

Building and Assessing Soil Health Across the CCRP Program:

A cross-cutting soils effort within McKnight communities of practice

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Objectives:

1. Develop a soil tool kit with partners for soil health assessment in smallholder management systems.
2. Apply the tool kit with partners in the McKnight Communities of Practice to understand soil contexts and evaluate management impacts.
3. Address key social and biophysical knowledge gaps surrounding tradeoffs of residue management and SOM dynamics in smallholder systems.

1. Progress on the Soil Tool Kit

- Gathering feedback on the use of the tool kit
- Simplification of protocols and materials to make more convenient while retaining validity
- Networking with other efforts to provide open-source assessment tools, such as Africa Rising and Land PKS.
- Validation of the data kit with 36 soils under two treatments in western Kenya
- New soil assessments under development:
 - Medium-term available nitrogen (amino N test)
 - Soil respiration
 - Soil water infiltration
 - Local soil characterization (proposed ODK form for the integrated database)
- Assessments are featured in YouTube videos and at www.smallholder-sha.org

2. Soil Tool Kit Distribution and Trainings

- Training and participation in research methods workshops in East Africa (November 2017), Southern Africa CoP, West Africa (March 2018) and the Andes.
- Between four and seven kits were distributed in each region for testing with partners.



Practicing the aggregate stability and active carbon tests at a regional training



Training on soil texture by feel



Soil tool kits going to East Africa partners, May 2017



Assessing soil-available phosphorus, Andes training 2017

3. Addressing Knowledge Gaps

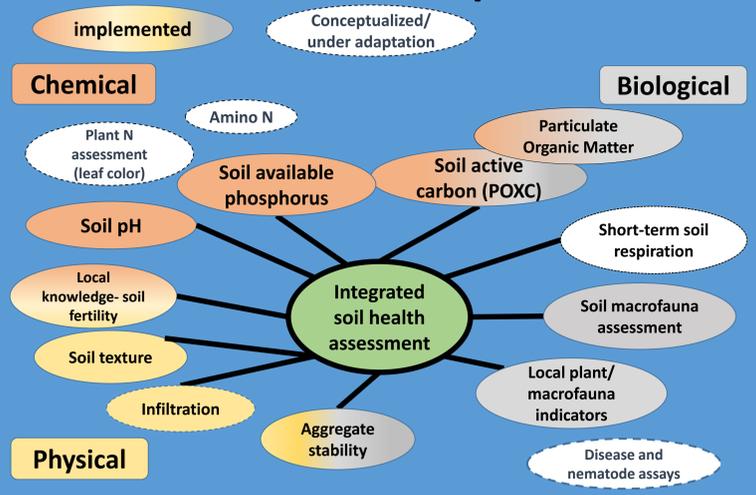
Our project seeks to address key knowledge gaps for soil health in the areas of:

- Management impacts on soil organic matter
- Crop rotations, forages, and residue management

To accomplish this we are developing knowledge products and collaborations including:

1. The Soil Tool Kit Manual (online and distributed by email)
2. Soil tool Kit Instructional videos on our website and YouTube (www.smallholder-sha.org)
3. Conceptual guide to soils research for CoP projects, including:
 1. What impacts are we trying to foster in soils?
 2. How can we measure these and how long does it take?
 3. What tools beyond multi-environment trials can be used to assess soil management in smallholder contexts?
4. With partners and soils groups within the CoPs, supporting research design on management innovations to improve soil health, such as legume integration and targeted organic matter application
5. Literature review and participation in CoP discussion groups on new soil management literature and approaches.
6. (Under development) – Survey and findings on crop residue, manure, and other organic matter management in smallholder contexts. This will be piloted with one or two partner projects and then offered across the CoPs
7. (Under Development) Development of nutrient balance tools for analyzing crop rotations.

Soil Health Tool Kit Components



Tool Kit Photos



Soil phosphorus extract and blue color development for available phosphorus

100% control High-intensity Degraded Regenerated Land
Permanganate Oxidizable ("Active") Carbon (POXC)

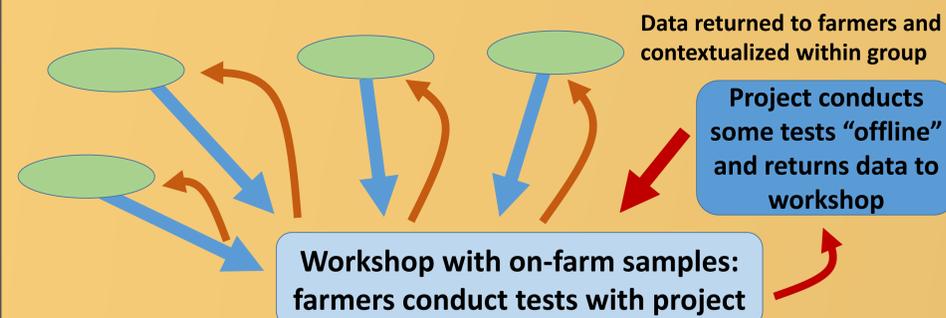


Aggregate stability of tilled silt loam (left) versus a meadow control (right)

Tool Kit Implementation:

Workshop-based soil testing, networked findings, and farmer learning

- Projects testing the kit find that more accessible and learning-oriented tests are best conducted by farmers while some more complex tests like available phosphorus are conducted on behalf of farmer groups.
- The tool kit data, as well as management information, can be aggregated in larger-scale databases (see at right), but value for the project and farmer network needs to be demonstrated at each level.



Soil testing with local farmer groups: samples being brought from farms to a central workshop can provide a management feedback and a learning resource for farmers about local soil properties and constraints.

4. Development of a Soils Data Platform

Project effort in conjunction with the McKnight research methods team and Statistics for Sustainable Development (Dave Mills and Carlos Barahona) and Ernest Ronoh, Mumias Soil Health Project

