Soil mapping for resilient agrifood systems

In Central America and sub-Saharan Africa, the Soil Mapping for Resilient Agrifood Systems (SoilFER) project stands out as a unique framework aimed at unearthing valuable information from soils to guide policymaking and fertilizer recommendations both at national and field scale.

This project directly addresses the fertilizer crisis driven by supply-chain shocks and current conflicts. This crisis is set to persist, affecting global agricultural production and food security, particularly in regions heavily dependent on imported inputs, such as Africa. Faced with the challenges posed by climate change, soil degradation and the misuse of inputs, SoilFER uses a holistic approach, from soil sampling in the field to advanced laboratory analysis and comprehensive soil information systems and decision support tools, including tailored fertilizer recommendations. To ensure the accuracy and effectiveness of these recommendations, field trials will be established to validate the proposed fertilizer strategies.

The project’s emphasis on strengthening capacities as well as empowering stakeholders with full ownership and control over the data and tools underscore its long-term ambition to sustainably equip both participating governmental institutions and farmers. By providing farmers with digital solutions based on the variability of soils, SoilFER promotes the efficient use of fertilizers, sustainable farming practices and the selection of major and opportunity crops as part of VACS*, positively impacting soil health, agricultural livelihoods and enhancing the resilience of agrifood systems in the five beneficiary countries.

* The Vision for Adapted Crops and Soils (VACS): https://www.state.gov/the-vision-for-adapted-crops-and-soils/
From the ground up
the SoilFER process

**Soil sampling**

- Field trials
  - Validation of fertilizer recommendations

**Soil data management**

- National Soil Information System
- Laboratory Information Management System (LIMS)

**Soil Laboratories**

- Decision support tools
  - Fertilizer management, Major and opportunity crops, Sustainable Soil Management
  - Fertilizer testing, Wet and dry chemistry

**Field data collection tool**

Field data, Major and opportunity crops, Sustainable Soil Management

From the ground up
the SoilFER process
National governments are provided with robust, rigorous, and responsive framework for integrated soil nutrient management at local, subnational, and national scales.

National high resolution digital soil maps (soil nutrient, nutrient budget, soil property maps, soil threats, crop suitability map) and Integrated National Soil Information Systems

Capacity Development Programme for governmental staff (soil data management, digital soil mapping, soil organic carbon sequestration modelling, training sessions on using NSIS & FERSIS applications)

Farmers are empowered with web-based applications, high-resolution nutrient maps and enhanced capacity on sustainable soil management.

Global Soil Doctors Programme a farmer-to-farmer training initiative

One tool for all farming needs (fertilizer recommendations, fertilizer prescription maps, real-time vegetation index, access to field data, crop suitability, weather conditions)

Communication, awareness raising and advice services on sustainable soil management practices

Laboratories are strengthened by the implementation of Laboratory Information Management Systems, the modernization of their facilities, and staff capacities development through training.

Laboratory Information Management System (Central sample and analysis management and stock management; chemicals & supplies)

Modernization of national laboratories & capacity development (training on wet & dry chemistry, safety, procurement, QA/QC; provision of equipment for soil and fertilizer analysis and spectral and calibration libraries/services)

Connecting and fostering collaboration between three core stakeholders
A four-year project with multiple objectives:

**Short term**: Provide farmers with tools and resources to facilitate data-driven decision-making at the farm level.

**Medium term**: Advocate for sustainable management practices to enable farmers in preserving and enhancing soil health and fertility through sustainable soil management.

**Long term** (beyond the project lifetime): Cultivate a sense of ownership and self-sustainability among governments and local stakeholders. The ultimate aim is to establish sustainable soil-crop systems that benefit governments, farmers, and their communities.

---

**Expected results**

1. **Improved understanding, databases and maps of soil resources at national and field scale**
2. **Digital tools and solutions for improved natural resource and fertilizer management**
3. **Governmental institutions are strengthened and empowered in state-of-the-art soil analysis and data management**
4. **Farmer capacities are raised for improved fertilizer use, crop selection and sustainable soil management**

Some rights reserved. This work is available under a CC BY-NC-SA 3.0 IGO licence.