



# Key findings and way forward

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

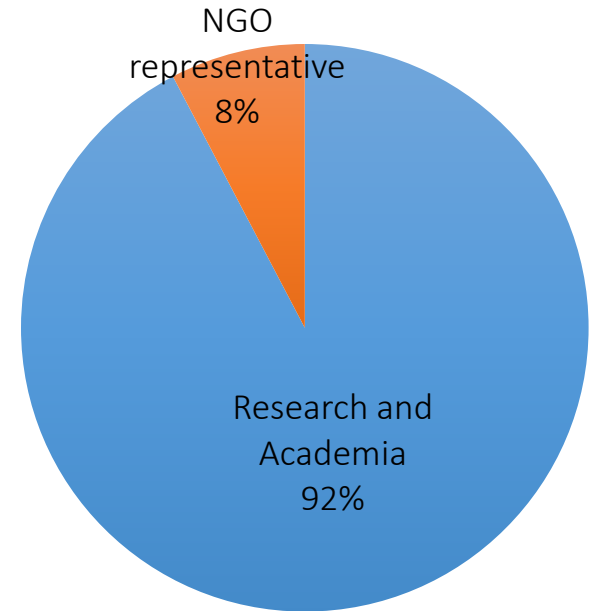
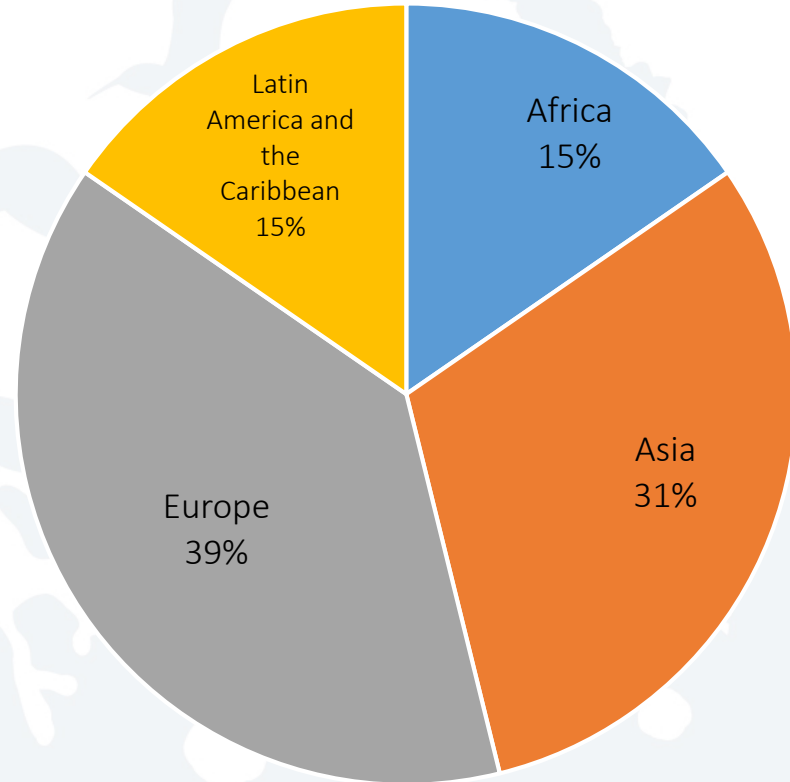
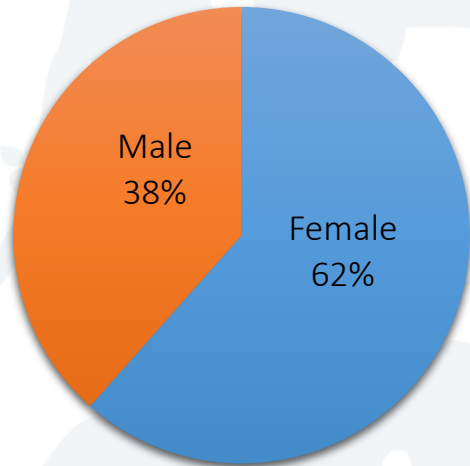


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## Theme 2: gender, regional, and stakeholder balance



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

- Healthy and nutritious food starts with healthy soils. They are key in the implementation of nutrition sensitive approaches, contributing to improve health outcomes, with production of diverse, safe, and nutrient-rich food.
- Natural soil fertility and natural nutrient cycles can be improved and maintained through soil conservation practices, integrated agricultural systems, nature-based solutions, the rescue of traditional knowledge, and innovative approaches.

The **topics to be addressed** under theme 2 were:

- Nutrition sensitive agriculture
- Innovations on sustainable soil management and soil fertility
- Soil micronutrients and human health
- The role of fertilizers on cost-effective crop production and nutrition.
- Fertilizers use efficiency and innovations on the production of fertilizers (mineral and bio-products)
- State of the art on biological nitrogen fixation

95 % of our food comes from soils



99 % of calories and 93 % of protein come from plants and animals ... that all depend - directly or indirectly - on soils!

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

## July 27 - Soil micronutrients and human health

### - Innovations on sustainable soil management and soil fertility

- Linking adsorption-desorption characteristics with grain **Zn concentrations** and uptake by teff, wheat, and maize in different landscape positions **in Ethiopia**
- Novel fertilizer strategy to **biofortify zinc** concentration in wheat grains
- Soil factors influence the geospatial variation in **zinc nutritional quality of maize in Malawi**
- Where do we need to apply **Zn fertilizers in sub-Saharan Africa?**
- **Foliar zinc** fertilization in soybean
- **Biofortification of rice with iron and Zinc** using indigenous micronutrient mobilizing beneficial **rhizobacteria**
- Can **cobalt-ferrite nanoparticles** be an alternative fertilizer for the agronomic **iron fortification of wheat?**
- **Biofortified maize in Zimbabwe**: nutritional quality depending on field position and crop management
- **Selenium biofortification** of staple crop to fight hidden hunger in **Malawi**
- **Micronutrient** deficiency assessment in rural **Zimbabwe**: Translating Geonutrition (ZimGRTA) study

### Highlights

- Large **variation of results** in terms of nutrients deficiency or crop yields; correlated with soil properties (clay content and SOC), field position and crop management;
- Innovative approach's integrating **nutrient management, rhizobacteria** and biofortification of rice;
- **Biofortification** as a strategy to increase Zn, Fe, and Se;
- **Nanoparticles** of citrate cobalt ferrite can be effective for Fe fortification; and
- **Farmer scale** comparison of micronutrient deficiency.

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

## July 28 - Soil micronutrients and human health

- Innovations on sustainable soil management and soil fertility
- Fertilizers use efficiency ...

- Soil-based **biofortification** to alleviate selenium deficiency - **An isotopic study** to investigate **sulphur and selenium competition for ryegrass uptake**
- Evidence of micronutrient fertilizer effect on **agronomic fortified tef** under different landscape positions in **Amhara** region
- **Micronutrient constraints** in **sodic soils** of Israna, Haryana (India)
- **Si bioavailability** and fate of the applied **phytogenic silica** in a soil plant system in acidic, neutral and alkaline soils

### Highlights

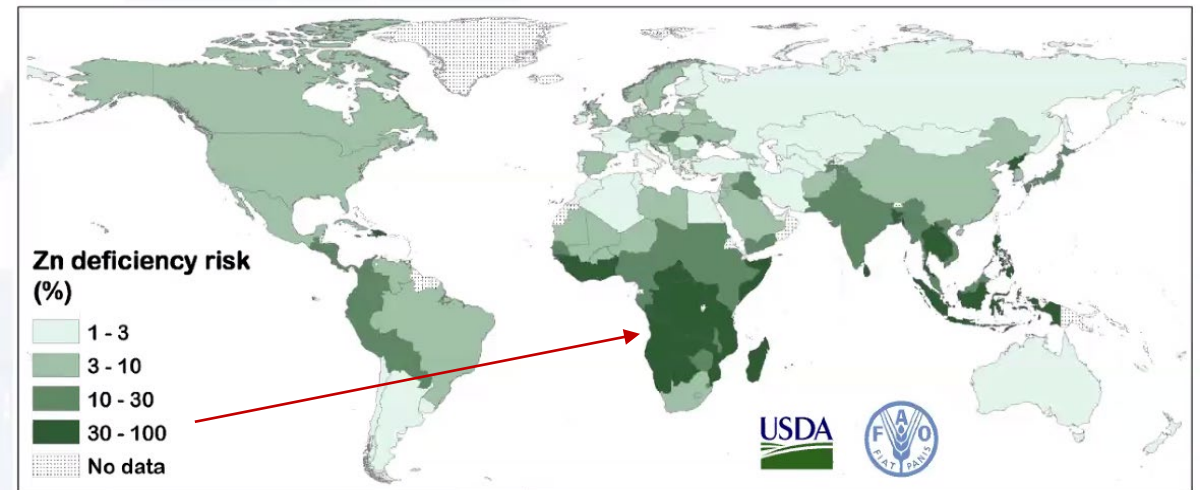
- **Selenium** deficiency is governed by **sulphur** availability;
- **Plant physiological** and **soil chemical and biological processes** affect **Se fertilizer efficiency**;
- **Agronomic biofortification** influenced by **micronutrient** and **N** fertilization of **tef**, and method of application;
- **Micronutrients imbalances** in **sodic soils**, strong **influence of pH and EC**, where Mo and B were found in the **toxic** range;
- Effect of **different phytogenic sources of Si** and application of biochar to increase solubility of phytoliths and release plant-available Si.

## Theme 2: Sustainable soil management (SSM) for food security and better nutrition

- **Expected Outcome:** Improved understanding of how the adoption of sustainable soil management can produce nutritious food to fight malnutrition and contribute to human well being;

- **Zn and Selenium** as the main micronutrients required in the soils to provide healthy food; Zn and Covid-19 after effects;
- **Agronomic Biofortification**, nutrient enhancement of staple food;
- Importance of **on farm studies**, and more research with **underutilized and neglected crops**;
- **Reinforcement of the relationship between micronutrients levels in the soils, nutritious crops, and human health.**

Zinc (Zn) deficiency risks (2015)



SCIENTIFIC REPORTS

OPEN Dietary calcium and zinc deficiency risks are decreasing but remain prevalent

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Mr Martin Broadley

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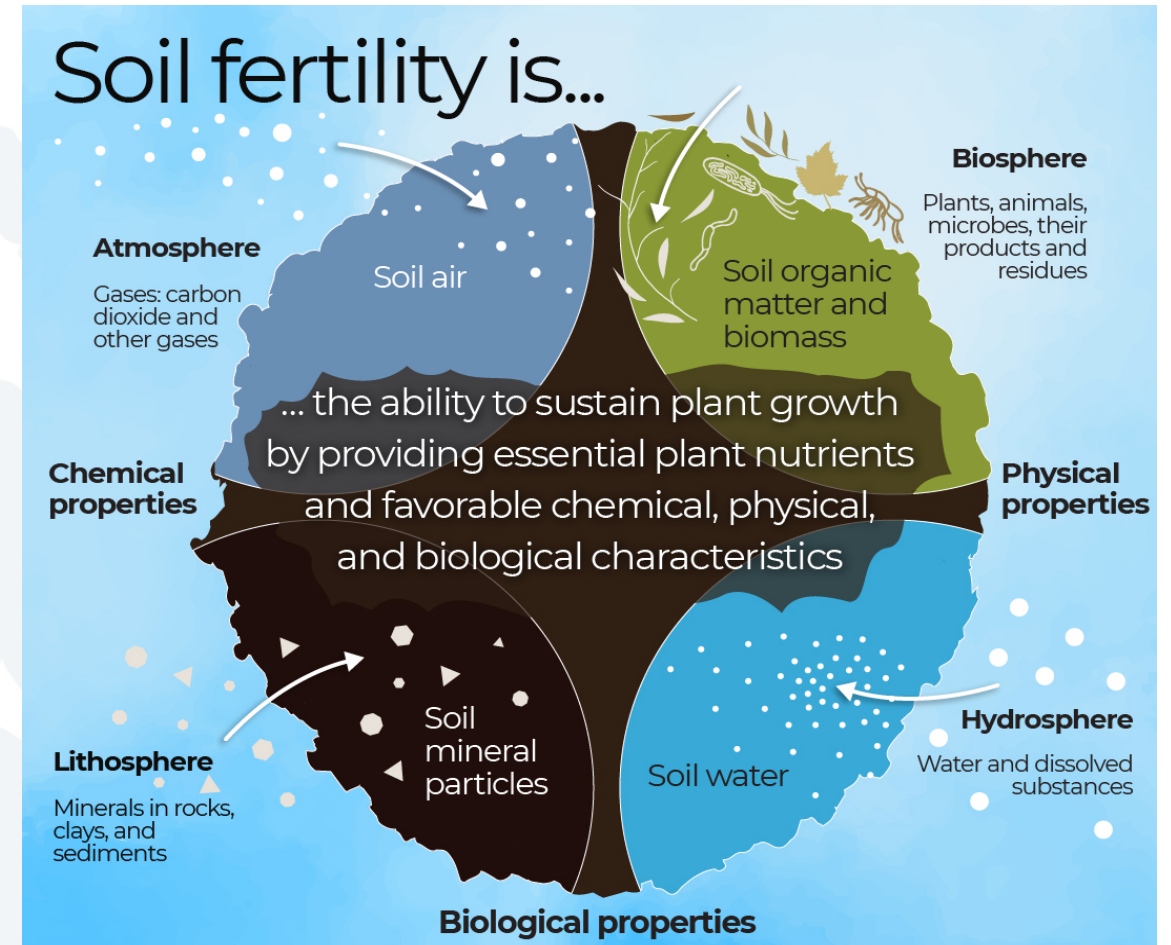


## Theme 2: Sustainable soil management (SSM) for food security and better nutrition

- **Expected Outcome:** **Knowledge gaps** identified on how soil fertility supports better production, better nutrition, a better environment, and a better life;

### To complete the gaps:

- **Interdisciplinary research;**
- **Strengthening networks;**
- **Increasing collaborative studies.**



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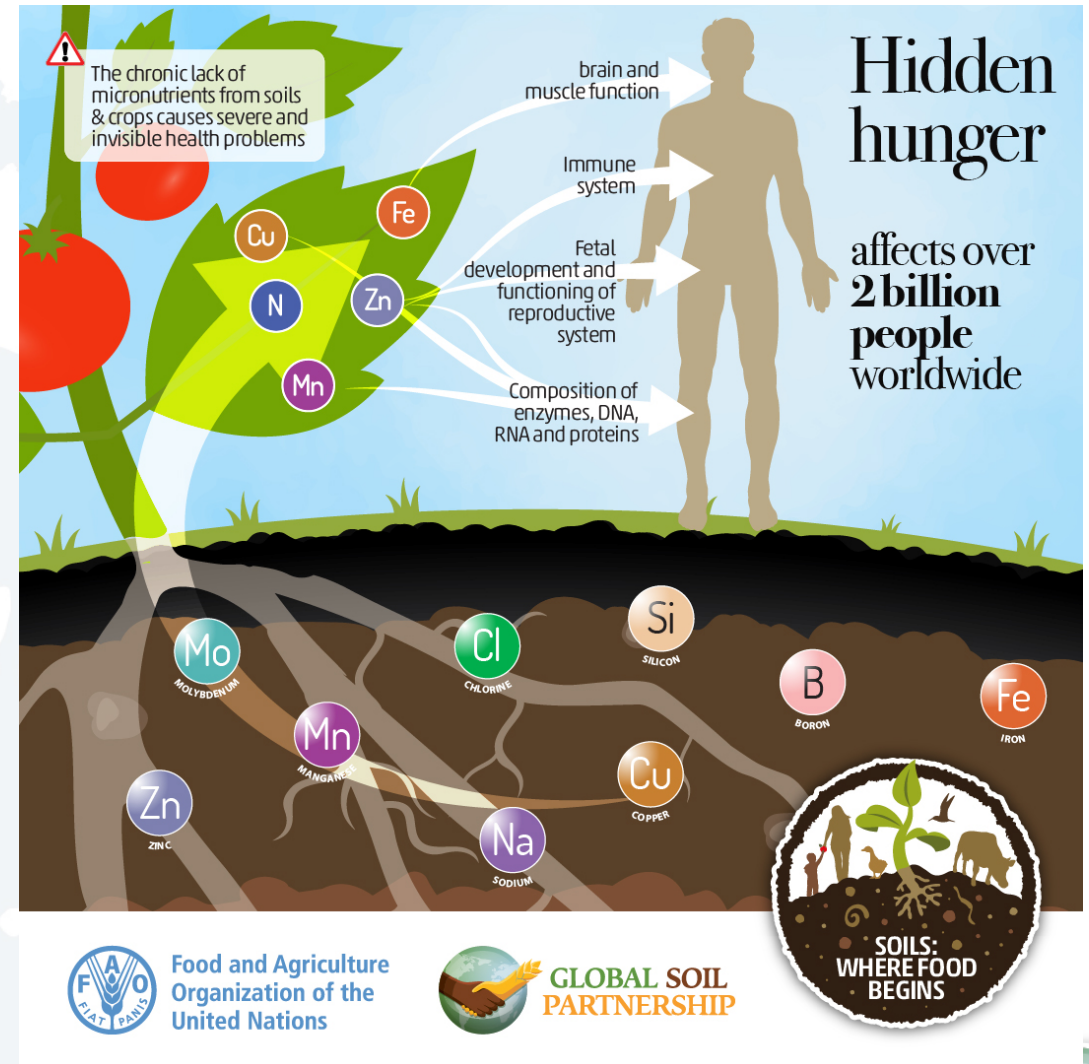
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## Theme 2: Sustainable soil management (SSM) for food security and better nutrition

- **Expected Outcome:** The **gaps** in the **implementation** of tools for guiding the sustainable use and management of fertilizers is identified.

- ✓ To recognize the problem of **Hidden hunger**;
- ✓ To **disseminate information** on how to enhance soil health, the foundation of healthy food and a better environment;
- ✓ To **involve all partners**, farmers, NGOs, companies and governments.



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Thank you !

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