**Session Proposal**

# Session Title

Advances in Soil Fertility Management Through the Utilization of Organic Waste

# Session Organizers

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# Session Description

This session will explore global challenges and innovative solutions for achieving sustainable nutrient management in agroecosystems through organic waste recycling. Optimizing nutrient recovery and reuse from organic waste materials offers numerous benefits, including reducing input dependency, enhanced soil health and climate resilience through carbon sequestration, and fostering local economies by supporting organic waste recycling industries.

Organic soil amendments provide multiple co-benefits, such as increasing biologically available plant nutrients, soil organic matter, protecting water quality, enhancing crop performance, and reducing greenhouse gas emissions. This session will integrate diverse perspectives across three key themes: Advances in Biofertilizer Production, Impacts of Biofertilizer on Soil Fertility and long-term Nutrient Use Efficiency, Opportunities for Climate Resilient Agroecosystems. Using this framework, speakers will address major barriers to circular nutrient management, identified through a pre-congress stakeholder survey and literature review. Key challenges are likely to include optimizing the manufacturing and processing of bio-based fertilizers, mitigating potential negative soil biogeochemical and climate impacts, and assessing barriers to agricultural application.

Discussions will highlight technological advancements in nutrient recovery from municipal waste, manure, and agricultural byproducts, as well as the potential for organic amendments to increase climate resiliency through sequestering soil carbon and supplementing synthetic fertilizers. A major focus will be scalability, with invited speakers presenting research spanning laboratory experiments to landscape-scale modeling, to economic analysis. The session aims to provide a comprehensive roadmap for integrating organic waste products into agricultural systems, driving sustainable nutrient management forward. Speakers will be invited to participate in a joint publication highlighting lessons learned from the session.

# Relevance

This session is directly relevant to the congress’s theme of *Soil and the Shared Future of Mankind*. As the global population grows, sustaining a livable planet requires that we manage global nutrient cycles more sustainably. The International Solid Waste Association estimates that 2.6 million tons of organic waste are generated per day globally, comprising over 40% of the total mass of waste generated. Rich in carbon and important crop nutrients, forging a cooperative future depends on recycling these materials to boost soil health and forge climate resilient cropping systems.

# Format

The format of the proposed session will be oral presentations from globally recognized experts is the fields of soil fertility, biogeochemistry, environmental sciences, and bio-fertilizer production. A pre-session survey will be emailed to global experts in the field of organic waste management and soil fertility. Questions will be focused on identifying the major challenges to recycling organic waste back into agricultural systems.

# Proposed Speakers

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

**Qirong Shen**, Nanjing Agricultural University, China – Dr. Shen is a leading expert in the field of bio-fertilizer production, organic waste recycling, and soil microbiology. He will be invited to present on his work with optimizing the biochemical environment during the composting of organic waste to reduce nitrogen loss and improve product quality. Additionally, Dr. Shen will be asked to discuss his work with innovations in composting oxygen control systems to decrease the composting time.

**Jeanette Norton,** Utah State University, United States of America – Dr. Norton is a leading expert in soil microbiology, fertility and sustainable waste management. She will be invited to present on the potential for organic waste derived amendments to enhance biological nutrient cycling. This will include innovative approaches in the analysis of soil microbial communities,

**Sabine Houot,** National Research Institute for Agriculture, Food and Environment, France – Dr. Houot will be invited to present on the state-of-the-art methods in modeling soil fertility and carbon cycling outcomes from the use of organic amendments. She will be invited to discuss the curation of large-scale datasets for the improvement of global biogeochemical models aimed at predicting climate outcomes from agricultural production.

**Junling Zhang,** China Agricultural University, China – Dr. Zhang is working in the field of soil health assessment, and the regulation of soil microbiome for building up healthy soils to achieve sustainable agriculture. She will be invited to present on her work on managing soil health in typical agricultural systems in China.

**Wenjie Gu,** Institute of Agricultural Resources and Environment, Guangdong Academy of Agricultural Sciences, China – Dr. Gu is a senior researcher specializing in agricultural microbial resources, soil microbial ecology, and microbe-plant interactions. She has extensive experience in molecular microbiology and the application of functional microorganisms. Dr. Gu will be invited to present her work on the resource utilization of agricultural waste, including the bioprocessing and field recycling of waste materials, odor control, and biological pest control. Additionally, she will discuss her research on carbon sequestration mechanisms in the production and land application of organic fertilizers derived from livestock manure.

**MH Mehta** is the Chairman – Working Group Eco Agriculture, Indian Chamber of Food and Agriculture (ICFA) and President/Chairman of the Science Ashram/Gujarat Life Sciences, Vadodara, India. He heads the Mission on Eco Agriculture for Ever Green Revolution.