



Food and Agriculture  
Organization of the  
United Nations



**SOILS:  
WHERE FOOD  
BEGINS**

AGENDA

**Global Symposium on Soils for Nutrition**

26-29 July 2022





The times indicated are local times for Rome, Italy.  
Rome time is in the Central European Summer Time Zone (CEST).

# SUMMARY AGENDA

## 26 July / DAY 1

13.00 - 14.00	High Level Opening Session
14.00- 15.45	Keynote Speakers   Setting the scene for the GSOIL4N
15.45 - 15.55	Launch of the Photo-contest on #Soils4Nutrition & Quiz
15.55 - 16.00	Launch of the poster exhibition

## 27 July / DAY 2

13.00 - 14:00	Plenary Panel - Innovations for soil fertility management
14:00- 16:00	Parallel sessions (oral and poster presentations)

## 28 July / DAY 3

13.00 - 14.00	Plenary Panel - Sustainable Soil Management and Biofortification: Allies to combat malnutrition
14:00- 17.00	Parallel sessions (oral and poster presentations)

## 29 July / DAY 4

13.00 - 14.00	Plenary Panel - Integrated soil fertility management: a look ahead
14.00 - 15.00	Key findings and the way forward
15.00 - 15.30	Closure of the Symposium

Plenary

Parallel sessions

# Tuesday 26 July

## HIGH LEVEL OPENING SESSION

**Moderator:** Ms Maria Helena Semedo, FAO

## VIDEO: SOILS FOR NUTRITION

### OPENING OF THE SYMPOSIUM

13.00  
14.00

**Mr QU Dongyu**, Director-General of the Food and Agriculture Organization of the United Nations

### OPENING REMARKS

**H.E. Muhammad Abdur Razzaque**, Minister of Agriculture, Bangladesh;  
**H.E. Gilbert F. Houngbo**, President of the International Fund for Agricultural Development;  
**The Honourable Penelope Wensley AC**, National Soils Advocate, Australia;  
**Mr Yemi Akinbami**, Executive Director of the Forum for Agricultural Research in Africa (FARA).

## VIDEO: ARTISTIC PERFORMANCE

## KEYNOTE SPEAKERS | SETTING THE SCENE FOR GSOIL4N

**Moderator:**

**Status and challenges of agri-food systems: what is the role of soil health in a scenario of conflicts and pandemics?**

**H.E. Gerda Verburg**, UN Assistant Secretary-General & Coordinator of the Scaling Up Nutrition (SUN) Movement

**Effects of the misuse of fertilizers on climate change and the environment**

**Mr Johan Rockström**, Director Postdam Institute for Climate Change

14.00  
15.45

**Do we really need fertilizers to grow healthy crops?**

**Mr Fusuo Zhang**, China Agricultural University

**Status and perspectives on the production of fertilizers**

**Ms Alzbeta Klein**, CEO International Fertilizers Association

**Healthy soils for healthy and nutritious crops: combating hidden hunger**

**Ms Grace Kangara**, University of Nottingham

**Status and challenges of soils for nutrition**

**Ms Vinisa Saynes**, FAO's Global Soil Partnership

**Interactive Q&A session**

15.45  
16.00

**Launch of the Photo-contest on #Soils4Nutrition & Quiz** (Ms Isabelle Verbeke, FAO)  
**Launch of the poster exhibition**

# Wednesday 27 July

## PLENARY PANEL - INNOVATIONS FOR SOIL FERTILITY MANAGEMENT

### Moderator:

**The industry perspective, progress, and new trends to increase soil fertility in a sustainable way**  
**Mr Amit Rastogi**, Coromandel International Limited, India

**Development of better, cleaner technologies for food production**  
**Mr Prem S. Bindraban**, International Fertilizer Development Center (IFDC), Ghana

13.00  
14:00 **Rethinking plant nutrition: current biofertilizer technologies and microbiome-based management**  
**Ms Micaela Tosi**, University of Guelph, Canada

**Bioestimulants: Opportunities and challenges to increase soil fertility**  
**Mr Antonis Angeletakis**, European Bioestimulants Industry Council (EBIC), Yara, United Kingdom

**Soil fertility mapping for guiding fertilizers recommendation**  
**Mr Aniss Bouraqqadi**, OCP Group, Morocco

**Parallel session 1: Theme 1 - Status and trends of global soil nutrient budget**  
**Moderator: Mr Ghiath Ahmad Alloush**, Tishreen University, Syria

**Parallel session 2: Theme 1 - Status and trends of global soil nutrient budget**  
**Moderator: Ms Nyambilila Abdallah Amuri**, Sokoine University of Agriculture, Tanzania

**Parallel session 3: Theme 1 - Status and trends of global soil nutrient budget**  
**Moderator: Ms Isabel Luotto**, Global Soil Partnership, FAO, Italy

14.00  
16.00 **Parallel session 4: Theme 3 - Impacts of soil nutrient management on the environment and climate change**  
**Moderator: Mr Saeed Saadat**, Soil and Water Research Institute, Iran

**Parallel session 5: Theme 2 - Sustainable soil management for food security and better nutrition**  
**Moderator: Mr Sheleme Beyene Jiru**, Hawassa University, Ethiopia

Thursday 28 July

PLENARY PANEL - SUSTAINABLE SOIL MANAGEMENT AND BIOFORTIFICATION:  
ALLIES TO COMBAT MALNUTRITION

**Moderator:** Ms. Patrizia Fracassi, Food and Nutrition Division FAO, Italy

**The role of soils on human and animal nutrition**

**Mr Martin Broadley**, Rothamsted Research, United Kingdom

**Biofortification, an innovative approach to bridge the gap between agriculture and nutrition**

**Ms Jenny Walton**, Harvest Plus, United States of America

13.00  
14:00

**Cost effective practices of sustainable soil management to combat malnutrition in Burkina Faso**

**Mr Mamoudou Traorè**, National Soil Survey Office, Burkina Faso

**Micronutrient fertilization strategies in Bangladesh**

**Mr Md Kamaruzzaman**, Soil Resource Development Institute, Bangladesh

**Dissemination of Sustainable soil management practices in the Soils4Nutrition project**

**Ms Carolina Olivera**, Global Soil Partnership, FAO, Italy

**Closing remarks: underscoring feasibility and scalability of strategies to combat malnutrition**

## Parallel session 1

**Theme 1 - Status and trends of global soil nutrient budget**

**Moderator:** Mr Gaius Eudoxie, The University of the West Indies St. Augustine, Trinidad and Tobago

## Parallel session 2

**Theme 1 - Status and trends of global soil nutrient budget**

**Moderator:** Mr Guillermo A. Studdert, Universidad Nacional de Mar del Plata (UNMP), Argentina

## Parallel session 3

**Theme 1 - Status and trends of global soil nutrient budget**

**Moderators:** Ms Jeyanny Vijayanathan, Forest Research Institute Malaysia (FRIM), Malaysia

**Theme 2 - Sustainable soil management for food security and better nutrition**

**Moderators:** Ms Jeyanny Vijayanathan, Forest Research Institute Malaysia (FRIM), Malaysia

14.00  
16.00

## Parallel session 4

**Theme 3 - Impacts of soil nutrient management on the environment and climate change**

**Moderator:**

## Parallel session 5

**Theme 4 - Governance of soil fertility/soil nutrients**

**Moderator:** Mr Ranjan Bhattacharyya, Indian Agricultural Research Institute (ICAR), India

# Friday 29 July

## PLENARY PANEL - INTEGRATED SOIL FERTILITY MANAGEMENT: LOOKING AHEAD

**Moderator:** Mr VARGAS Ronald, Global Soil Partnership Secretary, FAO, Italy

**Fifty years of Integrated Soil Fertility Management: what is next?**

**Mr Bernard Vanlauwe**, International Institute of Tropical Agriculture (IITA), Kenya

13.00

**The role of microbes to enhance soil fertility**

14.00

**Ms Mariangela Hungria da Cunha**, Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), Brazil

**Models and technological tools to improve fertilizer recommendations**

**Mr Jorge Delgado**, United States Department of Agriculture (USDA), United States of America

**Status and Challenges of Phosphorus Reserves for Agriculture: a matter of quantity and quality**

**Mr Gerald Steiner**, Global Phosphorus Institute (GPI), Austria

## MAIN SESSION OUTCOMES OF THE GSOIL4N

### Key findings and way forward

**Moderator:** Ms Natalia Rodríguez Eugenio, FAO

**Theme 1 - Status and trends of global soil nutrient budget**

**Ms SUVANNANG Nopmanee**, Ministry of Science and Technology, Thailand

14.00

15.00

**Theme 2 - Sustainable soil management for food security and better nutrition**

**Ms CUNHA DOS ANJOS Lúcia Helena**, Federal Rural University of Rio de Janeiro, Brazil

**Theme 3 - Impacts of soil nutrient management on the environment and climate change**

**Ms MUSCOLO Adele**, Mediterranean University of Reggio Calabria, Italy

**Theme 4 - Governance of soil fertility/soil nutrients**

**Mr NDZANA Georges Martial**, University of Dschang, Cameroon

### Closure of the Symposium

**Moderator:** Ms Natalia Rodríguez Eugenio, FAO

15.00

15.30

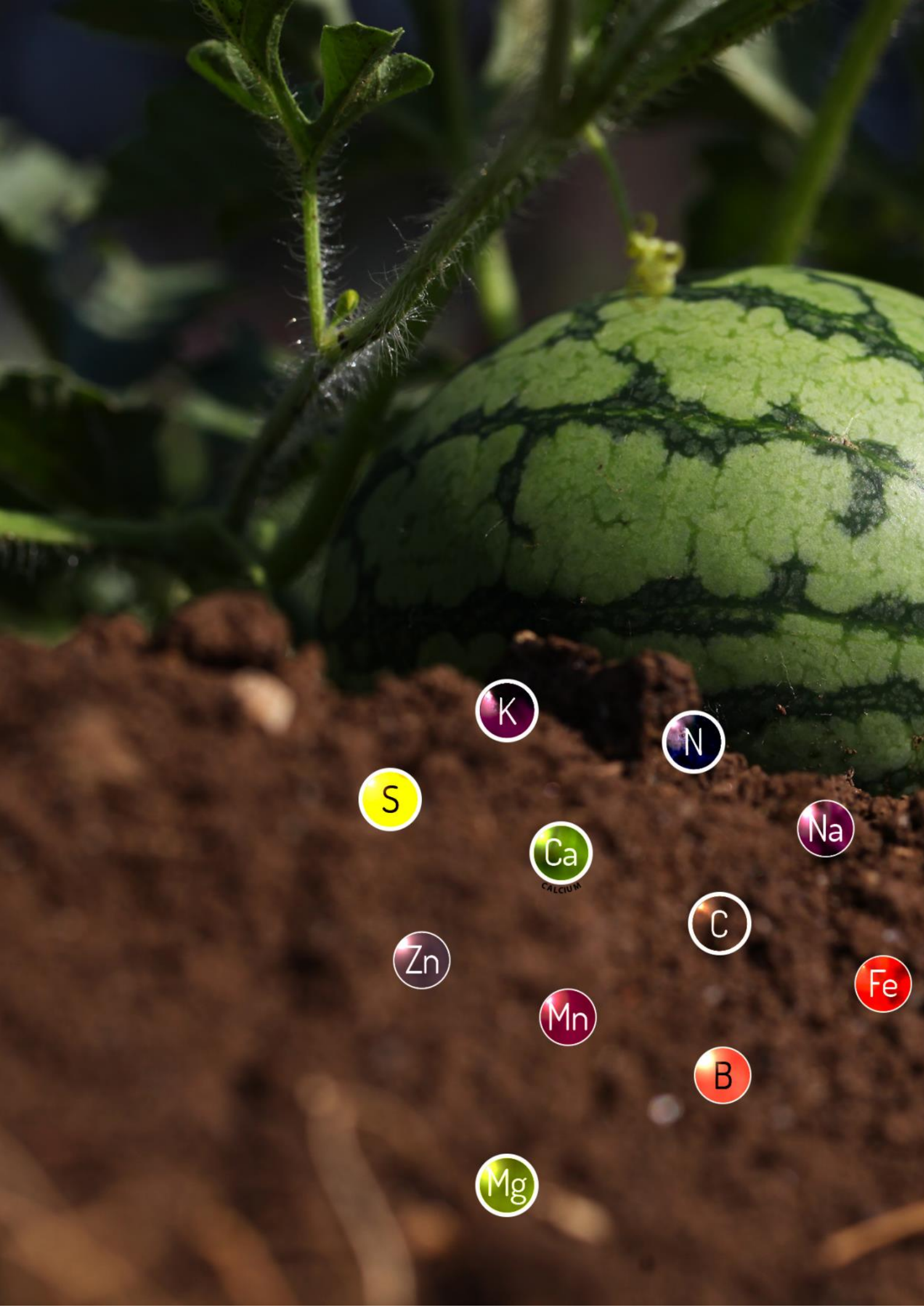
**Result of the GSOIL4N poster competition | Announcement of the photo contest's winners**

**Conclusions of the Symposium and the way forward**

**Mr Ronald Vargas**, FAO

**Closing remarks**

**Mr Lifeng Li**, Director NSL, FAO



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# Detailed agenda

## Parallel sessions



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# Wednesday 27 July

13.00

## PLENARY PANEL

14:00

Innovations for soil fertility management: look ahead

## Parallel session 1

### Theme 1 - Status and trends of global soil nutrient budget

**Moderator: Mr Ghiath Ahmad Alloush**, Tishreen University, Syria

#### Improving crop resilience through plant microbiome

**Ms TIGANI Wendalina**, Leiden University, the Netherlands

#### Khethi Sudhaar (Improving Soil Health) & NBF (Nutritionally Balanced Farming) practices in India

**Mr MUDDLURU Sree Rama Raju**, SSCT PVT Limited, India

#### Bacterial diversity of the rhizosphere of two priority species from Miombo (*Brachystegia boehmii*) and Mopane (*Colophospermum mopane*) woodlands

**Ms ALBERTO MAQUIA Ivete Sandra**, Eduardo Mondlane University, Mozambique

#### Soybean nutrition using *Trichoderma spp.* and organic acids in the seeding furrow

**Ms SCHWAMBACH Josèli**, Caxias do Sul University, Brazil

#### Novel spent coffee ground-based biofertilizer: effects on crops and bacterial rhizospheric microbiome

**Mr D'ALESSANDRO Aldo**, University of Camerino, Italy

#### A meta-analysis approach to measure the global effect of biofertilizer on soil organic carbon stocks

**Ms SINGLA Berta**, BETA Technological Centre, UCC-UVIC, Spain

#### Efficiency of biological preparations based on nitrogen-fixing and phosphate-solubilizing bacteria for optimizing the plant nutrition

**Ms NAIDONOVA Oksana**, National Scientific Center "Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky", Ukraine

#### Ecosystem engineering by termites (Insecta: Isoptera): implications for the restoration of degraded agroecosystems in the context of climate change

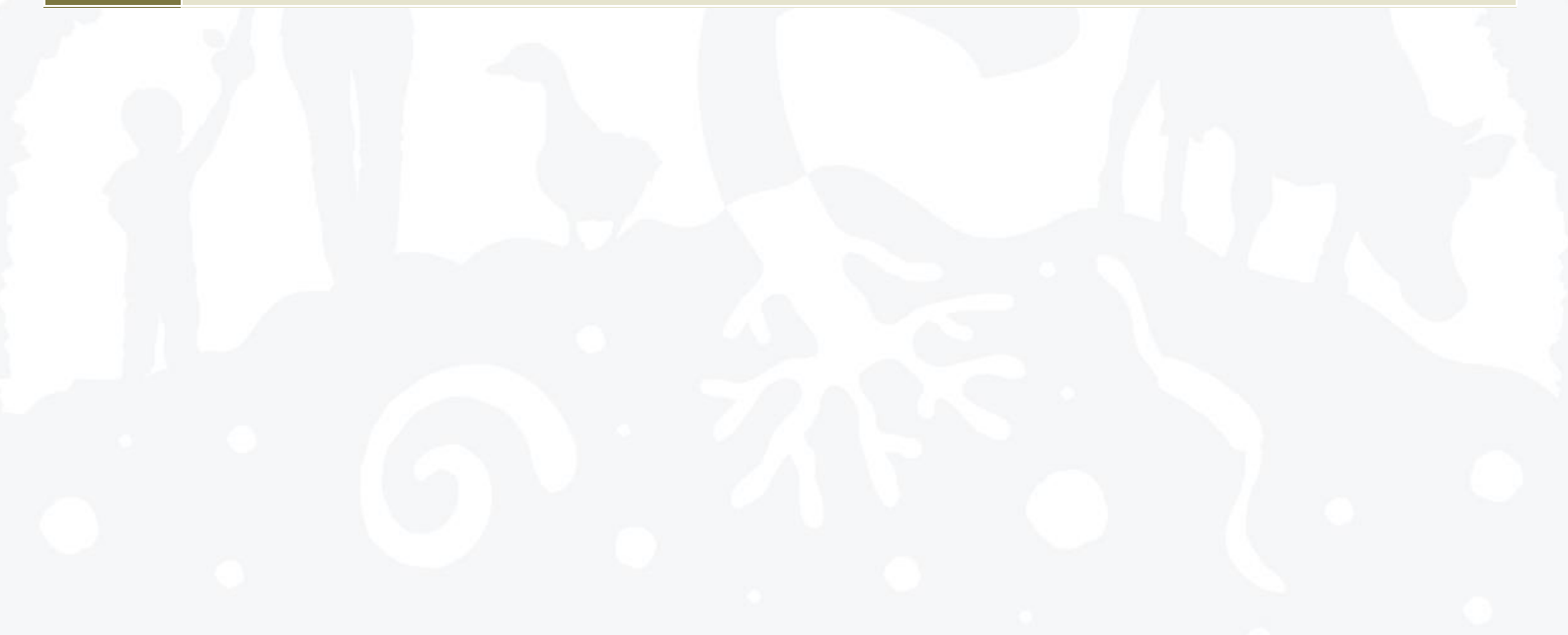
**Mr AMADOU ISSOUFOU Abdourhimou**, University of Diffa, Niger

#### Assessing nutrient management strategies in Mediterranean cropping systems under current and climate change scenarios

**Ms DI BENE Claudia**, Council for Agricultural Research and Economics, Research Centre for Agriculture and Environment CREA-AA, Italy

14.00

16.00



13.00  
14:00

## PLENARY PANEL

Innovations for soil fertility management: look ahead

## Parallel session 2

### Theme 1 - Status and trends of global soil nutrient budget

**Moderator: Ms Nyambilila Abdallah Amuri**, Sokoine University of Agriculture, Tanzania

#### Biodegradable plastics: effects on functionality and fertility of two different soils

**Ms MAZZON Martina**, University of Bologna, Italy

#### Fertility and quality of soil as affected by external additives: effect of integrated biochar and polymer application

**Mr MAMEDOV Amrah**, Tottori University, Japan

#### Inorganic fertilizer use in rice fields and its association with yield gap in different growing environments in sub-Saharan Africa

**Mr JOHNSON Jean-Martial**, Africa Rice Center, Côte d'Ivoire

#### Four directions for enhancing plant nutrition management system under arid growing season

**Ms HLADKIKH Yevheniia**, National Scientific Center "Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky", Ukraine

14.00  
16.00

#### Dissolved soil organic matter as a fertility indicator in arable soils: how local conditions control its properties and implications for climate change

**Mr AL-GRAITI Thulfiqar**, Eötvös Loránd University, Hungary

#### More than an organic fertilizer: mealworm frass as a substitute to conventional fertilizer to ensure a sustainable future

**Mr BOHUON Emilien**, Ynsect, France

#### Evaluation of polyhalite fertilizer for soybean balanced nutrition using a novel root phenotyping system

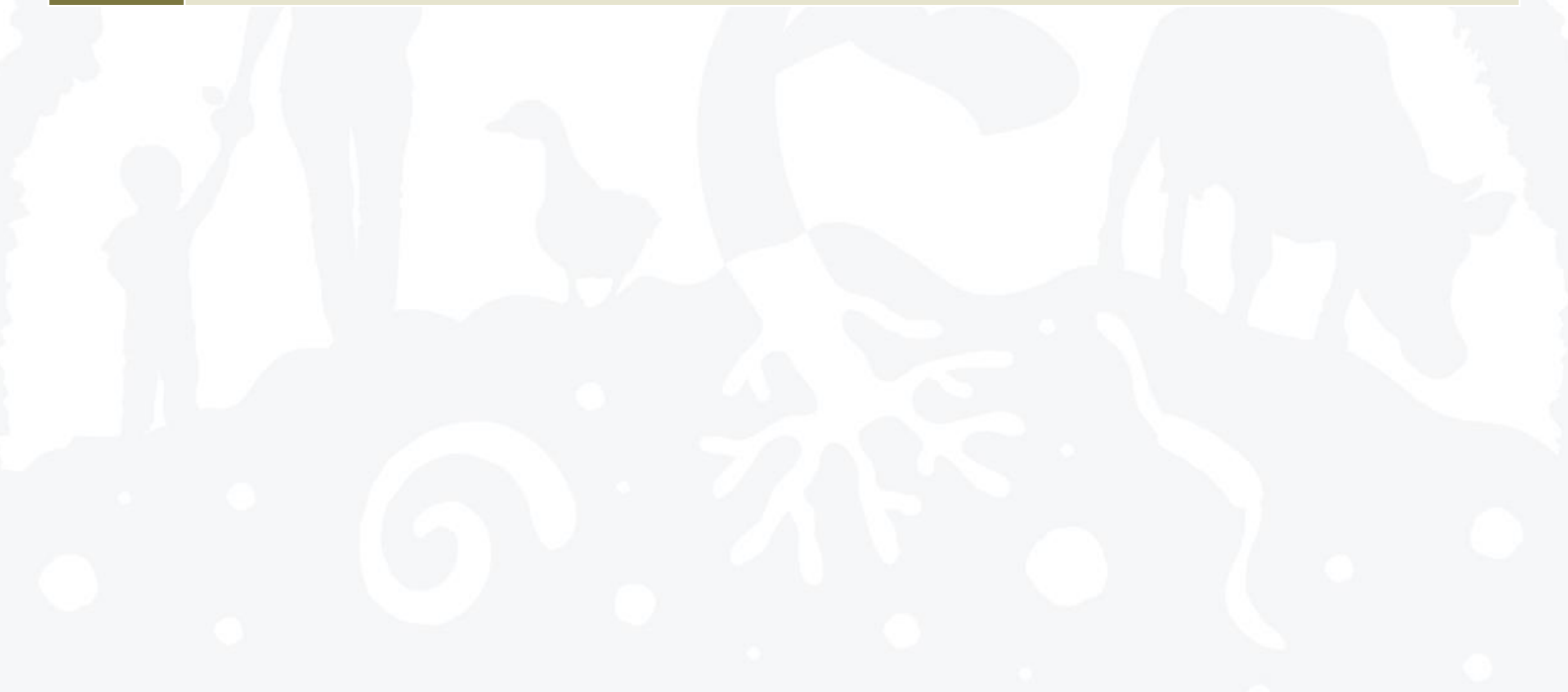
**Ms IMAS Patricia**, ICL, Israel

#### Effects of soil amendments on growth and protein generation of paddy grown on acid sulfate soil

**Mr ABDULLAH Rosazlin**, Universiti Malaya, Malaysia

#### Supplementary fertilization with magnesium increases both yield and nutritional quality of potato tubers in tropical soils

**Mr LACERDA Santiago**, Federal University of Viçosa, Brazil



13.00

## PLENARY PANEL

14:00

Innovations for soil fertility management: look ahead

## Parallel session 3

### Theme 1 - Status and trends of global soil nutrient budget

**Moderator:** Ms Isabel Luotto, Global Soil Partnership, FAO, Italy

#### Global Soil Nutrient and Budget map - GSNmap

Mr ANGELINI Marcos, Global Soil Partnership, FAO, Italy

#### Status and balance of nutrients in the agricultural soils of Iran

Mr GHAFARI NEJAD Seyed Ali, Soil and Water Research Institute, the Islamic Republic of Iran

#### Phosphorus stocks in EU agricultural soils: inputs, outputs and fluxes

Mr PANAGOS Panos, European Commission - Joint Research Centre, Italy

#### The European Space Agency WORLDSOILS Monitoring System

Ms YAGÜE María Julia, GMV Aerospace, Spain

#### Towards a global nutrient budget data platform

Mr DOBERMANN Achim, International Fertilizer Association, France

#### Modelling and mapping of fertilizer recommendations for major crops in West Africa; a proof of concept

Mr LEENAARS J.G.B., ISRIC - World Soil Information, the Netherlands

#### Spatial analysis of the soil nutrient availability in Agricultural lands of Morocco: trends and challenges

Mr MOUSSADEK Rachid, International Center for Agricultural Research in the Dry Areas, Morocco

#### Modelling phosphorus soil dynamics and P budgets in European agricultural soils

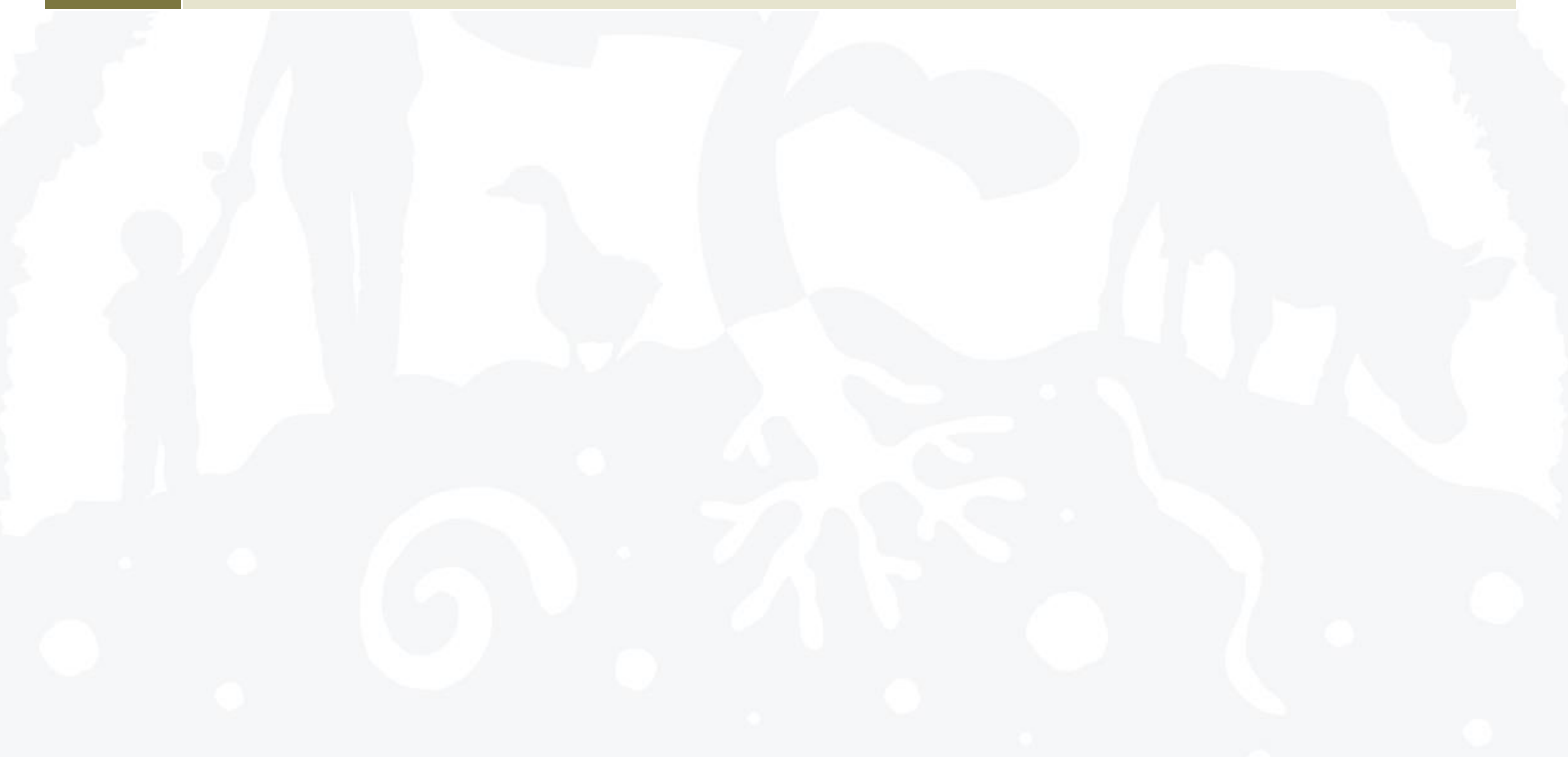
Ms MUNTWYLER Anna, Joint Research Centre, Italy

#### Sustainable soil management for food security and better nutrition; Digital mapping and values of heavy metal quality reference in soils of the North and Northwest Fluminense, RJ

Ms BRUNO RODRIGUES Niriele, Federal Rural University of Rio de Janeiro, Brazil

14.00

16.00



13.00  
14:00

## PLENARY PANEL

Innovations for soil fertility management: look ahead

## Parallel session 4

### Theme 3 - Impacts of soil nutrient management on the environment and climate change

**Moderator: Mr Saeed Saadat**, Soil and Water Research Institute, Iran

**Identification of wheat root traits that improve soil structure and optimize nitrogen cycling: the WISH-ROOTS project**

**Ms HERNANDEZ-SORIANO Maria**, John Innes Centre, United Kingdom

**Increasing the efficiency of Ukrainian agriculture in arid conditions**

**Ms ZAKHAROVA Maryna**, National Scientific Center "Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky", Ukraine

**Biodegradable PVA/starch/bentonite polymeric blend to improve fertilizer use efficiency**

**Mr SARKAR Abhijit**, ICAR — Indian Institute of Soil Science, Bhopal, India

**FERTIMANURE: Upcycling animal manure into improved fertilising products**

**Ms DIAZ-GUERRA Laura**, BETA Technological Center - Universitat de Vic, Spain

14.00  
16.00

**Composting of municipal solid waste a remedy for water pollution and soil fertility decline in Uganda**

**Mr MUGAMBE Christopher**, Makerere University, Uganda

**Micronutrient management adaptations to climate change: Extrapolations from findings on copper and zinc chemistry in semi-arid to arid climate of the United States**

**Mr UDEIGWE Theophilus K.**, Bioterra, United States of America

**Mixed application of compost and inorganic fertilizers increases maize (*Zea mays L.*) yields, grain minerals, and nutrient use efficiency and mitigates greenhouse gas emissions in Southwestern Ethiopia**

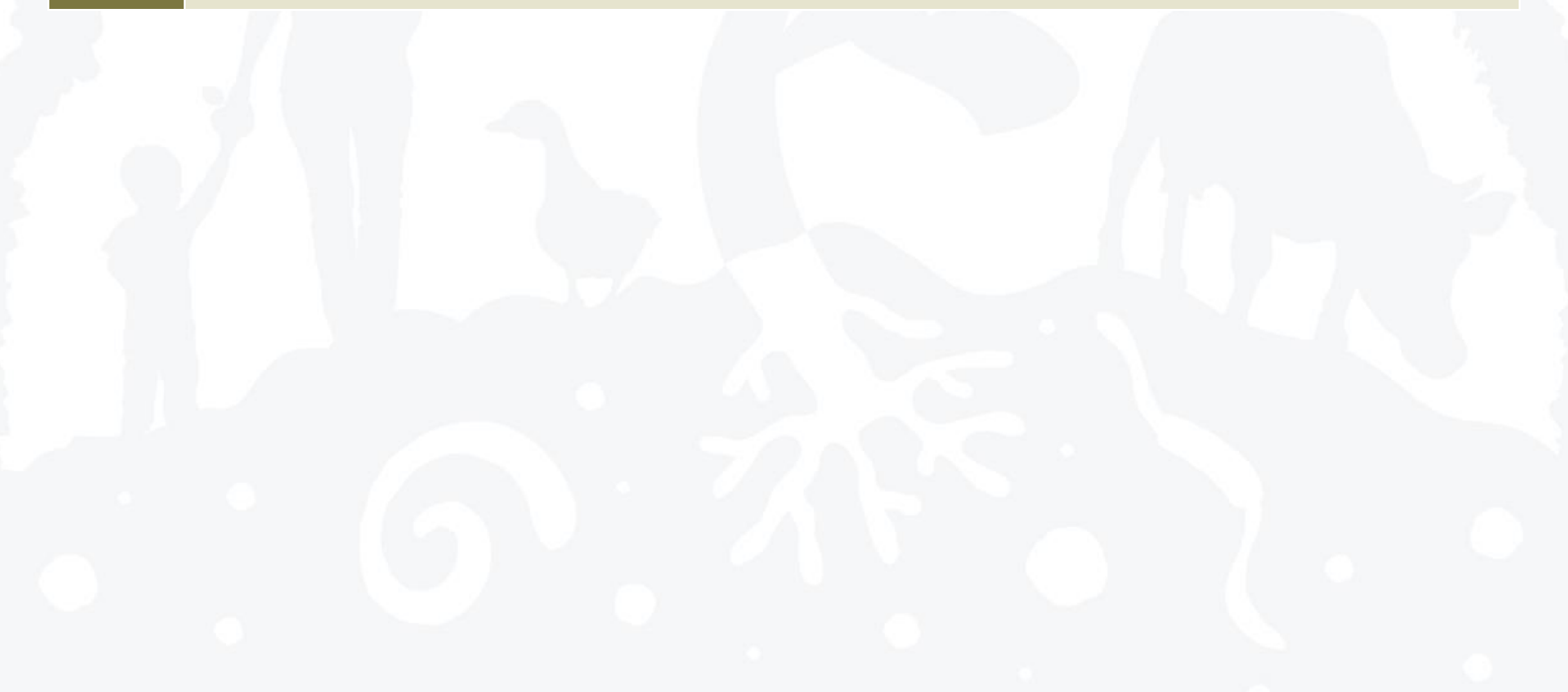
**Ms ZERSSA Gebeyanesh Worku**, University of Rostock, Germany

**Greenhouse Gas Emissions and dynamics of soil nutrients in coffee crops**

**Ms PERALTA ZUÑIGA Kathia**, Postgraduate College - Campus Montecillo, Mexico

**The effectiveness of Neem materials and biochar as nitrification inhibitors in reducing nitrate leaching in a compost-amended Ferric Luvisol**

**Mr ABEKA Hammond**, CSIR - Savanna Agricultural Research Institute, Ghana



13.00

## PLENARY PANEL

14:00

Innovations for soil fertility management: look ahead

## Parallel session 5

### Theme 2 - Sustainable soil management for food security and better nutrition

**Moderator: Mr Sheleme Beyene Jiru**, Hawassa University, Ethiopia

**Linking adsorption-desorption characteristics with grain Zn concentrations and uptake by teff, wheat, and maize in different landscape positions in Ethiopia**

**Mr DESTA Mesfin Kebede**, University of Nottingham — Rothamsted Research, United Kingdom

**Novel fertilizer strategy to biofortify zinc concentration in wheat grains**

**Mr SINGH Kuldeep**, Amity University Uttar Pradesh, India

**Soil factors influence the geospatial variation in zinc nutritional quality of maize in Malawi**

**Mr BOTOMAN Lester**, Lilongwe University of Agriculture and Natural Resource, Malawi

**Where do we need to apply Zn fertilizers in sub-Saharan Africa?**

**Ms VAN EYNDE Elise**, European Commission, Joint Research Centre (JRC), Ispra, Italy

14.00

16.00

**Foliar zinc fertilization in soybean**

**Ms BUSTOS Ana Natalia**, Estación Experimental Agropecuaria Manfredi - Instituto Nacional de Tecnología Agropecuaria, Argentina

**Biofortification of rice with iron and Zinc using indigenous micronutrient mobilizing beneficial rhizobacteria**

**Ms VAIYAPURI RAMALINGAM Prabavathy**, M.S. Swaminathan Research Foundation, India

**Can cobalt-ferrite nanoparticles be an alternative fertilizer for the agronomic iron fortification of wheat?**

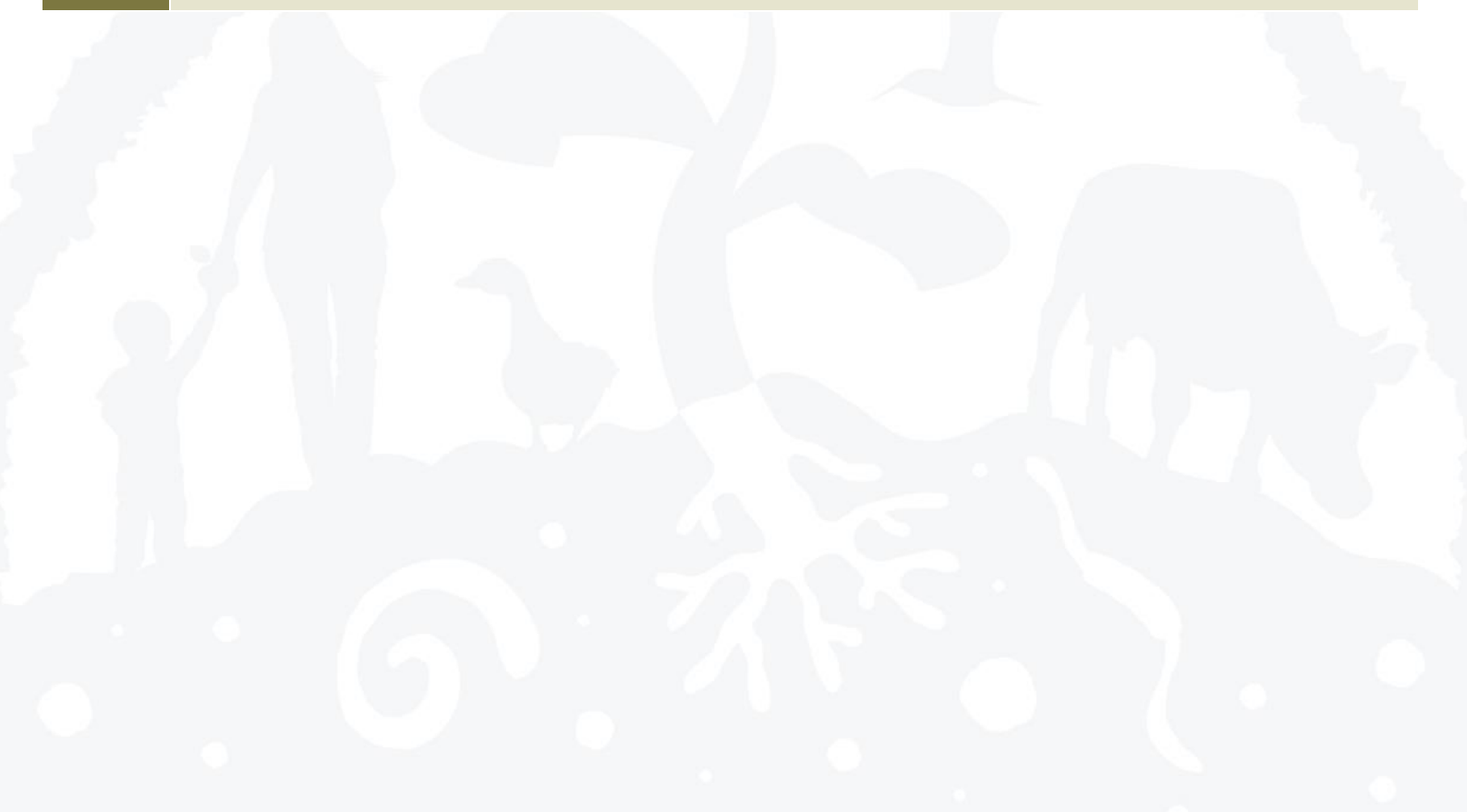
**Ms PEREA VÉLEZ Yazmín Stefani**, Postgraduate College, Mexico

**Biofortified maize in Zimbabwe: nutritional quality depending on field position and crop management**

**Mr HAEFELE Stephan**, University of Nottingham — Rothamsted Research, United Kingdom

**Selenium biofortification of staple maize: a way to combat hidden hunger in Malawi**

**Ms LIGOWE Ivy Sichinga**, Chitedze Agricultural Research Station Soil and Plant Nutrition Section, Malawi



13.00  
14:00

## PLENARY PANEL

Sustainable Soil Management and Biofortification to combat malnutrition

## Parallel session 1

### Theme 1 - Status and trends of global soil nutrient budget

**Moderator:** Mr Gaius Eudoxie, The University of the West Indies St. Augustine, Trinidad and Tobago

#### Agroforestry as an effective practice for sustainable soil management in olive orchards in Morocco

Ms ZAYANI Inass, University Abdelmalek Essaadi Faculty of Sciences and Techniques of Tangier, Morocco

#### Role of Integrated Nutrient Management for improving crop yield and enhancing soil fertility under smallholder farmers in degraded soils of Tanzania

Mr KIRIBA Deodatus Stanley, TARI—Tanzania Agricultural Research Institute, Tanzania

#### Prospects of sustainable food security in tribal areas with improvement in soil health by adopting practices of summer green gram cultivation

Mr JOSHI Jayesh, VAAGDHARA, India

#### Traditional coffee system that improves production and soil fertility

Mr ROMERO FERNANDEZ Abraham de Jesús, Postgraduate College, Mexico

#### Major integrated nutrient management strategies for rice-wheat cropping, and their impact on nutrient cycling, use efficiency and climate resilience of the system

Mr BHARDWAJ Ajay, ICAR — Central Soil Salinity Research Institute, India

#### Soil fertility improvement under conservation agriculture: effect of fertilization on soil physicochemical properties and wheat yield under both conventional and no-till systems

Ms EL MEKKAOUI Abdelali, INRA — National Institute of Agronomic Research, Morocco

#### The effect of different doses of organic and mineral fertilizers on the availability of trace elements in soils through the transformation of their organic matter

Mr SEMENOV Dmytro, National Scientific Center "Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky", Ukraine

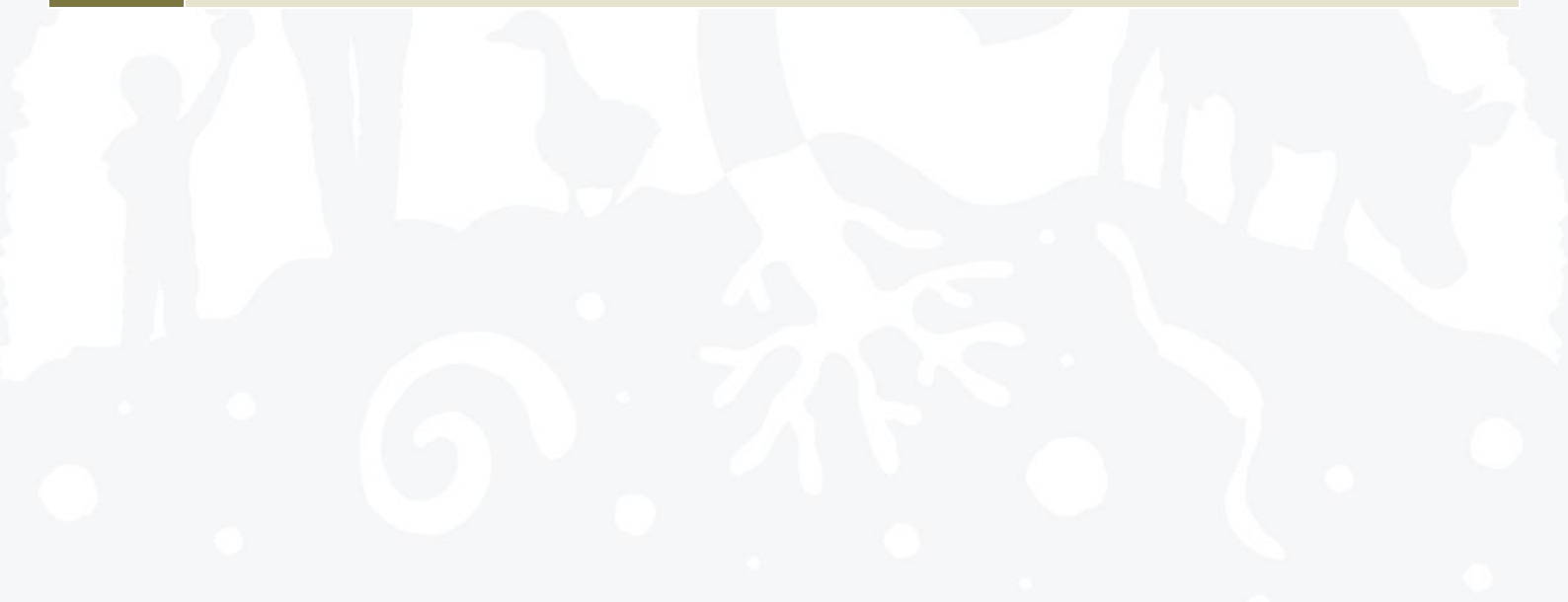
#### Minimum soil disturbance and increased crop residue retention improve N, P, K, and S budgets in rice-based cropping systems

Mr JAHIRUDDIN M., Bangladesh Agricultural University, Bangladesh

#### Accessible and informative field tests for soil health: shade trees in coffee systems sustain life above and belowground

Ms CAMILLONE Nina, the Pennsylvania State University, United States of America

14.00  
16.00



13.00

## PLENARY PANEL

14:00

Sustainable Soil Management and Biofortification - Allies for Food Security

## Parallel session 2

### Theme 1 - Status and trends of global soil nutrient budget

**Moderator:** Mr Guillermo A. Studdert, Universidad Nacional de Mar del Plata (UNMP), Argentina

#### Bioenergy, Healthy Soil and Nutrition: an exploration of the links for win-win opportunities

Ms MILLER Constance, Food and Agriculture Organisation / Global Bioenergy Partnership, Italy

#### Omission plot technique for assessing the nutrient contribution towards productivity of rice-maize cropping system in calcareous soils in eastern India

Mr SINGH Shiveswar Pratap, Dr Rajendra Prasad Central Agricultural University, India

#### Combined effect of TRICHODERMA X SILICON X ORGANIC MATTER on the dry matter production of *Chenopodium quinoa* Willd. cultivated in saline soil in the Semiarid of Pernambuco

Mr SANTOS SILVA Luiz Filipe, Federal Rural University of Pernambuco, Brazil

14.00

#### Soil fertility status and oil palm productivity in coastal plains of southwest Cameroon

16.00

Mr KOME Georges Kogge, University of Dschang, Cameroon

#### Multiscale evaluation of Nitrogen Use Efficiency (NUE) in common bean (*Phaseolus vulgaris*) under different inoculation strategies in Cuba.

Mr GÓMEZ-JORRÍN Luis, Instituto de Suelos, Cuba

#### Changes in nutrients contents (P, K, Mg) in topsoil over the past 30 years in mainland France

Ms CAUBET Manon, INRAE — Institut national de recherche pour l'agriculture, l'alimentation et l'environnement, France

#### Effect of agriculture on soil properties associated with soil health and fertility in the Argentinean pampas?

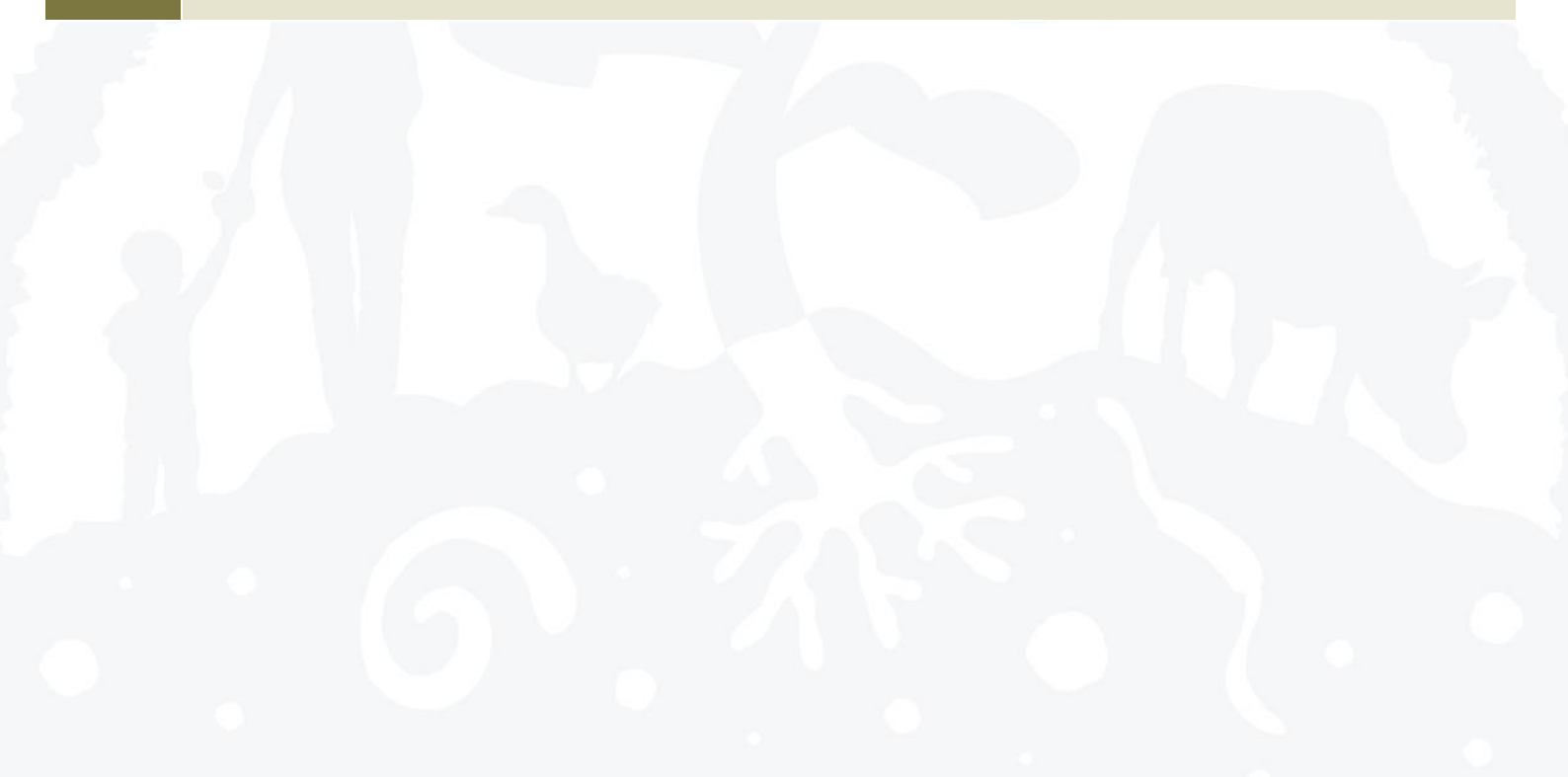
Mr SAINZ ROZAS Hernán René, IPADS Balcarce INTA-CONICET & UNMdP, Argentina

#### Soil nutrient management for healthy dry edible beans

Mr MAHARJAN Bijesh, University of Nebraska-Lincoln, United States of America

#### Enhancing seed and mace yield in nutmeg (*Myristica Fragrans*) through scientific nutrient management

Ms M.S Sailajakumari, Kerala Agricultural University, India





# Thursday 28 July

13.00 **PLENARY PANEL**

14:00 Sustainable Soil Management and Biofortification - Allies for Food Security

## Parallel session 3

### Theme 1 - Status and trends of global soil nutrient budget

**Moderator: Ms Jeyanny Vijayanathan**, Forest Research Institute Malaysia (FRIM), Malaysia

**Phosphorus biogeochemistry regulated by carbonates in soil**

**Ms GENG Yuanyuan**, Nanjing Agricultural University, China

14.00

**Geochemical analysis of rock waste of a mining exploitation as potential remineralizer of soil fertility**

15.00

**Ms CHIGLINO Leticia**, Universidad de la Republica, Uruguay

**Utilizing Basalt quarry wastes in improving soil fertility and the growth of rubber**

**Mr MOKHATAR Shafar Jefri**, University Putra Malaysia, Malaysia

**New protocol for phosphorus estimation in organically managed acidic soils, Meghalaya, India**

**Mr SWAMI Sanjay**, Central Agricultural University, Imphal, India

## Parallel session 3

### Theme 2 - Sustainable soil management for food security and better nutrition

**Moderator: Ms Jeyanny Vijayanathan**, Forest Research Institute Malaysia (FRIM), Malaysia

**Soil-based biofortification to alleviate selenium deficiency - An isotopic study to investigate sulphur and selenium competition for ryegrass uptake**

**Mr JIANG Linxi**, the University of Nottingham, United Kingdom

15:10

**Evidence of micronutrient fertilizer effect on agronomic fortified tef under different landscape positions in Amhara region**

16.00

**Ms MANZEKE-KANGARA Muneta Grace**, University of Nottingham — Rothamsted Research, United Kingdom

**Micronutrient constraints in sodic soils of Israna, Haryana (India)**

**Ms CHAHAL Seema**, School of Environmental Sciences, Jawaharlal Nehru University, India

**Si bioavailability and fate of the applied phytogenic silica in a soil plant system in acidic, neutral and alkaline soils**

**Ms ANJUM Mohsina**, University of Agricultural Sciences, Bangalore, India

13.00

## PLENARY PANEL

14:00

Sustainable Soil Management and Biofortification - Allies for Food Security

## Parallel session 4

### Theme 3 - Impacts of soil nutrient management on the environment and climate change

#### Moderator:

#### Status of soil pollution with heavy metals and fluorine derived from the application of high doses of phosphate fertilizers

**Ms HLADKIKH Yevheniia**, National Scientific Center "Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky", Ukraine

#### Phosphorus fractionation in soil and sediments along a continuum from agricultural fields to lake sediments

**PRADHAN Satya Narayana**, Banaras Hindu University, India

#### Evaluation of the phytotoxic effect, through tests with *Lactuca sativa*, of soils contaminated with extra heavy crude treated with a biological coupling

**Ms RODRÍGUEZ URRUTIA Eliaira Andreina**, Dirección de Energía y Ambiente, Fundación Instituto de Estudios Avanzados (IDEA), Venezuela

#### Analysis of the source of wheat lead pollution and study on soil solidification and remediation technology

**Mr LIU Fuyong**, University of Camerino, Italy

#### Characteristics of the soil conditions of the southern part of the Odessa region

**Ms LIASHENKO Galina**, National Scientific Center "Tairov Institut of Viticulture and Winemaking", Ukraine

#### Aerial deposition of polyethylene microplastics affects tomato (*Solanum lycopersicum L.*) rhizosphere ecology

**Mr BOUAICHA Oussama**, Free University of Bozen-Bolzano, Italy

#### Spatial differentiation of soil micronutrients in eroded and Pb-contaminated agricultural landscapes in the Donetsk region: availability and potential toxicity

**Ms POGROMSKA Yana**, State Enterprise "DG "Donetske" National Scientific Center "Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky" (NSC ISSAR), Ukraine

#### Effects of biodegradable and un-biodegradable plastic mulches on soil abiotic characteristics and microbial populations involved in N cycle

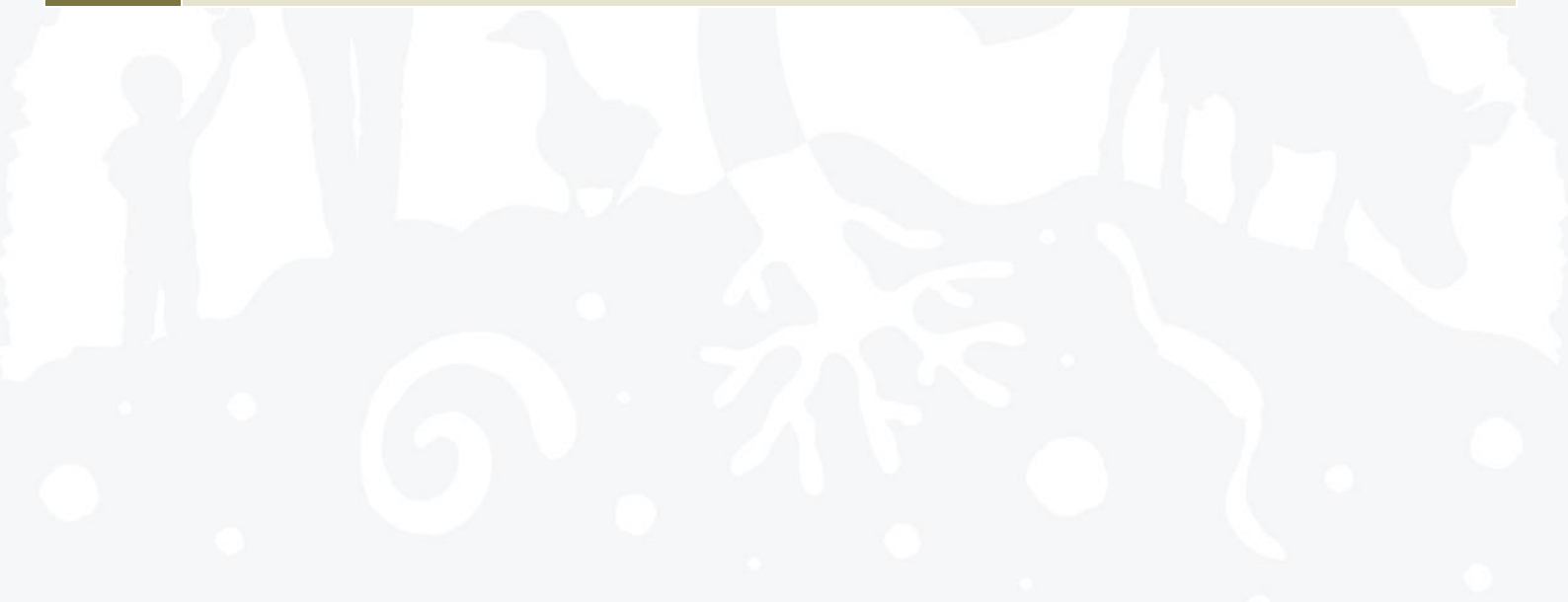
**Ms SANTINI Giorgia**, University of Federico II of Naples, Italy

#### Agroecological assessment of radiocesium contamination of seeds and sunflowers on irrigated lands of the Zaporozhye region

**Ms ZHYGAILO Olena**, Odessa State Environmental University, Ukraine

14.00

16.00



Thursday 28 July

13.00  
14:00

**PLENARY PANEL**

Sustainable Soil Management and Biofortification - Allies for Food Security

**Parallel session 5**

**Theme 4 - Governance of soil fertility/soil nutrients**

**Moderator: Mr Ranjan Bhattacharyya**, Indian Agricultural Research Institute (ICAR), India

**Manure management and soil biodiversity: Towards more sustainable food systems in the EU**

**Ms KOENINGER Julia**, European Commission Joint Research Centre, Italy

**Sustainable soil management for food security and better nutrition**

**Mr BABA Mutala**, CSIR - Soil Research Institute, Ghana

14.00  
15.20

**Effect of Government of Ghana fertilizer subsidy policy on major cereals yield**

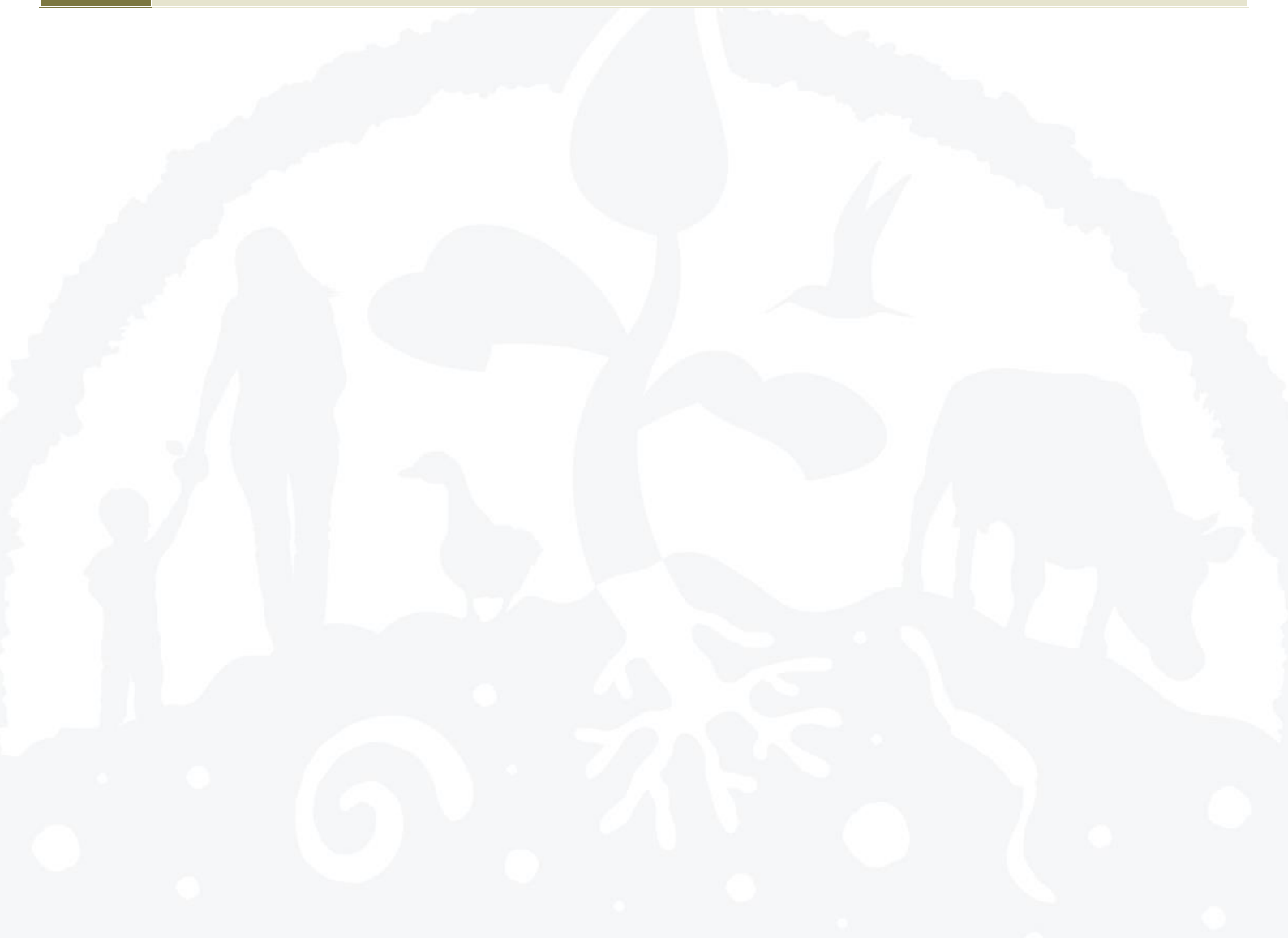
**Mr LABOAN Bright Mayinl**, CSIR - Soil Research Institute, Ghana

**Soil governance and integrated plant nutrient management for agricultural production & sustainable ecosystem in district Chakwal-Pakistan**

**Mr EHSAN Muhammad**, Soil and Water Testing Laboratory Chakwal, Pakistan

**Sustainable Soil Management technologies upscale through Research-Extension-Farmers-Input Linkage System; Implications for effective policy implementation in Nigeria**

**Ms ADEJUMO Adeola**, Obafemi Awolowo University, Ile- Ife, Nigeria



# Friday 29 July

## 13.00 PLENARY PANEL

14:00 Sustainable Soil Management and Biofortification - Allies for Food Security

## PLENARY PANEL - INTEGRATED SOIL FERTILITY MANAGEMENT: LOOKING AHEAD

**Moderator: Mr Ronald Vargas, Global Soil Partnership Secretary, FAO, Italy**

**Fifty years of Integrated Soil Fertility Management: what is next?**

**Mr Bernard Vanlauwe**, International Institute of Tropical Agriculture (IITA), Kenya

**The role of microbes to enhance soil fertility**

**Ms Mariangela Hungria da Cunha**, Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), Brazil

**Models and technological tools to improve fertilizer recommendations**

**Mr Jorge Delgado**, United States Department of Agriculture (USDA), United States of America

**Status and Challenges of Phosphorus Reserves for Agriculture: a matter of quantity and quality**

**Mr Gerald Steiner**, Global Phosphorus Institute (GPI), Austria

## MAIN SESSION OUTCOMES OF THE GSOIL4N

### Key findings and way forward

**Moderator: Ms Natalia Rodríguez Eugenio, FAO**

**Theme 1 - Status and trends of global soil nutrient budget**

**Ms SUVANNANG Nopmanee**, Ministry of Agriculture and Cooperatives, Thailand

**Theme 2 - Sustainable soil management for food security and better nutrition**

**Ms CUNHA DOS ANJOS Lúcia Helena**, Federal Rural University of Rio de Janeiro, Brazil

**Theme 3 - Impacts of soil nutrient management on the environment and climate change**

**Ms MUSCOLO Adele**, Mediterranean University of Reggio Calabria, Italy

**Theme 4 - Governance of soil fertility/soil nutrients**

**Mr NDZANA Georges Martial**, University of Dschang, Cameroon

### Closure of the Symposium

**Moderator: Ms Natalia Rodríguez Eugenio, FAO**

**Result of the GSOIL4N poster competition | Announcement of the photo contest's winners**

**Conclusions of the Symposium and the way forward**

**Mr Ronald Vargas, FAO**

**Closing remarks**

**Mr Lifeng Li, Director NSL, FAO**



# POSTER SESSION



## THEME 1 STATUS AND TRENDS OF GLOBAL SOIL NUTRIENT BUDGET

### Diverse crop rotations sustain soil management and food security in Kazakhstan

**Ms AKHMETOVA Aigul**, Barayev Research and Production Center of Grain Farming, Kazakhstan

### Soil fertility and suitability evaluation for barley cultivation using GIS (geographic information system) in an arid region in Syria

**Ms AL-HASN Rukea**, General Commission for Scientific Agricultural Research (GCSAR), Syria

### Profitability of Pure vs. Integrated Application of Organic and Inorganic N-Fertilizers under Rice-Wheat System

**Mr AMANULLAH Khan**, The University of Agriculture Peshawar, Pakistan

### Nutrient Management of Papaya (*Carica papaya* L.) for Enhanced Yield and Fruit Quality Under Kerala Situations

**Ms B. Bindu**, Kerala Agricultural University, India

### Nitrogen diagnosis in maize-forage grasses intercropping receiving nitrogen as side-dressing for production sustainability

**Ms BATISTA Karina**, SAA-SP - Instituto de Zootecnia, Brazil

### Soil organic carbon stock under land management practices in the landscapes of Ethiopian highlands

**Mr BAZIE Zerfu**, Amhara Region Agricultural Research Institute, Ethiopia

### Improving the soil fertility and crop productivity of intensive rice-wheat systems by crop residue recycling via integrating in nutrient management

**Mr BHARDWAJ Ajay**, ICAR - Central Soil Salinity Research Institute, India

### Innovating Organic Fenugreek (*Trigonella foenum-graecum*) Cultivation Using a Unique Locally Produced Liquid Biofertilizer

**Ms BUREZQ Hana'a A.**, Kuwait Institute for Scientific Research, Kuwait

### Native AMF communities in hop cultivation with bokashi type fertilization in Brazil

**Ms CAMPOS DE ALMEIDA Anastácia Perci**, Federal Rural University of Rio de Janeiro, Brazil

**Native arbuscular mycorrhizal fungi of salt affected soils: an alternative for enhancing P-nutrition and salt stress tolerance in crops**

*Ms CHANDRA Priyanka, ICAR-Central Soil Salinity Research Institute, India*

**ABRIOPACK Project: preliminary data on the effect of the use of compost added with compostable plastics on crop health and possible interactions with the rhizosphere communities**

*Ms COLETTA Martina, University of Camerino, Italy*

**Increasing cassava yield and quality on acid tropical soils**

*Ms DE SOUZA Gabrielle, The University of the West Indies, Trinidad and Tobago*

**Sustainable Plant nutrient management strategies for food and nutritional security – Current approaches and future strategies**

*Mr DEY P., ICAR - Indian Institute of Soil Science, India*

**Understanding the adoption of Zero Budget Natural Farming in Andhra Pradesh, India**

*Ms DUDDIGAN Sarah, University of Reading, United Kingdom*

**The effect of fallow technology on soil fertility of Kastanozem of cropland in Mongolia**

*Ms DUGAR Ariuntsetseg, Mongolian University of Life Science, Mongolia*

**Effects of poultry droppings and NPK on the growth and yield of carrot- *Daucus carota L.***

*Mr EREMRENA Peter Ovie, University of Port Harcourt, Nigeria*

**The potential of cereal- legume intercropping in lowering the carbon footprints of agriculture**

*Ms ESNARRIAGA Dayana Naimid, Universidad Nacional de Catamarca, Argentina*

**Effect of different organic nutrient solutions on the growth and yield of Blackgram**

*Mr EZHUMALAI Balaji, Annamalai University, India*

**Soil salinity management in coastal smallholder vegetable production in Mozambique – the role of synthetic and organic fertilizers and manures**

*Mr FAMBA Sebastião, University Eduardo Mondlane, Mozambique*

**Durum wheat response to no-tillage and nitrogen fertilization in dry area of Morocco.**

*Ms HASSNAE Maher, FSR-INRA-ICARDA, Morocco*

**Factors in the formation of paddy soil bacterial communities**

*Mr IGARASHI Hajime, Niigata University, Japan*

**Effects of different Organic Mulching on soil moisture retention and crop productivity increase of maize farming system under degraded soils of Northern Tanzania**

*Mr JUSTINE Michael, Tanzania Agricultural Research Institute, Tanzania*

**Enhanced yield and quality in chilli with calcium, magnesium and boron nutrition**

*Ms K. Anjitha, Kerala Agriculture University, India*

**Contribution to soil fertility management for improved climate resilience in Senegal: case of the avenir project**

*Mr KANE Babacar, Alliance of Bioversity International and CIAT, Senegal*

**Current state and perspective of effective use of soils of Zaporizhzhya region**

*Ms KOLOSOVSKA Valeriya, Odessa State Environmental University, Ukraine*

**Assessment of the diversity of cultivated microorganisms in samples of soils and plants of the Aral Sea region in the autumn-winter period**

*Ms KONDRASHEVA Kseniya, Institute of Microbiology of the AS RUZ, Uzbekistan*

**Synergistic interaction of thermochemical organic fertiliser and *Piriformospora indica* in growth promotion parameters of tomato**

*Ms M.K. Krishnapriya, Kerala Agricultural University, India*

**Rice - pasture rotation as sustainable cropping management in Entre Rios, Argentina.**

*Ms MAGUIRE Vanina G., INTECH (UNSAM-CONICET), Argentina*

**Nutrient management and crop paddy to improve productivity and income from salt-affected coastal soils: From a fallow establishment methods in land to a bountiful harvest**

*Ms MAHAJAN Gopal Ramdas, ICAR - Central Coastal Agricultural Research Institute, India*

**Potential alteration of soil extracellular enzyme activity and earthworm ingestion under different toxicity of microplastics and heavy metal mixture in soils**

*MAI Huong, University of Science and Technology of Hanoi, Vietnam*

**Selection of PGPR bacteria to improve and increase bean productivity**

*Ms MAOUGAL Rim Tinhinen, Université des Frères Mentouri Constanine 1 - INATAA , Algeria*

**Effect of different land-use management on soil organic matter content**

*Ms MASOUDI Malihe, Institute of Wildlife Management and Nature Conservation, the Hungarian University of Agricultural and Life Sciences, Hungary*

**Bacterial metabolites as a component of the biofertilizers dedicated to the improvement of the biological and chemical quality of the soil**

*Mr MUSIALOWSKI Marcin, University of Warsaw, Poland*

**Effect of long-term nutrient management practices on soil health and paddy yield of rice-rice-fallow cropping system in tropic humid climate**

*Ms NAHER Umme Aminun Naher, Bangladesh Rice Research Institute, Bangladesh*



**Results from two national field experiment networks with maize and wheat: effects of enhanced efficiency nitrogen fertilizers on crop yields, greenhouse gas emissions, and soil organic carbon sequestration.**

**Mr PERALTA E. Guillermo**, Carbon Group Agroclimatic Solutions SRL

**Hidden nutrient leaks in agricultural soils**

**Ms PORTOCARRERO Rocio**, Instituto Nacional de Tecnología Agropecuaria, Argentina

**Initial changes in microbial biomass, functional diversity and soil organic matter mineralisation after showing maize in an old meadow field**

**Ms PRIETO-FERNÁNDEZ Ángeles**, MBG sede Santiago-CSIC, Spain

**Assessing phosphorus availability for plants in Malagasy soils**

**Ms RAHANTALALAO Ravaka**, University of Antananarivo, Madagascar

**Use of citrus pruning waste and plant covers as a source of organic matter in soils**

**Mr ROS LIS Jose Vicente**, Universitat de València, Spain

**Bio-based fertilizers: some case studies**

**Ms ROSSI Gabriella**, CREA-AA - Consiglio per la Ricerca in Agricoltura e l'analisi dell'Economia Agraria - Centro di Ricerca Agricoltura e Ambiente, Italy

**Interactive effect of tillage and potassium: A stress mitigating strategic approach improving yield, physiology and biochemical activities of lentil in rice-fallows of eastern India**

**Ms SAHA Madhumonti**, ICAR-Indian Institute of Soil Science, India

**Exploring thermophilic bacteria isolated from Anhoni Hotsprings of central India for plant growth-promoting potential on pigeon pea (*Cajanus cajan*)**

**Ms SAHU Asha**, ICAR-Indian Institute of Soil Science, India

**State of the art on biological nitrogen fixation of leguminous crops in Argentina**

**Mr SALVAGIOTTI Fernando**, EEA INTA Oliveros - CONICET, Argentina

**Microbial source shapes the community of endophytic bacteria in rice roots**

**Mr SAMUEL OLORUNTOBA Solomon**, Niigata University, Japan

**Available phosphorus in soils of conventional and agroecological orchards of Chaco (Argentina)**

**Ms SCHAHOVSKOY Nara**, INTA CONICET, Argentina

**Impact of mulching on soil health and productivity of Peach (*Prunus persica* L. Batsch)**

**Ms SHARMA Radhika**, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, India

**The potential of silicon, Trichoderma, and organic matter to promote the growth of forage sorghum under saline stress**

**Mr SILVA José Orlando Nunes da**, Federal Rural University of Pernambuco, Brazil

**Long-term irrigation with alkali and partially neutralized water changes soil nutrient availability, carbon fractions and microbial activities in sandy loam soils**

*Mr SINGH Awtar, ICAR-Central Soil Salinity Research Institute, India*

**Phosphorus and sulfur role in potato (*Solanum tuberosum*) nutrition on brown hill soil of Shimla, India**

*Ms SINGH Preeti, ICAR-Indian Agricultural Research Institute, India*

**Improve soil fertility through circular use of agricultural plant waste: new mulching techniques**

*Ms SOCCIARELLI Silvia, Consiglio per la Ricerca in Agricoltura e l'analisi dell'Economia Agraria - Centro di Ricerca Agricoltura e Ambiente (CREA-AA), Italy*

**Effect of simulated soil salinity conditions and varieties of pigeon pea (*Cajanus cajan* L.) on growth, yield and yield attributes**

*Ms SONI Gaytri, Junagadh Agricultural University, India*

**Rhizosphere microbiome community diversity of *Coffea arabica* implanted in the Gorongosa National Park (Mozambique) across different agroforestry systems**

*Ms TAPAÇA Inocência, Instituto Superior de Agronomia, Portugal*

**Symbiotic Properties of Soybean Rhizobia Isolated from Soils of the Nigerian Sudan Savanna**

*Mr UZOMA Anthony Ozoemenam, Federal University of Technology, Nigeria*

**Contributions of chiseling and winter cover crops on soil fertility and biomass yield in maize for silage production**

*Ms VALLE Thamires, Federal University of Rio Grande do Sul, Brazil*

**Phoretic mites as microclimate originators in special ephemeral soil habitats and as presumed co-creators of nutrient-rich soil areas using examples of Histiostomatidae (Acariformes, Astigmata)**

*Mr WIRTH Dr. Stefan Friedrich, Germany*



## **THEME 2** SUSTAINABLE SOIL MANAGEMENT FOR FOOD SECURITY AND BETTER NUTRITION

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**Manganese management in different soils in relation to its availability to manganese efficient and inefficient wheat genotypes**

*Mr BARMAN Arijit, ICAR-Central Soil Salinity Research Institute, India*

**Sustainable Soil Management for Nutrition-sensitive Agriculture in Bangladesh**

*Mr BISWAS Parimal, FAO, Bangladesh*

## Sustainable soil management and biodiversity friendly practices in protected areas: The Sentina Natural Regional Reserve case study

**Ms COLETTA Martina**, *University of Camerino, Italy*

## The issue of soil pollution solved using organic farming #03: Tried out research on soils for nutrition

**Mr CHONGSERMSIRISAKUL Pathawit**, *Chulalongkorn University, Thailand*

## Influence of mobile iron forms on the fertility of meadow alluvial soil

**Mr KAZIUTA Oleksandr**, *State Biotechnological University, Ukraine*

## Effect of zinc and iron biofortification on profitability and productivity of chickpea (*Cicer arietinum* L.) varieties

**Ms KHARRA Rekha**, *Maharana Pratap University of Agriculture & Technology, India*

## On multinutrient deficiencies in rainfed agroecosystem – A case study from India

**Ms MANICKAM Lalitha**, *ICAR-National Bureau of Soil Survey & Land Use Planning, India*

## Biofortification of romaine lettuce (*lactuca sativa* L.) on soils treated with zeolite chabazite and magnesium sulphate for better nutrition and sustainability

**Ms SOCCIARELLI Silvia**, *Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria - Centro di ricerca Agricoltura e Ambiente (CREA-AA), Italy*

## Nutritional evaluation of coffee soils in the North Siera of Puebla, Mexico

**Mr TAMARIZ FLORES José Víctor R.**, *Benemérita Universidad Autónoma de Puebla, Mexico*



## THEME 3 IMPACTS OF SOIL NUTRIENT MANAGEMENT ON THE ENVIRONMENT AND CLIMATE CHANGE

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### Assessment of heavy metal contamination in soils from selected agricultural areas in tropical Southwest India

**Ms BALAKRISHNAN Shruthi**, *Manipal Academy of Higher Education, India*

### Potential of lignocellulolytic microbial consortia in achieving in-situ crop residue decomposition to abate residue burning

**Ms BHATTACHARJYA Sudeshna**, *ICAR-Indian Institute of Soil Science, India*

### Dynamics of soil nitrates in a plot under onion cultivation in the Saiss Basin

**Ms CHAIMAE Nessah**, *National Institute for Agricultural Research (INRA), Morocco*

### Suitability of plant growth-promoting bacteria to decrease nitrous oxide emissions: a case study in sugarcane

**Mr CHALCO-VERA Jorge**, *Instituto Nacional de Tecnología Agropecuaria, Argentina*

**Available Cd mitigation through elevation of soil base saturation using lime and gypsum**

**Mr GALO LOZANO Carlos Hernan**, *Universidade Federal do Ceará, Brazil*

**The influence of climate change on the functioning of soil microbiocenosis**

**Ms GUMENIUK Iryna**, *Institute of Agroecology, Ukraine*

**Nitrogen release mechanisms of lignite-based nitrogen fertilizer in calcareous soils**

**Mr HUSSAIN Qaiser**, *Institute of Soil and Environmental Sciences, PMAS-Arid Agriculture University, Pakistan*

**Study of municipal solid waste as a resource of organic fertilizers**

**Mr PARDAEV Sindor**, *Samarkand State University, Uzbekistan*

**Bovine manure mineralization and organic matter quality on ultra high density grazing (puad) in the Colombian tropic**

**Ms RODRIGUEZ TORRES Eliana**, *Universidad de Caldas, Colombia*

**Effect of a biological system on the management of soils contaminated with extra heavy crude oil**

**Ms ROSAS Jesmary**, *Dirección Energía y Ambiente Fundación Instituto de Estudios Avanzados (IDEA), Venezuela*

**Linking straw use, carbon balance, greenhouse gas emissions, and crop growth for a sustainable sugarcane production**

**Mr VALENCIA-MOLINA Manuel Camilo**, *Universidad de Los Llanos, Colombia*

**Kuyka: an urban vermiculture experience from Cuenca-Ecuador**

**Ms VIVAR Verónica**, *Universidad Católica de Cuenca, Ecuador*



## **THEME 4** GOVERNANCE OF SOIL FERTILITY/ SOIL NUTRIENTS

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**Governance of soil fertility for adaptation to climate change in Ukraine**

**Ms HETMANENKO Viktoriia**, *NSC "Institute for Soil Science and Agrochemistry Research named after Sokolovsky", Ukraine*

**Governance of nutrient management in Bulgaria to reduce the risk of soil and water pollution**

**Mr HRISTOV Biser**, *University of Forestry, Bulgaria*

**How to improve the uptake of sustainable nutrient management practices in Catalonia?**

**Ms PECURUL BOTINES Mireia**, *Science for Forest Management, Biodiversity & Bioeconomy, Spain*

**Peculiarities of cation exchange capacity of agricultural soils of Kakheti region (Georgia)**

**Ms URUSHADZE Teo**, *Agricultural University of Georgia, Georgia*



The Global Soil Partnership (GSP) is a globally recognized mechanism established in 2012. Our mission is to position soils in the Global Agenda through collective action. Our key objectives are to promote Sustainable Soil Management (SSM) and improve soil governance to guarantee healthy and productive soils, and support the provision of essential ecosystem services towards food security and improved nutrition, climate change adaptation and mitigation, and sustainable development.



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