

SOIL INFORMATION SYSTEMS REVIEW: A PROCESS TOWARD STRENGTHENING NATIONAL SOIL INFORMATION SYSTEMS

Locations	Sub-Saharan Africa
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Summary

The Bill & Melinda Gates foundation has made great progress in the past 10 years in exploring new and innovative digital soil mapping technologies and national soil information systems (SIS) in Africa and South Asia to help organize new and existing soil information. However, constraints within countries stop the SIS from being sustainable and adaptable. The foundation is now looking for ways to make the SIS more responsive to local demand. CABI is working with partners to identify what intervention approaches have worked, and which have not, which solutions work best and where to take innovation to scale for SIS development. The process will involve engagement with key stakeholders and decision makers in various countries through an iterative process.

The problem

Many initiatives have been developed around the world to organize new and existing soil information by developing SISs. These aim to make soil data available to potential users, through an online portal, service, or website, and are often assisted by the development of innovative digital soil mapping techniques. SISs help users by sharing data and information on soil health which can then be used to make more informed decisions about agricultural and environmental practices. However national support, ownership of SIS development and replication in other countries remain low.

Although great progress has been made in the uptake of SIS over the years, constraints that limit the potential effect of SIS interventions around data utility, such as data quality, data standards, data security and privacy, data sharing and access, governance, data literacy, trust and benefits, policy, resourcing and technical infrastructure remain.

Investments in such technologies and data assets have contributed to improving soil health and farmer livelihoods. However, the development and success of such activities can be further improved by involving decision makers and key stakeholders in the design process, resulting in SISs that are more responsive and adaptative to local demand, as well as sustainable, by being able to continue operating when external support and funding has stopped.

CABI's solution to this is to involve key actors at the review and design phase to ensure technology and environmental factors, as well as potential issues and enablers, are considered. Having previously worked on national SIS projects, such as RwaSIS and EthioSIS, CABI understands that there is not a one-fit-for-all technology or approach across countries as each country has specific needs.

What we are doing

CABI's work will cover a review of SIS interventions, the current state of soil analysis technology, in-country engagement with key decision makers and stakeholders to design a replicable 'Framework for Intervention' for SIS development.

This project will use human-centred design to inform and guide the technology solutions proposed around soil data needs, data utility and data sharing. This approach will allow us to fill in the missing gaps between the perspectives and preconceptions of different stakeholder groups, which are a major barrier to engagement and prevent investments from realising their potential.

We will create assessments and pathways to solution development in identified target countries; a profile of existing data, capabilities, and legal/regulatory frameworks, including other industries (at a high level). We also aim to develop an understanding of what interventions could help address the problems and will recommendations for improvement.

The project consists of the following five work streams:

1. A review of soil information systems and their history
2. A review of state-of-the-art technology options for soil
3. A framework for SIS intervention design and archetypes of SIS profiles with products and services
4. Target Country Roadmaps towards a national SIS
5. International soil community engagement and advocacy

CABI and the foundation seek to improve the evidence-based intervention design for SIS co-created with the global soil data community and deliver the following outcomes:

- Provide evidence from a review of SIS interventions and the current state of soil analysis technology provides a basis for a framework towards improved intervention design for soil information systems

- Produce a replicable framework for intervention design that shapes roadmaps for two target countries
- Encourage the participation of the soil data community and new intervention design approaches are valuable to them

Results so far

Interviews were completed with a variety of SIS users and stakeholders across nine countries to support a desk research study on existing SIS focusing on their strategies and results. A further five countries participated in in-depth interviews to gain insights into how their SISs were developed, how they operate, what issues were encountered and what has worked well.

Our partner, ISRIC, completed a technical report on the technology options for a SIS that describes the stages of a soil information workflow, including: 1) soil data collection, 2) laboratory analysis, 3) soil archiving, 4) soil data organization, 5) modelling and mapping, 6) applying soil information, and 7) soil data and information serving.

The emerging findings of both the technical and socio-political research informed the development of SIS archetypes which aim to provide some tangible options of what a functional SIS might look like.

This information also formed the basis for the 'Framework for Intervention Design.' The 'Framework for Intervention Design' was tested and iterated through engagement with key actors and stakeholders in two countries that are looking to develop a national SIS.

Two reports have since been published as well as well-documented SIS use cases, of which, have been captured in the 'New Evidence for SIS Development Framework' report. The report details key insights for adoption and scaling SISs.

A new innovative online platform hosts the framework for strengthening national SIS design. It is publicly available for the global soil data community to use, along with supporting resources and tools to ensure the financial sustainability of a SIS. The framework is designed to provide guidance for all key individuals and institutions who could be involved in the design and development of a new SIS or in the process of enhancing an existing one. These include SIS owners, system developers, funders, implementing partners and research institutions.

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Partners ISRIC, UC Davis

CABI Project Manager Rasaki Arasah



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