**Session Proposal**

# Session Title

Nature-Based Solutions for Soil Health and Sustainable Crop Production

# Session Organizers

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# Session Description

This session explores innovative, ecologically grounded strategies to enhance soil function and resilience while supporting long-term agricultural productivity. Topics will include the role of soil biodiversity, organic amendments, cover cropping, agroforestry, microbial management, and regenerative practices in improving soil health. This session highlights scalable, nature-based approaches that align environmental stewardship with food security and climate adaptation goals by bridging research, policy, and practice.

This session will integrate diverse perspectives across three key themes: Enhancing Diversification and soil function through Nature-based Practices; Integrating Nature-based Solutions into Climate-Resilient Cropping Systems; Scaling and Policy Pathways for Nature-based Soil Function through Nature-based Practices. Using this framework, speakers will address: 1) how practices such as cover cropping, organic amendments, reduced tillage, and agroecological diversification support soil microbial diversity and improve ecosystem services; 2) how Nature-based Solutions can buffer agriculture against climate extremes via discussions on carbon sequestration, drought and warming mitigation, and the role of soils in adaptation and mitigation strategies at field and landscape scales; 3) the socioeconomic, institutional, and policy dimensions of implementing Nature-based Solutions at scale. It includes incentives, farmer engagement, and knowledge transfer, as well as frameworks for monitoring, reporting, and verifying outcomes.

# Relevance

This session aligns closely with the overarching theme of the congress by addressing the urgent need for sustainable, climate-resilient approaches for sustainable agricultural and environmental management. As soil degradation, biodiversity loss, and climate change threaten food security and ecosystem stability, nature-based solutions offer a promising path forward. This session highlights the scientific advances and practical innovations driving the transition toward sustainable agriculture by emphasizing practices that restore soil function, such as organic amendments, diversified cropping systems, and soil biodiversity management. It fosters interdisciplinary dialogue around emerging research, on-the-ground applications, and policy mechanisms that support the integration of soil health into broader sustainability frameworks.

# Format

# The session will feature oral presentations showcasing cutting-edge research and panel discussions that bring together scientists, practitioners, and policymakers to explore the practical implementation and scaling of Nature-based Solutions. Designed to foster interactive dialogue, the session will emphasize interdisciplinary perspectives, encourage knowledge exchange, and identify actionable pathways for integrating soil health into climate and sustainability agendas.

# Proposed Speakers

**In addition to the session organizers, the following scholars will be invited to participate:**

**Minggang Xu**, Shanxi Agricultural University, China –His research focuses on sustainable soil management, soil fertility, and nutrient cycling in agroecosystems. Dr. Xu has played a pivotal role in advancing conservation agriculture and using organic amendments to enhance soil health and crop productivity in China. He has led numerous national and international research projects and is widely recognized for bridging scientific research with practical applications. His work contributes significantly to developing and promoting nature-based solutions for sustainable agricultural development.

**Rattan Lal**, Ohio State University, USA—A world-renowned soil scientist and advocate for soil carbon sequestration, Dr. Lal can provide a keynote presentation on nature-based solutions within global climate and food security agendas.

**Claire Chenu**, INRAE & AgroParisTech, France—An expert in soil organic matter dynamics and policy-research interface, Dr. Chenu can speak on the role of soils in climate mitigation and EU policy support for nature-based farming practices.

**Johannes Lehmann**, Cornell University, USA—He is an expert on biochar and how its application can enhance soil health/biodiversity and increase C storage in the soil. He is one of the most famous experts in this field.