



Food and Agriculture
Organization of the
United Nations

17-21 October 2022

FAO SCIENCE AND INNOVATION FORUM

Harnessing science, technology
and innovation for transforming
our agrifood systems

SPECIAL EVENT

09:00 - 17:00 CET | Red Room, FAO, ROME

20
October
2022

INNOVATIONS IN SOIL AND PLANT NUTRIENT MANAGEMENT

The soil fertility status is the fundamental building block on which all agricultural production systems are built. The sustainable improvement of soil fertility and nutrient imbalances prevention will make it possible to increase food production and agrifood systems' resilience to climate change while contributing to the mitigation of greenhouse gases and reducing other externalities of agricultural activities such as environmental pollution.

This event builds on the discussions and outcomes of the Global Symposium on Soils for Nutrition organized by FAO in July 2022. It highlights innovations in soil and plant nutrient management that contribute to optimizing resource use, improving the nutritional value of food and maximizing crop productivity, while minimizing negative impacts on land, soil, water and the environment, contributing to a circular economy and nutrient recycling.

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INNOVATIONS IN SOIL AND PLANT NUTRIENT MANAGEMENT

Special event organized by

Global Soil Partnership | Land and Water Division (NSL)
Food and Agriculture Organization of the United Nations

Background and rationale

With a global population that is projected to increase to 9.7 billion by 2050, compounded by competition for land and water resources and the impact of climate change, our current and future food security depends on our ability to increase yields and food quality by improving soil fertility and plant nutrient uptake. However, intensive agricultural practices have already had a lasting effect on soil health, environmental quality, and climate change.

Each year, an estimated 24 billion tonnes of fertile soil are lost due to erosion. In addition, the most fertile soils worldwide have been degraded over decades of intensive production due to unsustainable practices that have led to nutrient mining and rapid mineralization of soil organic carbon. Along with other soil degradation processes, the Voluntary Guidelines for Sustainable Soil Management (FAO, 2017) identified nutrient imbalance as a significant obstacle on the road to food security as it directly affects food production, quality and nutritional value, and safety.

Efforts and investments have focused on increasing plant nutrient uptake and balance. Overuse of inorganic fertilizers has caused soil and water pollution through nutrient leaching, alteration of biogeochemical cycles, accumulation of toxic chemicals in soils, eutrophication of water bodies and GHGs emissions. In highly fertilized areas, between 50-60 percent of the nutrient inputs become a major source of pollution to groundwater, freshwater, and coastal waters. On the other hand, in some regions, the inorganic fertilizer use currently is very low compared to the global average. The underuse of fertilizers also has a significant impact on soil health as it means that nutrients are being mined from soils and soil organisms do not have access to essential nutrients to grow and continue the nutrient cycle.

Further, the mounting global fertilizer misallocation and their price increase recently are threatening food security. Vulnerable countries especially in Africa, Latin America, and Asia, grapple with fertilizer prices that have soared by 300 percent now and where the smallholder farmers lack access to inorganic and organic fertilizers. Growing uncertainties and high fertilizer prices already impacts food production prospects and farmers' livelihoods in many countries.

The answer to the crisis is not simply to ease the production of more fertilizers, but additional efforts are needed to consolidate and promote alternative fertilizer sources including manures and bio-fertilizers, and the pursuit of new sources and technologies for cheaper, cleaner, and more effective soil nutrition. A holistic and integrated approach to soil and plant nutrient management is needed to ensure sustainable use and management of soil and water resources and improve plant nutrient use and nutrient use efficiency.

The Global Symposium on Soils for Nutrition (GSOIL4N) recently held (July 2022) summarized the latest research findings and discussions about integrated plant and soil fertility management. The one-day special event on "Innovations in Soil and Plant Nutrient Management" will highlight all of the above issues and discuss viable technical solutions that will address national priorities and concerns identified during the ministerial segment at the beginning of the day.

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Global Soil Partnership | Land and Water Division (NSL)

09:00 - 10:45

HIGH LEVEL MINISTERIAL OPENING

Minister of Agriculture, Ethiopia
Minister of Agricultural Development, Chad
Minister of Agriculture, Fisheries and Food, Spain (tbc)
Deputy Minister of Agriculture, Maritime Fisheries, Rural Development, and Water and Forests, Morocco
Deputy Minister of Environment, Water and Agriculture, Saudi Arabia (tbc)
Minister of Agriculture, Livestock and Food, Guatemala (tbc)
Minister of Lands, Agriculture, Fisheries, Water and Rural Resettlement, Zimbabwe
Former Secretary of the Department of Agriculture, Philippines

10:45 - 11:45

TECHNICAL SESSION 1. Setting the scene on the status and challenges of soil and plant nutrient management

Moderator **Ms Natalia Rodriguez, FAO**

Challenges for innovation on the use and management of fertilizers

Mr Upendra Singh, IFDC

Farmers perspectives regarding the challenges associated with soil health and access to fertilizers

Ms Arianna Giuliadori, World Farmers Organization

Innovation in crop nutrition: an industry perspective

Mr Achim Dobermann, IFA

Outcomes of the Global Symposium on Soils for Nutrition: a joint plan of action on soil fertility beyond 2030

Mr Ronald Vargas, FAO

11:45 - 12:30

PANEL DISCUSSION AND Q&A

12:30 - 14:00

LUNCH

14:00 - 14:50

TECHNICAL SESSION 2. Innovation on Fertilizers

Moderator **Mr Mohamed Eida, FAO**

Science and innovation on soil fertility, where are we?

Mr Rattan Lal, Ohio University

Why can't quality assessment be postponed any longer?

Mr Ettore Capri, Director of Opera Research, European Observatory on Sustainable Agriculture

How to improve fertilizer recommendations for farmers?

Mr Dinesh Panday, Rodale Institute

Technological alternatives for increasing nutrient use efficiency in plants and soils

Mr Ivan Ortiz Monasterio, CIMMYT

14:50 - 15:10

PANEL DISCUSSION AND Q&A

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15:10 - 16:10

TECHNICAL SESSION 3. Innovative solutions to address nutrient imbalances

Moderator **Mr Ronald Vargas, FAO**

Challenges of soil fertility in Africa

Mr Kaushik Majumdar, African Plant Nutrition Institute

Biological fixation of nutrients: a real way forward

Ms Mariangela Hungria, EMBRAPA, Brazil

Innovation on Bio stimulants: status and challenges

Mr Antonis Angeletakis, EBIC

Bioestimulants: Opportunities & Challenges in the Global context

Mr Prem Warrior, Valagro, Italy

Challenges, environmental and health concerns of nano fertilizers

Ms Melanie Kah, University of Auckland

16:10 - 16:40

PANEL DISCUSSION AND Q&A

16:40 - 17:00

CONCLUSIONS AND CLOSURE

Mr Lifeng Li, FAO