Food and Agriculture Organization of the United Nations

SoilFER
Soil mapping for resilient agrifood systems

Information from the soil up: The SoilFER project

GSID24

Isabel Luotto

Soil Mapping for resilient agri-food systems in Central America and sub-Saharan Africa (SoilFER)

- Is an integrated, data-driven framework consisting of two projects funded by **the US Department of State** and the **Japanese government (MoFA),** involving seven countries.
- It is a comprehensive framework aimed at increasing the resilience of agri-food systems by providing data-driven answers to:
  - Where to plant
  - What to plant
  - Which management system to adopt
  - How to apply

SoilFER

The US, Department of State

May 2023 – May 2027

Global + 5 Countries

Guatemala

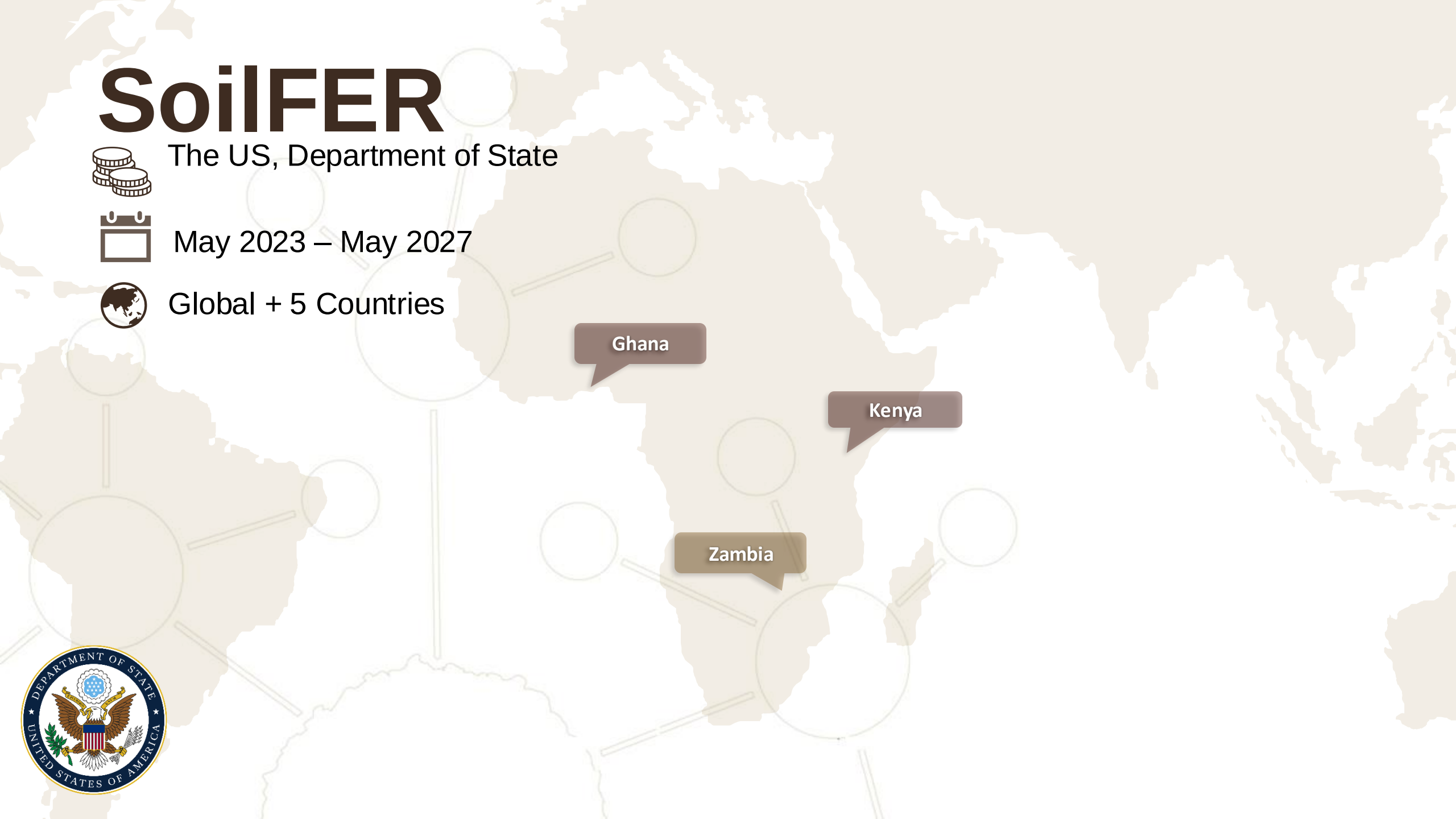
Honduras

SoilFER

The US, Department of State

May 2023 – May 2027

Global + 5 Countries



SoilFER

The US, Department of State

May 2023 – May 2027

Global + 5 Countries

The Project is Amended

- + VACS Components
- + Kenya and Ghana
- + 4 new activities
- Global Crop Decision Support Platform
- Land Use Planning at Farm Level
- Strengthening Institutional Framework
- Crop Models

SoilFER-JPN

Japan, MOFA

May 2024

Global + 2 Countries

Tunisia

Mozambique

外務省
Ministry of Foreign Affairs
of JAPAN

SoilFER-JPN

Japan, MOFA

May 2024

Global + 2 Countries

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Soil, Land and Crops

- Enhancing Integrated Soil-Crop Management for Sustainable Food Systems in Africa
- Operational - May

外務省
Ministry of Foreign Affairs of JAPAN

The Vision for Adapted Crops and Soils (VACS)

Dr Carry Fowler - SPECIAL ENVOY FOR GLOBAL FOOD SECURITY

- launched in February 2023 in partnership with **the African Union and the FAO**.
- To advance VACS objectives, The US DoS since directed **$100M towards crop and soil activities**

1

DATA

- Soil Sampling Campaign
- Harmonization and Collection of Legacy Data
- Soil Analysis (Soil labs)
- National Soil Analytical Databases
- National Spectral Libraries
- National Soil Information Systems (NSIS)
- Laboratory Information Management Systems (LIMS)

2

INFORMATION + KNOWLEDGE

- National Nutrient and Nutrient Budget Maps
- National Soil Property Maps
- Crop Suitability Maps
- Fully Integrated National Soil Information System (NSIS)
- Soil Monitoring System for select
- Decision Support Tools (DST) and System (DSS) – fertilizer, crop, management

3

ACTION

- Fertilizer Decision Support for farmers and governments
- Decision Support for Crop Suitability including *Opportunity Crops**
- Capacity Development and Outreach Programme
- Socioeconomic, financial and cost-benefit analysis for Fertilizers and SSM

SoilFER National Components

* The Vision for Adapted Crops and Soils (VACS)

Fertilizer management,
Major and opportunity crops,
Sustainable Soil Management

Validation of fertilizer recommendations

Field trials

Decision support tools

National Soil Information System

Laboratory Information Management System (LIMS)

Soil data management

Fertilizer testing,
Wet and dry chemistry

Soil Laboratories

Soil sampling

Field data collection tool

Connecting and fostering collaboration between three core stakeholders

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)

National governments

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

Farmers

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

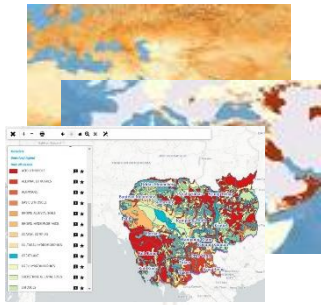
Laboratories

SoilFER is …

- **Multiscale** (Global, National, Local)
- **Multistakeholder**
- **Integrated** (Soil, Land, Water)
- **Complete** And **Data Driven** Soil Health Framework
- **VACS-ready**
- Fully compliant with the principles and goals outlined in the **Nairobi Declaration**

Beneficiaries (Governments)

National High Resolution Digital Soil Maps



- Soil Nutrient, Nutrient Budget Maps (Time Series)
- Soil Property Maps
- Soil Threats
- Crop Suitability Map

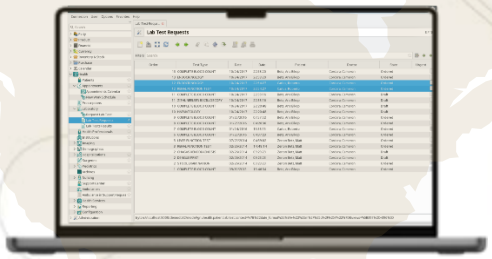
Integrated National Soil Information Systems (NSIS)

- Connected with LabSIS
- Monitoring System
- Spectral Services (Libraries and Calibration Services)
- National Level Decision Support Systems (NDSS)

Capacity Development Programme – Government Staff

- Soil Data Management
- Digital Soil Mapping
- Soil Organic Carbon Sequestration Modeling
- Trainings on using NSIS & FerSIS Applications

Beneficiaries (Laboratories)



(LIMS) Laboratory Information Management System

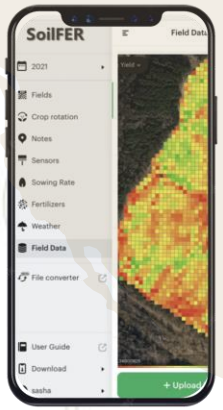
- Central Sample and Analysis Management
- Built-in QA/QC, Data Validation Tools
- Connected to the NSIS & Internet
- Stock Management (Chemicals & Supplies)

Modernization of the National Laboratories & Capacity Development

- Trainings (Wet & Dry Chemistry, Safety, Procurement, QA/QC)
- Fully equipped for all soil and fertilizer analysis
- Increased technical & technological capacities
- Spectral Libraries and Calibration services

Beneficiaries (Farmers)

One Tool for all Farming Needs



For instance:

- Fertilizer Recommendations
- Fertilizer Prescription Maps (Variable Fertilizer Application)
- Realtime Vegetation Index
- Access to Field Data
- Crop Suitability
- Weather Conditions
- Extreme Weather Events

Soil Doctors Programme

- Peer-to-Peer Training
- Improve the capacity of farmers on sustainable soil management while supporting national governments and stakeholders in addressing the needs of their rural communities.

Communication and Awareness raising

- Podcasts for Farmers in Local Languages
- Radio Programmes
- Webinars and Seminars
- Trainings (Agro-Dealers)

Advice Services

- Amendment
- Sustainable Soil Management Practices
- Mitigation of Soil Threats

SoilFER is …

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- **VACS-ready**
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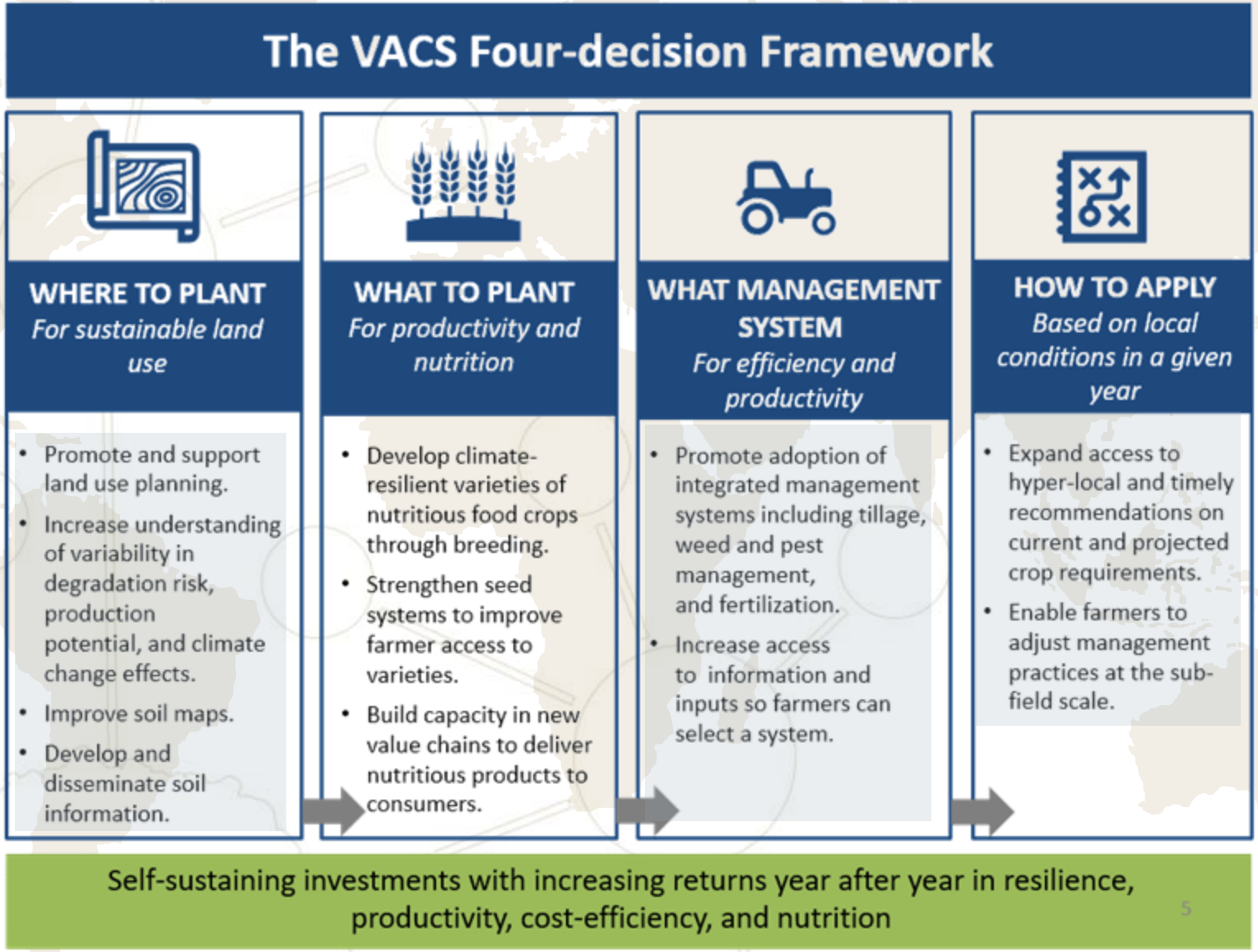
The Vision for Adapted Crops and Soils (VACS)



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Nairobi Declaration

- Tripling Fertilizer Production and Distribution
- Enhancing Soil Health ✓
- Improving Capacity and Knowledge ✓
- Creating Enabling Environments ✓
- Financing and Investment ✓
- Monitoring and Reporting ✓
- Supporting Smallholder Farmers ✓
- Engagement with Private Sector ✓
- Support from Development Partners ✓

Data Driven

The SoilFER proposes a holistic approach that addresses the need for short, medium, and long-term solutions

Short Term

The SoilFER aims **to equip farmers and the government with tools and resources for making data-driven decisions at the farm level.**

Medium Term

The SoilFER focuses on promoting sustainable management practices to help farmers maintain and **improve soil health and fertility through Sustainable Soil Management (SSM).**

Long Term
(beyond the project lifetime)

The SoilFER seeks to foster a sense of **ownership and self-sustainability** among governments and local stakeholders, with the goal of creating sustainable soil-crop systems that benefit governments, farmers, and their communities.

Soil Sampling

Croplands (85%)	Grasslands (10%)	Forestlands (5%)

Soil Sampling

TOPSOIL, SUBSOIL

LEGACY DATA

WET CHEMISTRY

Soil Analytical Databases

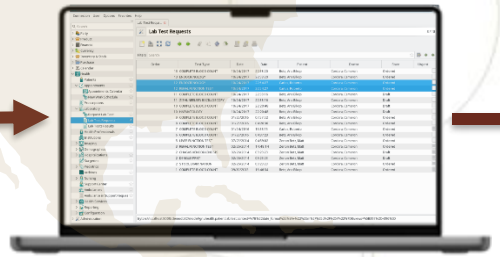
DRY CHEMISTRY

Spectral Libraries & Estimation Services

- **MAPS –** Nutrients, Soil Properties, Crop Suitability
- **NSIS -** Soil Information Systems & Monitoring
- **DSS -** Decision Support Systems for Governments
- **Farmer Apps -** Decision Support Systems for Farmers

Seamless Data flow

Field Data Collection Tool

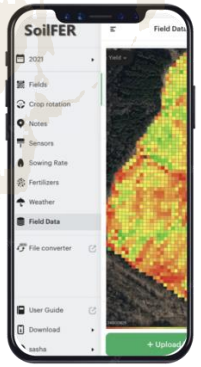


Laboratory Information Management System (LIMS)

LEGACY DATA

National Soil Information System

Decision Support Systems and Tools



Farmer Applications (Mobile)

Implementation Partners/Collaboration

- **ISRIC**– *System Development (Field Tools, LIMS,DST, NSIS) - Global*
- **CRS**– *Sampling, SoilFER-Soil Doctors, Field Trials – HND, GTM*
- **CIAT** – Sampling, Mapping, SIS - *HND*
- **IFDC** – Fertilizer Recommendations, Field Trials, DST – *ZMB*
- ***IAEA*** – *Soil* Spectroscopy, Proximal Sensing (soil moisture) – HND, ZMB, GTM, KEN, GHN
- **CABI** – SIS Assessment – ZMB, KEN, GHA


Director NSL
Minister HND
Minister GTM
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Imane
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Yi
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Discussion