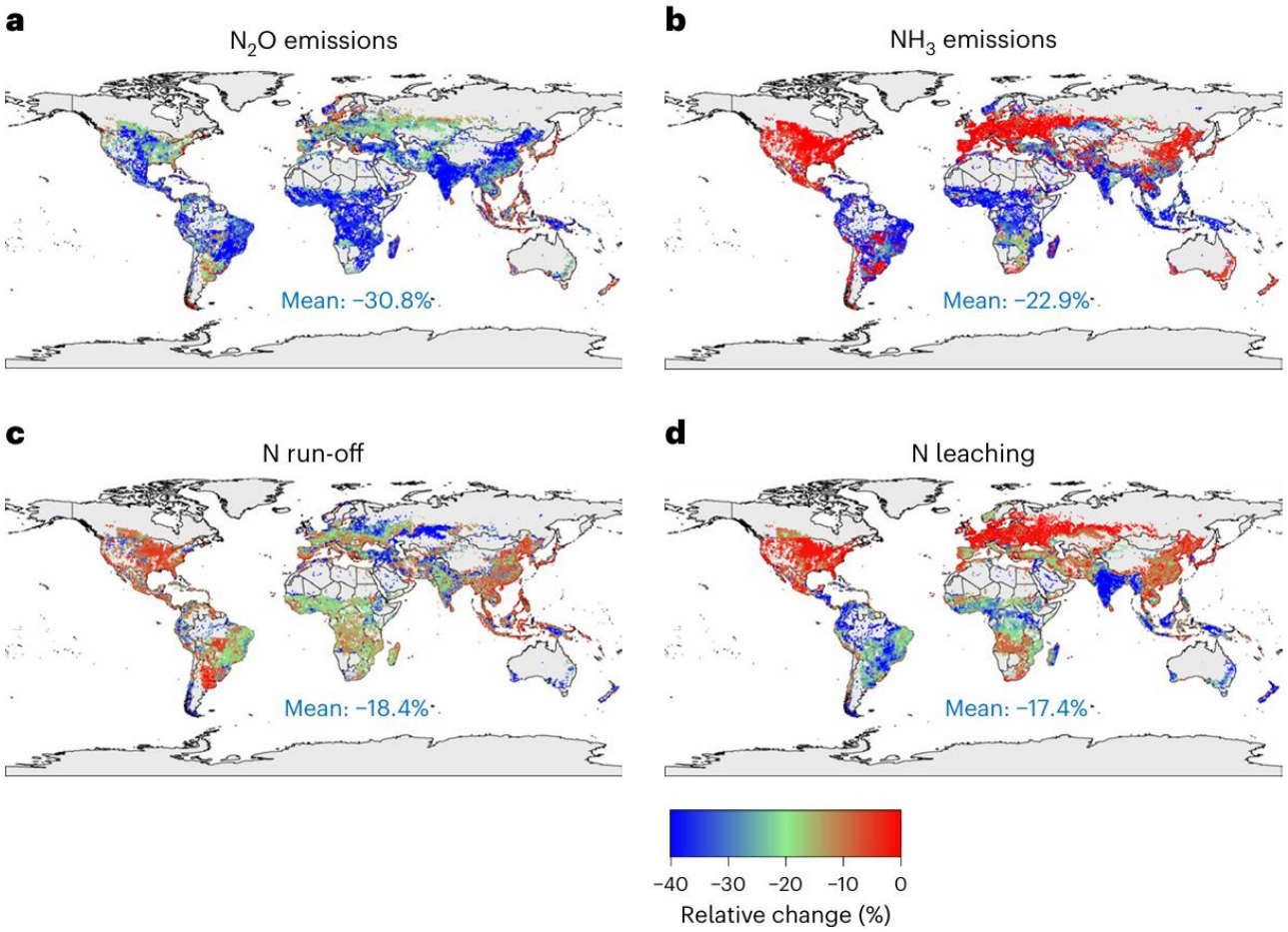


Figure | Predicted impacts of optimal management practices on nitrogen losses in global croplands.
a–d, Predicted spatial variation in the impacts of combined optimal management practices on the relative average changes in N_2O emissions **(a)**, NH_3 emissions **(b)**, N run-off **(c)** and N leaching **(d)** in global croplands.

02 THEME: GHG Emission Reduction; Carbon Sequestration

Diversifying crop rotation increases food production, reduces net greenhouse gas emissions and improves soil health

January 3, 2024 | Nature Communications | Source |

Introduction: Conventional intensive farming boosts yields but also drives GHG emissions, soil degradation, and climate vulnerability, especially in densely populated regions with limited resources. Collaboration among institutions across East Asia, Europe and North America, conducted a six-year (2016–2022) field experiment in the North China Plain to assess how diversifying wheat–maize monoculture with sweet potato and legumes (peanut and soybean) impacts food production, GHG emissions, soil health, and farmer income.

Key findings:

- **Increased Ecosystem Productivity:** The sweet potato → wheat – maize (SpWM) rotation increased yield by 38% and farmer income by 60%, while peanut (PWM) and soybean (SWM) raised income by 13 – 22%. SWM yielded 8 – 31% more protein than wheat – maize (WM), and ryegrass – sorghum (RSWM) produced the most biomass. These rotations also enhanced subsequent WM productivity, increasing grain yield (26–32%), economic benefits (39–46%), and protein yield (25–29%).
- **Reduced Net GHG Emissions:** Diversified rotations lowered N_2O emissions by up to 49% and increased carbon sequestration by 33–76%. GWP dropped 32–51%, and indirect emissions from agrochemicals and irrigation fell 34–41%. Soil carbon sequestration offset 75–89% of emissions, reducing net GHG emissions by 83% (SpWM), 90% (SWM), and 92% (PWM).
- **Improved Soil Health:** PWM had the highest soil health score, followed by SWM and SpWM, scoring 41–59% higher than WM. Sweet potato, peanut, and soybean rotations enhanced microorganism diversity by 7–10%, with legumes enriching bacterial and fungal communities.
- **Economic and Environmental Benefits:** Diversified rotations outperformed WM in productivity, income, and sustainability. Soil health correlated positively with yield, income, and carbon sequestration but negatively with GHG emissions. Large-scale adoption in the North China Plain could increase cereal production by 32%, income by 20%, and cut CO_2-eq emissions by 106.8 million tons annually.

This study confirmed the long-term benefits of diversified crop rotations, supporting higher yields, system resilience, and soil health while improving food nutrition. Findings align with global studies demonstrating increased productivity, reduced fertilizer reliance, and enhanced economic gains. Integrating diversified systems into policy can support China's sustainability goals. However, long-term, multi-location research is needed to address climate variability and regional differences.

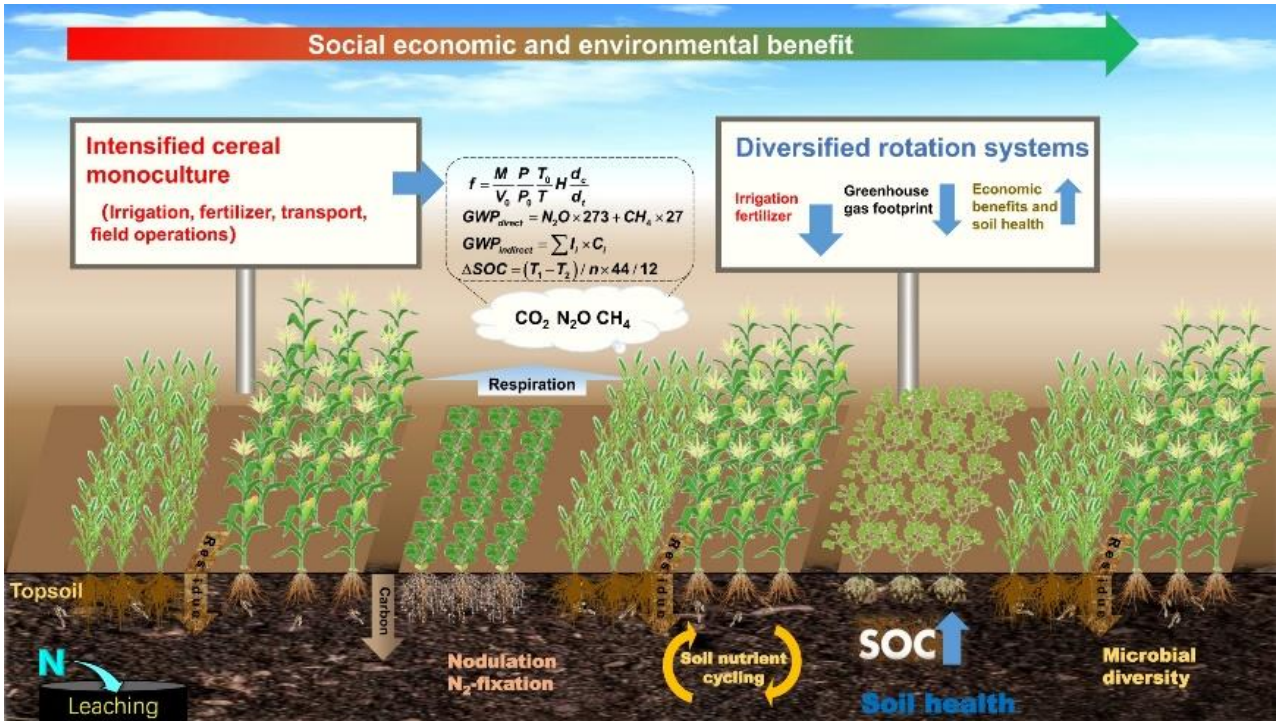


Figure | Schematic illustration of system integration from issues to outcomes.
In the North China Plain—the case study area, traditional cereal monoculture (such as wheat–maize double-cropping, i.e., two cereal crops per year) requires inputs of synthetic agrichemicals and irrigation in food production, causing large greenhouse gas (GHG) emissions; in contrast, rotation systems diversified with cash and legume crops can maintain crop yields, increase farmers' income, and reduce GHG emissions due to the biological N_2 fixation by legumes partly substituting for synthetic N inputs. Legume-included rotations can also enhance soil health by stimulating soil microbial activities, increasing carbon sequestration, and enhancing nutrient cycles.

03 THEME: GHG Emission Reduction

Enhancing agroecosystem nitrogen management: microbial insights for improved nitrification inhibition

June, 2024 | Trends in Microbiology | Source |

Introduction: Excessive nitrification in agroecosystems causes nitrate leaching and N_2O emissions. Although nitrification inhibitors (NIs) reduce nitrogen losses, their efficacy varies due to interactions among soil conditions and microbial communities. A Belgian-Spanish team led by Ghent University and Universidad del País Vasco reviews the microbiology of nitrification, NI mechanisms, aiming to understand how microbial and abiotic factors influence NI performance. The goal is to inform the development of more targeted, efficient NIs for sustainable nitrogen management.

Key findings: Nitrification in agroecosystems is primarily driven by ammonia-oxidizing bacteria (AOB), archaea (AOA), and comammox bacteria, which catalyze the rate-limiting step of ammonia oxidation. Their responses to NIs vary, depending on microbial traits and environmental conditions. Common NIs like DCD, DMPP, and nitrapyrin mainly target AOB, while few—such as PTIO and SIAS—affect AOA. No specific inhibitors currently exist for heterotrophic nitrifiers. The study highlights that soil pH, organic matter, clay and copper content, nitrogen levels, and temperature strongly shape the composition of the nitrifying community and thus influence NI effectiveness. For instance, acidic soils favor AOA, weakening AOB-targeted inhibitors, while higher temperature can positively affect AOA abundance and potentially lower the efficiency of DMPP and DCD.

NI application can also shift microbial dynamics, increasing non-target nitrifiers and reducing overall inhibition. Co-application of AOA- and AOB-targeting NIs emerges as a promising strategy. The study identifies key gaps—including NI persistence, microbial resistance, and the contribution of heterotrophic nitrifiers—and calls for broader NI testing, microbiome integration, and further exploration of crop-derived biological NIs. Policy incentives and site-specific NI strategies are crucial to enhance nitrogen use efficiency and reduce emissions in agriculture.

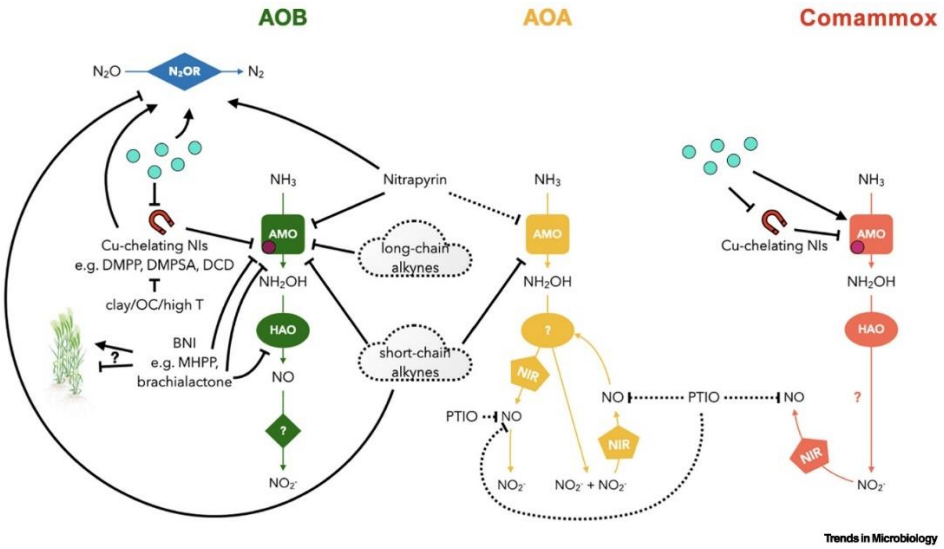


Figure | Targets and effects of NIs in different ammonia-oxidation pathways.

04 THEME: GHG Emission Reduction; Carbon Sequestration

The potential of biochar incorporation into agricultural soils to promote sustainable agriculture: Insights from soil health, crop productivity, greenhouse gas emission mitigation and feasibility perspectives—A critical review

November 11, 2024 | Reviews in Environmental Science and Bio/Technology | Source |

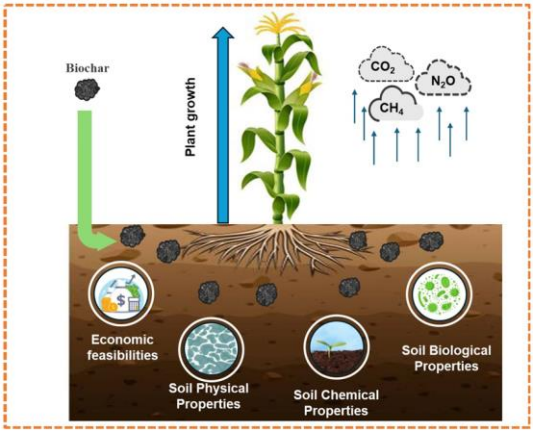
Introduction: Addressing the growing threat of soil degradation, researchers from the University of Prince Edward Island in Canada and Jiangsu University in China conducted a critical review of over 100 studies on biochar—a carbon-rich material from pyrolyzed biomass—providing an integrated analysis of biochar's effects on soil health, crop productivity, GHG mitigation, and economic viability.

Key findings: Biochar improves soil physical properties by enhancing soil porosity (SP) and reducing bulk density (BD), leading to better water infiltration and retention, and making soil more resilient. Chemically, it raises pH in acidic soils, boosts cation exchange capacity (CEC) and organic carbon levels, and improves nutrient availability while reducing leaching and immobilizing heavy metals. Biologically, biochar fosters microbial growth and activity by providing a supportive habitat, though effects vary with soil type and biochar characteristics.

Incorporating biochar into soil can boost crop yields by 10-16% by enhancing soil properties and nutrient availability. However, results vary with soil type, crop species, and biochar characteristics. Biochar also mitigates GHG emissions by stabilizing soil carbon, reducing N_2O through effects on nitrification and denitrification, and lowering CH_4—especially in flooded soils—by enhancing microbial processes and enabling slow-release fertilization. Economic feasibility depends on whether yield gains and input savings outweigh the costs of production, transport, and application, which vary by region and crop. Carbon market incentives can further enhance viability.

Key research gaps include optimizing biochar for specific soils, conducting long-term field studies, and assessing large-scale environmental impacts. Future work should prioritize cost–benefit analyses, farmer guidance, and meta-analyses to support broader, sustainable adoption.

Graphical abstract



05 THEME: GHG Emission Reduction

Optimizing agricultural management in China for soil greenhouse gas emissions and yield balance: A regional heterogeneity perspective

May 1, 2024 | Journal of Cleaner Production | Source |

Introduction: Region-specific strategies are critical for China to balance crop production and environmental sustainability. This study, led by researchers from Nanjing University and Groningen University, integrates meta-analysis and machine learning to assess the effects of various farming practices on soil greenhouse gas emissions (SGE) across seven agroecological regions. By modeling regional variations, it aims to identify optimal management strategies that reduce emissions, enhance yields, and support sustainable agriculture.

Key findings: The study evaluated the impact of chemical and organic fertilizers, tillage, straw incorporation, and irrigation on SGE, considering soil properties (pH, soil organic carbon/SOC) and climatic factors (humidity, temperature). Results reveal substantial regional variability in SGE due to differences in management practices. Chemical fertilizers increased emissions by 82%, organic fertilizers by 74%, and their combined use led to stark regional contrasts—rising 610% in Southern China but only 54% in Northwestern China. The effects of tillage, irrigation, and straw incorporation varied based on soil and climate conditions. Highly acidic (pH ≤ 5.5) or alkaline (pH > 8.5) soils significantly altered fertilization effects, while higher SOC levels (>10%) amplified the impact of fertilizers and irrigation. Dry climates generally heightened emissions across management practices, while cold climates exacerbated emissions from organic and combined fertilizers. The study recommends region-specific strategies, including optimizing NPK fertilizer applications (e.g., 180.54–194.02 kg/ha nitrogen in Central China), categorizing organic fertilizer and straw incorporation into four levels, and adopting conventional tillage and controlled irrigation (e.g., in East China) to improve efficiency and sustainability.

The findings align with existing research but challenge the assumption that no-till farming and straw incorporation consistently reduce emissions, underscoring the need for region-specific strategies. Future research should refine soil classification, improve predictive modeling, and integrate carbon sequestration into agricultural management. Policy recommendations include enhancing soil health, optimizing fertilizer use, and adopting controlled irrigation to balance productivity with environmental sustainability.

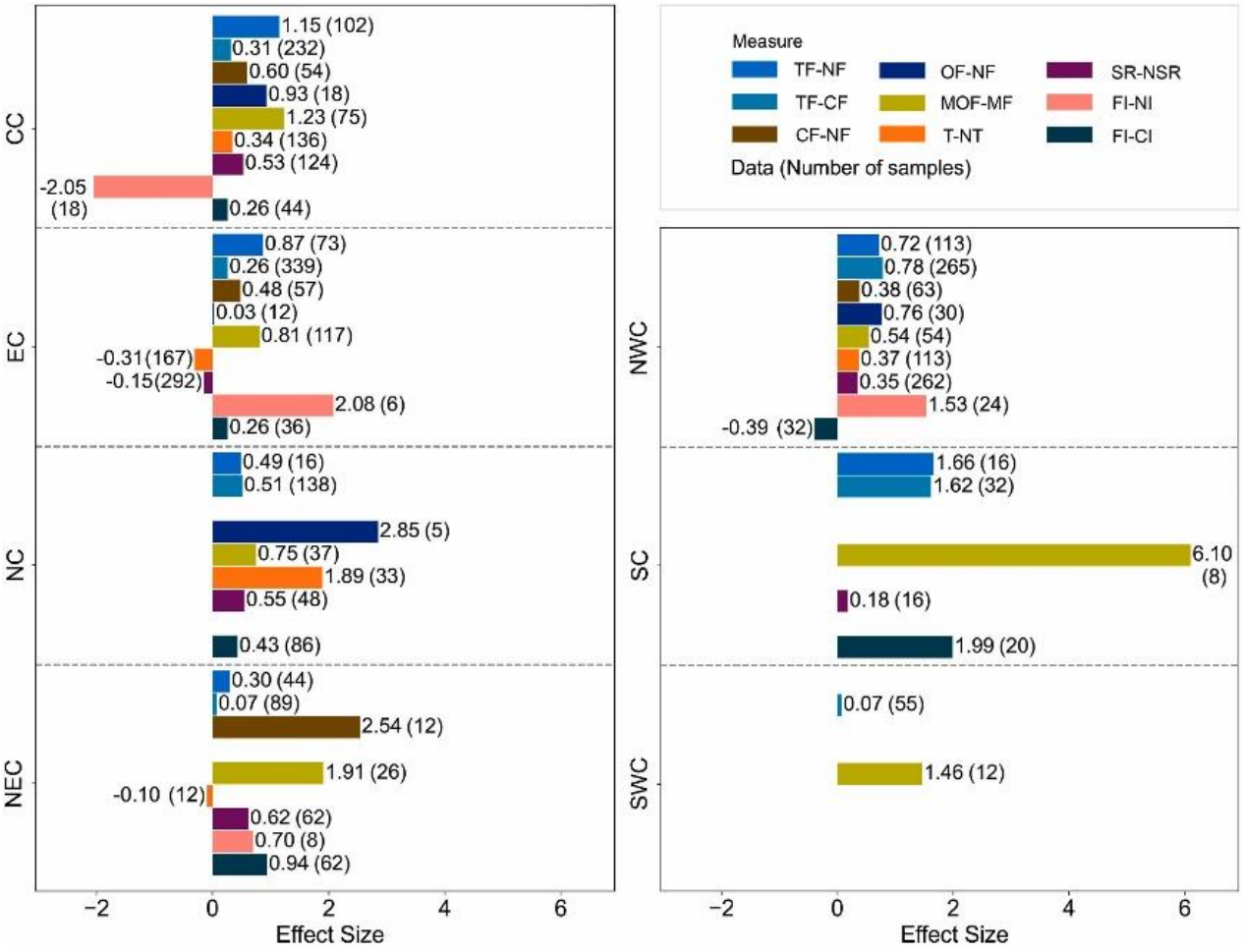


Figure | Soil greenhouse gas emissions effect size of various management measures includes TF-NF (Traditional Fertilizer vs. No Fertilizer); TF-CF (Traditional Fertilizer vs. Controlled Fertilizer); CF-NF (Controlled Fertilizer vs. No Fertilizer); OF-NF (Organic Fertilizer vs. No Fertilizer); MOF-MF (Combined Mineral and Organic Fertilizers vs. Mineral Fertilizer); T-NT (Tillage vs. No-Tillage); SR-NSR (Straw Returning vs. No Straw Returning); FI-NI (Flooding Irrigation vs. No Irrigation); and FI-CI (Flooding Irrigation vs. Controlled Irrigation) in agronomic regions including CC (Central China), EC (East China), NC (North China), NEC (Northeast China), NWC (Northwest China), SC (South China), and SWC (Southwest China).

NEWS

01 **THEME:** ICT in Agrifood Sustainability; GHG Emission Reduction

Japan's role in driving digital and green transformation in Mekong Delta

February 16, 2025 | Voice of Vietnam (VOV) |

Japan is playing a key role in Vietnam's digital and green transformation of rice farming in the Mekong Delta. Through the "One Million Hectares of High-Quality, Low-Emission Rice" project, Vietnam aims to enhance climate resilience, reduce emissions, and improve farmers' incomes. Supported by digital tools, sustainable practices, and international finance, the project has already shown success in pilot areas. Japan's expertise in high-tech agriculture and mechanization is seen as vital for scaling innovations such as digital monitoring, traceability, and carbon credit systems. The initiative also promotes cooperative development and value chain restructuring, helping Vietnam meet global standards and climate commitments while strengthening its rice sector's competitiveness.

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02 **THEME:** ICT in Agrifood Sustainability; GHG Emission Reduction; MRV (Measurement, Reporting, Verification)

Farm smarter, not harder: new science-driven tool for net zero farming

February 6, 2025 | CSIRO (Commonwealth Scientific and Industrial Research Organization) |

Australia's "Towards Net Zero Agriculture Pathfinder Manual," developed by CSIRO and the Clean Energy Finance Corporation (CEFC), offers farmers practical, science-driven strategies to reduce emissions and access green finance. The manual supports emission-reduction practices that qualify for discounted CEFC-backed loans, promoting both environmental and financial benefits. It emphasizes collaboration across science, finance, and policy to overcome adoption barriers, such as high costs, uncertain returns, and upfront investments. By aligning research, market mechanisms, and regulatory safeguards, the initiative aims to scale low-emission technologies across agriculture. This marks a crucial step toward a resilient, net-zero farming future, empowering farmers with tools tailored to their systems and sustainability goals.

03 **THEME:** Other; Policy Incentives, Financing, Pricing

NASA cuts off international climate science support

February 25, 2025 | Science |

The United States has unexpectedly withdrawn key support for the IPCC's seventh assessment report. NASA canceled its technical support unit contract, and U.S. officials, including NASA's chief scientist, were denied permission to attend the planning meeting in Hangzhou, China. The move marks the first time the U.S. government has actively disrupted international climate science coordination. Scientists warn that this decision jeopardizes American leadership in climate mitigation research and could significantly undermine the assessment process. With limited U.S. representation, IPCC is now seeking new leadership from other developed countries. Uncertainty also surrounds future participation and funding for U.S. researchers, raising concerns over the country's continued role in shaping global climate policy.

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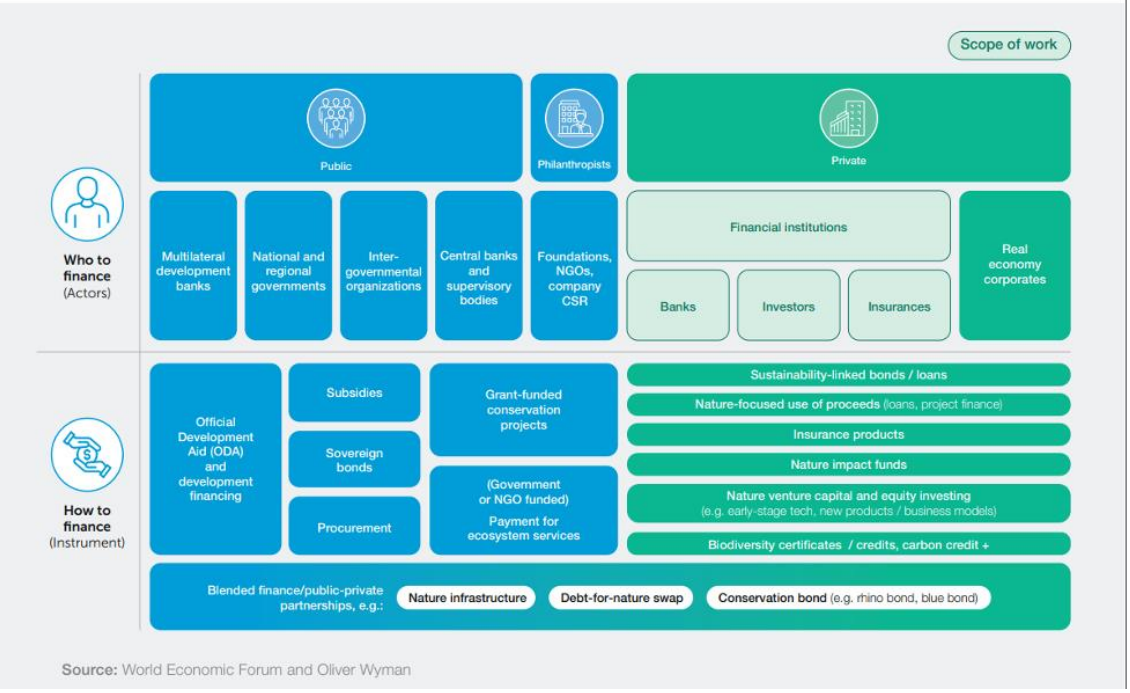
04 **THEME:** Policy Incentives, Financing, Pricing

3 reasons 2025 is the year for nature-positive finance

January 13, 2025 | World Economic Forum (WEF) |

This year 2025 marks a pivotal moment for nature-positive finance as financial institutions increasingly align capital flows with biodiversity goals. Over 194 institutions have signed the Finance for Biodiversity Pledge, recognizing both the economic risks of nature loss—estimated at up to $25 trillion annually—and the long-term value of nature-based solutions. This shift is driven by three key factors: growing global consensus around the Global Biodiversity Framework (GBF) and sector-specific guidance; the ability to build on existing climate finance systems with limited new resources; and improved access to high-quality nature data and disclosures through frameworks like Task-force on Nature Related Financial Disclosures (TNFD) and the EU's Corporate Sustainability Reporting Directive (CSRD). These developments equip institutions to better assess nature-related risks and opportunities. With strong momentum and new tools on the horizon, including a forthcoming evaluation framework from the World Economic Forum, 2025 is positioned to scale high-impact investment and accelerate the transition toward a resilient, nature-positive global economy.

Financing the nature-positive transition – examples of who (financing actors) and how to finance (financing instruments)



Source: World Economic Forum and Oliver Wyman

05 **THEME:** Carbon Sequestration; MRV (Measurement, Reporting, Verification)

Agreena achieves Verra registration landmark for soil carbon market

January 17, 2025 | Carbon Herald |

Agreena has achieved a major milestone by becoming the first large-scale cropland project registered under Verra's Verified Carbon Standard (VCS) VM0042 for Improved Agricultural Land Management. Covering millions of hectares across Europe, the AgreenaCarbon Project promotes regenerative farming to sequester carbon, enhance biodiversity, and boost climate resilience. This landmark registration, validated through years of rigorous assessment, positions Agreena to meet growing demand for high-integrity nature-based carbon credits. By directing carbon finance to farmers, the project supports the transition to sustainable practices and helps companies meet their net zero and nature goals, reinforcing soil's role as a vital carbon sink and climate solution.

06 **THEME:** Policy Incentives, Financing, Pricing

English farmland could be cut by 9% to hit green targets

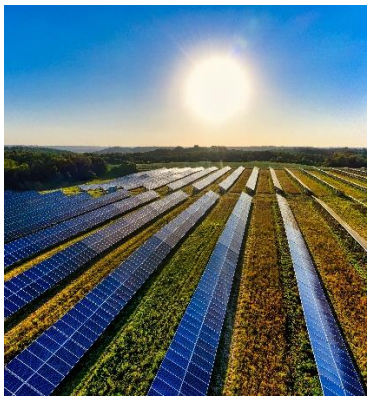
February 1, 2025 | BBC News |

To meet its 2050 net-zero and biodiversity targets, the UK government plans to repurpose 9% of England's farmland into woodland and wildlife habitats. Launched by Environment Secretary Steve Reed, the land use consultation outlines that nearly 1.6 million hectares must shift to environmental uses, while productivity gains on remaining land aim to maintain food output. The proposal is part of a long-delayed Land Use Framework to balance food security, nature restoration, infrastructure, and climate goals. While welcomed by some, critics argue the plan could burden farmers. Department for Environment, Food and Rural Affairs (DEFRA) maintains that data-driven planning can align climate, nature, and development without compromising agriculture.

07 **THEME:** Policy Incentives, Financing, Pricing

Environmental groups raise concerns Taiwan's draft guidelines for solar installations on farmland

February 19, 2025 | Central News Agency (In Chinese) |



Taiwan's Ministry of Agriculture (MOA) has released draft ecological guidelines for solar development on farmland, aiming to balance renewable energy expansion with biodiversity. However, environmental groups warn the guidelines lack legal force and enforcement mechanisms, potentially accelerating habitat loss for endangered species like the leopard cat and barn owl. Critics argue the guidance acts as a loophole for unchecked farmland conversion, while failing to uphold carbon sequestration benefits from agricultural land. In response, the Forestry and Nature Conservation Agency emphasized that the draft is not the sole basis for land-use approval and that ecological risks in key habitats will be considered in solar development reviews.

POLICY

01 THEME: Net-Zero Strategy; Climate-Smart Agriculture

RECARBONIZING GLOBAL SOILS - A Technical Manual of Recommended Management Practices

Food and Agriculture Organization (FAO) | Source |

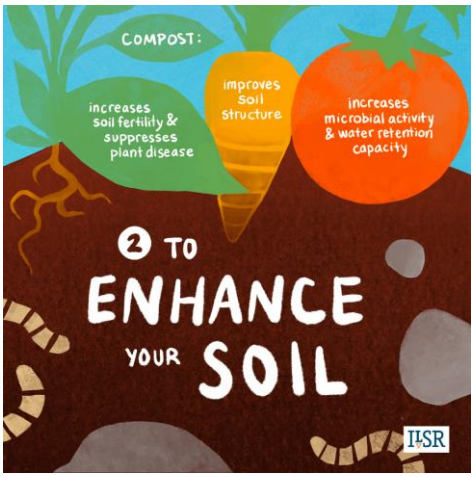
These technical manual compiles standardized data on soil organic carbon (SOC) management, emphasizing its role in climate regulation and Sustainable Development Goal 15. It presents sustainable soil management (SSM) practices across various environments, supported by case studies showcasing effective SOC sequestration. The manual is structured into six volumes: an introduction and methodology (Vol. 1), SOC stock hot spots and sequestration potential (Vol. 2), SOC-related practices and case studies in croplands, grasslands, and integrated systems (Vols. 3 & 4), and SOC management in forestry, wetlands, and urban soils (Vols. 5 & 6). These insights inform policy development and practical applications for improving soil carbon storage.

02 THEME: Net-Zero Strategy; Climate-Smart Agriculture

Healthy Soils and Compost Policy Guide: Synergies and Opportunities

U.S. Institute for Local Self-Reliance | Source | Report |

This policy guide explores the intersection of composting and soil health, emphasizing compost as a key tool for improving soil quality, enhancing carbon sequestration, and supporting climate protection. Despite its proven benefits, compost application remains underrepresented in many healthy soils policies. The guide outlines opportunities to integrate compost into soil health frameworks, promote high-quality compost production, and support policies that enhance accessibility, funding, and awareness. It highlights successful state-level initiatives and provides policy recommendations for advocates and policymakers to advance regenerative soil practices and circular food systems through composting.



03 THEME: Climate-Smart Agriculture

UK Soil Health Initiative Guides

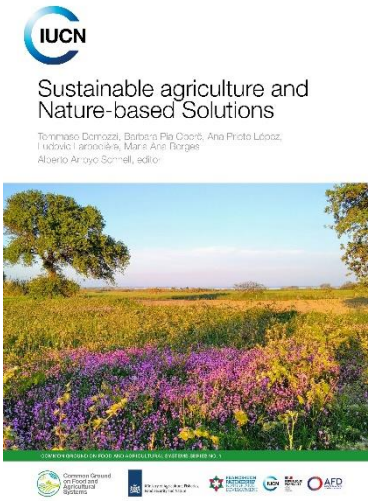
Agricology, UK | Source |

The UK Soil Health Initiative, in partnership with WWF-Tesco, Anglian Water, and CFE, developed a set of six practical guides to support farmers in improving soil health across diverse farming systems. Each guide offers tailored recommendations, including key considerations, common pitfalls, and actionable strategies on topics such as crop and nutrient management, soil structure, and biological activity. Six guides include: "*Managing Soils for a Sustainable Future In- Combinable Cropping*, *Field Vegetables*, *Rotations with Root Crops and Maize*, *Lowland Livestock Farms*, *Mixed Farms*, *Upland Livestock Farms*". Designed to future-proof farms against climate and policy shifts, the guides emphasize adaptable, system-specific approaches to enhance productivity, resilience, and environmental outcomes.

04 THEME: Nature-based Solutions; Climate-Smart Agriculture

IUCN - Sustainable Agriculture and Nature-based Solutions

International Union for Conservation of Nature (IUCN) | Source | Report |



This IUCN report explores how Nature-based Solutions (NbS) can support sustainable agriculture by aligning various farming approaches—such as agroecology, regenerative agriculture, and organic farming—with the IUCN Global Standard for NbS™. When correctly implemented, these approaches enhance biodiversity conservation, ensure economic viability, and support climate resilience and food security. The report recommends sustainable practices such as crop rotation, reduced chemical inputs, and agroforestry, alongside financial and policy reforms like redirecting harmful subsidies. It provides criteria-based assessments and policy guidance for integrating NbS into agricultural systems, emphasizing the need for strong governance and coherence within global frameworks such as the Kunming-Montreal Global Biodiversity Framework (GBF) and the EU Green Deal.

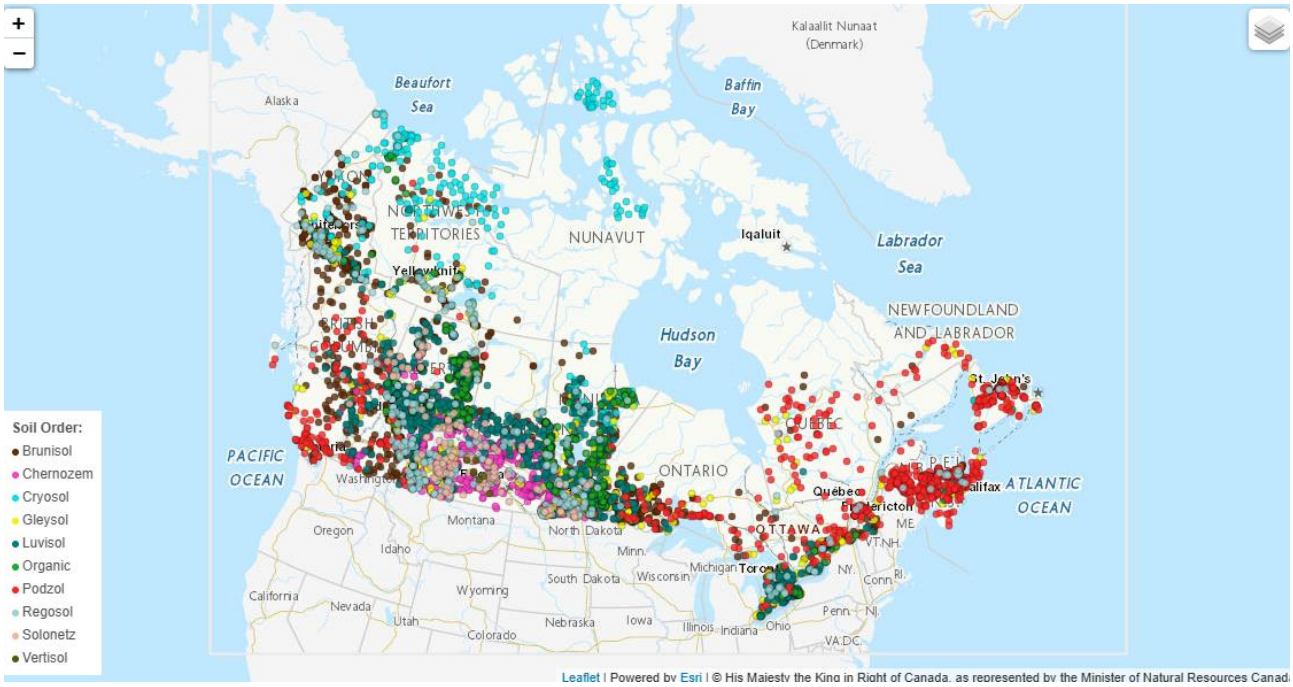
OPEN DATA

01 THEME: Land cover and soil

Canada National Soil Database (NSDB)

Minister of Agriculture and Agri-Food, Canada | Source |

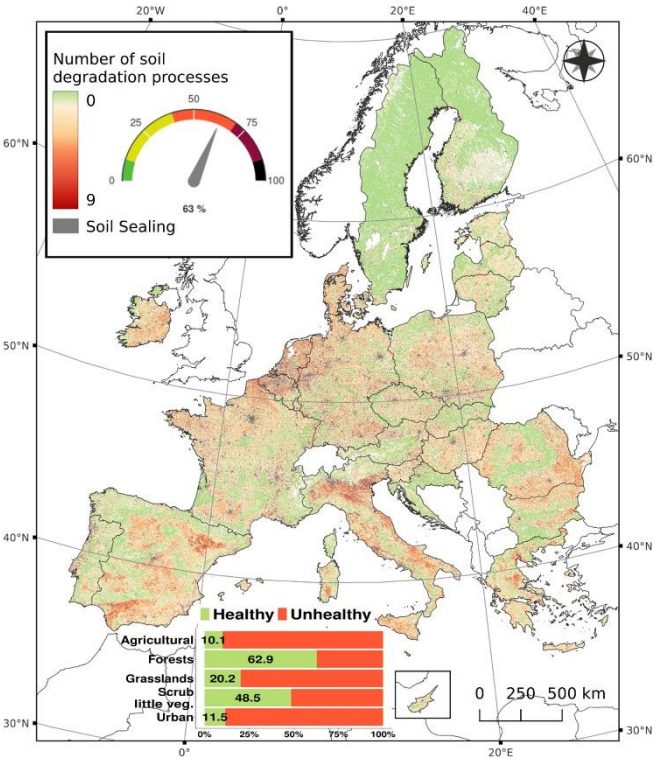
The NSDB is a comprehensive geospatial platform archiving soil, landscape, and climatic data across Canada. It integrates datasets from federal and provincial surveys to support land resource analysis and sustainable management. Key components include Soil Name and Layer Data, the National Pedon Database, and Soil Landscape Grids of Canada, which aid in soil classification, digital mapping, environmental modeling, carbon stock assessments, and soil health reporting. The Detailed Soil Surveys (DSS) offer the most extensive soil inventory, covering major agricultural regions at various scales to assess land suitability, soil fertility, and erosion risks. Additional datasets, such as the Canada Land Inventory (CLI) and Soil Landscapes of Canada (SLC), provide insights into land capability and ecological frameworks. Data is accessible via interactive maps, GIS layers, and downloadable tables.



02 THEME: Land cover and soil

European Soil Data Centre (ESDAC)

European Commission Joint Research Centre (JRC) | Source | Overview |



The European Soil Data Centre (ESDAC), hosted by the EU's Joint Research Centre (JRC), is the central repository for soil-related data in the region. Established in 2006, it provides harmonized soil information to support EU policies, scientific research, and public awareness. ESDAC hosts 88 datasets, 6,000 maps, six atlases, and over 500 scientific publications, covering soil properties, threats (e.g., erosion, compaction, salinization), functions, and project-derived data. Over the past 15 years, it has facilitated 50,000 dataset licenses and serves a diverse user base from academia, research, and public and private sectors. As part of the European Union Soil Observatory (EUSO), ESDAC enhances data accessibility through open and registered access, playing a key role in shaping EU soil policies and promoting sustainable land management practices.

EVENT

01

The Latin American and Caribbean Soil Carbon Research Symposium (LAC Soil Carbon) 2025

June 25-28, 2025 | In-person | Rio de Janeiro, Brazil | Source |

The LAC Soil Carbon 2025 will be held from June 25-28, 2025, at the Museum of Tomorrow in Rio de Janeiro, Brazil. Organized by Embrapa, CCARBON/USP, UFG, the ILPF Network Association, and INCT-ABC, in collaboration with the "4 per 1000" Initiative and the Soil Carbon International Research Consortium (IRC), the event will explore the critical role of soil organic carbon in sustainable agriculture. Researchers, policymakers, and farmers will convene to address regional and global challenges related to soil health, climate change adaptation, and food security. The symposium will feature presentations, knowledge exchange, and policy discussions. Registration closes on May 15, 2025.

02

The 80th Soil and Water Conservation Society (SWCS) International Annual Conference

August 3-6, 2025 | In-person | California, USA | Source |

80th SWCS International
ANNUAL CONFERENCE
Conservation Coast to Coast
August 3–6, 2025 | Costa Mesa, California

The 80th SWCS International Annual Conference will be held from August 3-6, 2025, in Costa Mesa, California. This year's theme, "Conservation Coast to Coast," underscores nationwide conservation efforts across diverse landscapes and communities. The event will bring together researchers, practitioners, industry leaders, farmers, and students to discuss soil health, water quality, conservation policy, and resource management. The agenda includes workshops, field tours, exhibits, and demonstrations, fostering collaboration and knowledge exchange. Attendees will engage with cutting-edge conservation technologies, policy advancements, and outreach strategies aimed at accelerating natural resource sustainability. Registration opens in April 2025.

03

The 8th International Farming System Design Conference (FSD8)

August 25-29, 2025 | In-person | Palaiseau, France | Source |

The FSD8 Conference will take place from August 25-29, 2025, in Palaiseau, France. Under the theme "Farming System Design for Sustainable Agrifood Systems: Theories and Practices," the conference will gather scientists from diverse disciplines to explore solutions to critical agricultural challenges, including climate change, biodiversity loss, and food security. Key discussions will cover systemic innovation, co-design methods, digitalization, resilience, and policy change to drive the transition toward sustainable agrifood systems. The event will also feature a specialized training course for PhD students and researchers. Registration is open from April 1 to June 30, 2025.

04

8th IFAC Conference on Sensing, Control and Automation Technologies for Agriculture (AGRICONTROL 2025)

August 27-29, 2025 | In-person | California, USA | Source |

The 8th AGRICONTROL 2025 will be held from August 27-29, 2025, at the UC Davis Conference Center, California, USA. Organized under the International Federation of Automatic Control (IFAC), the conference serves as a global platform for scientists, researchers, and industry professionals to explore advancements in automation, robotics, sensing, and AI applications in agriculture. Key topics include precision farming, sensing and control systems, smart irrigation, and data-driven technologies. The event fosters knowledge exchange on cutting-edge innovations aimed at enhancing efficiency, sustainability, and productivity in modern agricultural systems.

IFAC
INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL

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10th Asia Conference on Environment and Sustainable Development (ACESD 2025)

November 8-10, 2025 | In-person | Fukuoka, Japan | Source |

The 10th ACESD 2025 will be held from November 8-10, 2025, in Fukuoka, Japan. Sponsored by iNehc and IJESD, with technical support from Yokohama National University, National Institute for Environmental Studies, Nagasaki University, and the Japan International Cooperation Agency (JICA), the conference provides a platform for researchers, practitioners, and industry professionals to discuss advancements in environmental science and sustainable development. Topics include climate change, environmental restoration, water treatment, waste management, air pollution, and more. The event offers opportunities for networking, research presentations, and publishing in Scopus-indexed journals, fostering collaboration across academia, industry, and government. Paper submissions are due by June 20, 2025, with final registration closing on August 5, 2025.