Data Driven Agriculture for informed action: the future of Ethiopia

This leaflet explains how the agriculture sector in Ethiopia today is changing, and how these changes have been the key drivers behind establishing the Soil and Agronomy Data Sharing Policy.

Why share soil and agronomy data?

Shared digital data can enrich decision making, enable innovation and avoid duplication of efforts. By making soil and agronomy data FAIR – Findable, Accessible, Interoperable and Reusable – we can improve data access, use, and sharing which will in turn improve yields and food system efficiency. The goal to ensure food security in Ethiopia through sustained agricultural development depends on access to quality, adequate and timely information, which can be brought about by improved sharing of soil and agronomy data.

Why does Ethiopia need this now?

Although soil and agronomy studies have been conducted in Ethiopia since the 1960s, the data has not yet been collected and stored in a standardised, digitalised format. About 71% of the national datasets are only available in analogue format and/or stored on individual computers, and the majority of that existing digital data is lacking metadata - data that provides information about other data.

As such, access to soil and agronomy data in Ethiopia is very difficult, and the data itself is vulnerable to permanent loss. Isolated efforts based on small datasets do not allow for data analysis at the scale needed to generate essential information. Studies done in Tanzania and Kenya by the Food and Agriculture Organization of the United Nations have shown that using data to make decisions about fertiliser and crop management can increase crop yield profits by hundreds of USD per hectare. As a result, efforts to produce region specific blends based on precise nutrient combinations are underway, when blanket recommendation had been the norm until recently.

71%

of the national datasets are only available in analogue format and/ or stored on individual computers

At €1000 per soil profile dataset, soil survey missions are expensive. Even if the data is not shared or lost, duplication costs will continue to harm Ethiopia's limited financial resources, restricting growth.

At €1000 per soil profile dataset, soil survey missions are expensive. Even if the data is not shared or lost, duplication costs will continue to harm Ethiopia's limited financial resources, restricting growth. A policy to establish a national data platform and facilitate data access and sharing among national institutions can help address blockages. Failure to do so will lead to continued data loss, costing the country resources and hindering the development of data-driven services for the agriculture sector.

Moreover, it contributes to the successful implementation of the recently launched Digital Transformation Strategy, designed to transform the dominantly analog economy into a digital economy.

In Colombia, better data sharing facilitated by the International Centre for Tropical Agriculture (CIAT) and Fedearroz, predicted and responded to a dry spell - later planting led to farmers avoiding a crop loss valued at over 3.6 million USD. By making decisions informed by data, some farmers in Ghana have tripled their crop yield while those in Uganda have seen yields increase by as much as seven times.

Policies and best practices for data access and sharing are being developed and promoted across the global soil research community, because the benefits are clear: The more data that is shared, the richer the information farmers and policymakers receive, and the better the decisions they can make for their farms and the country.

...planting led to farmers avoiding a crop loss valued at over

3.6m USD

Supported by

The Ethiopian agriculture research and development community, led by the Ministry of Agriculture (MoA), recognised the need to improve the soil and agronomy data sharing environment in Ethiopia, and in 2018, the Coalition of the Willing (CoW) was formed with the mission to facilitate wider scale soil and agronomic data access and sharing in Ethiopia.

CIAT is playing a significant role in bringing the CoW members together and coordinating their activities. Currently, CoW is hosted by the Ethiopian Institute of Agricultural Research (EIAR) and receives financial and logistical support from the German Corporation for International Cooperation (GIZ).

Over the past two years, additional international partners the Bill & Melinda Gates Foundation (BMGF), the Centre for Agriculture and Bioscience International (CABI) and the Open Data Institute (ODI) have joined to help the Ministry and the Coalition fulfil their mission.

And all of the members of the Coalition of the Willing.

What has been done so far?

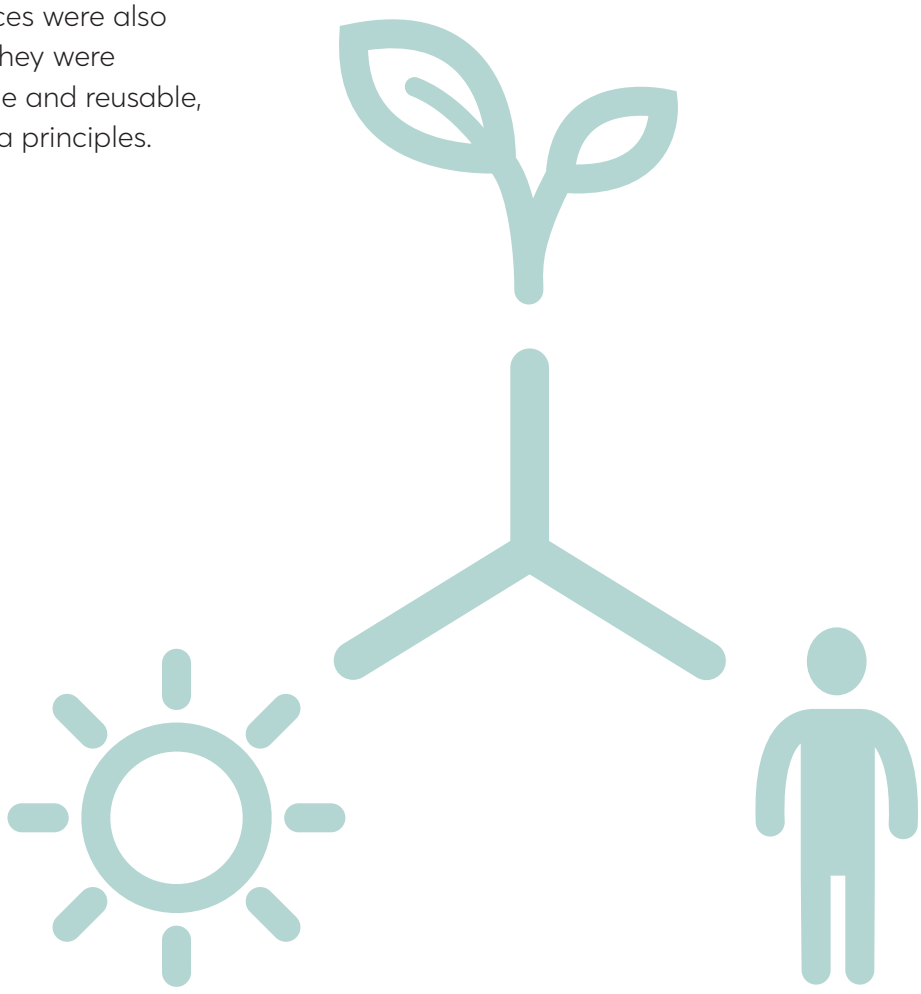
To date, the Coalition's achievements include:

Mapping the National Soil and Agronomy Data Ecosystem

The Coalition prioritized identification, cataloguing and mapping of soil and agronomy data in Ethiopia. The resulting report provides an overview of available soil and agronomy data from various research programs and survey initiatives around the country.

To enhance the data description and interpretation, the report describes the soil and agronomy data by categorizing it into survey and mapping data, and research-based data.

The report elaborates the national soil and agronomy data object/title, geospatial frame, data holding institution, publication type, publication year, geometry, scale/resolution, area coverage, data availability format, and data access/sharing captured by a predefined tabular template. The data sources were also evaluated as to whether or not they were findable, accessible, interoperable and reusable, in accordance with the FAIR data principles.



What are the FAIR principles?

In 2016 Scientific Data published the 'FAIR Guiding Principles for scientific data management and stewardship' to improve data sharing in the research and development community.

The FAIR data principles identify four important characteristics of datasets that will make them easier to use:

01

Findable

Datasets should have a unique identifier, metadata which describes its contents, sources and structure, and be published so they can easily be found with a search engine or in a data portal.

02

Accessible

Datasets and their metadata should be easily accessible, e.g. over the web, with appropriate access controls for shared data.

03

Interoperable

Datasets should be published and organized using open standards for data, so they can be easily accessed using a range of tools, and combined with other sources.

04

Reusable

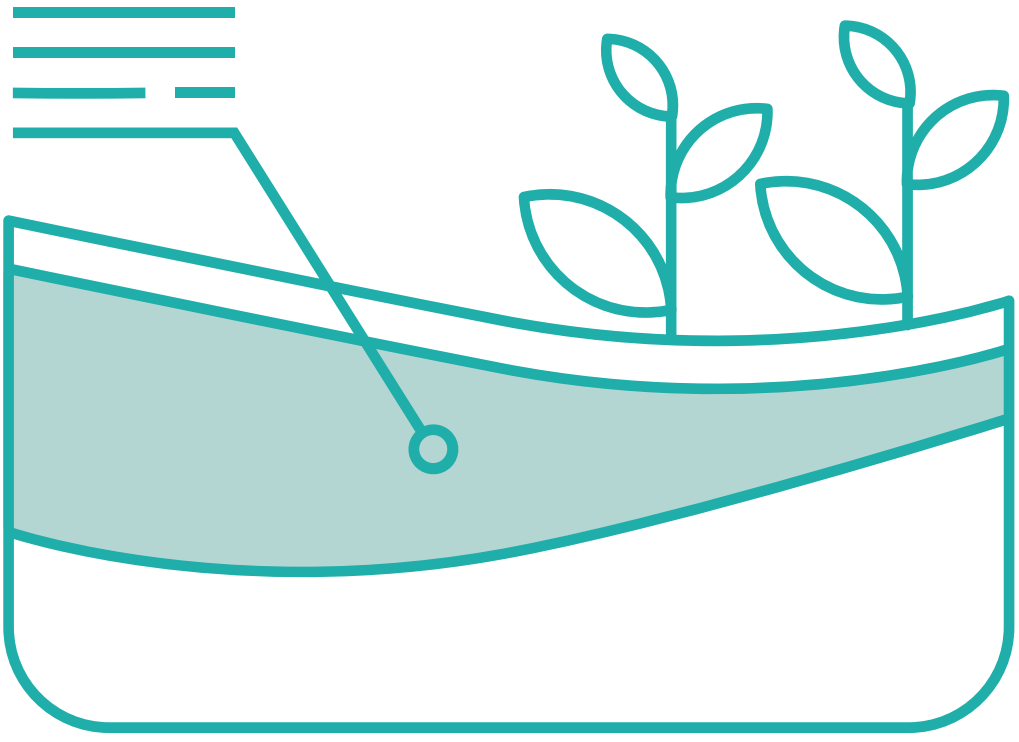
Datasets should be published with a clear license and terms of use, and have appropriate documentation and metadata that describes how the dataset has been collected and processed, allowing users to understand its potential and its limitations.

Developing soil and agronomy data standardization guidelines

The entire process of data design, collection, analysis and dissemination needs to be of high quality and integrity. In order to achieve this, the Coalition has created a set of standard guidelines to assist those working with soil and agronomy data. The standard guidelines cover agronomy and soil fertility; soil survey; soil biology; soil, plant, and water analysis; agricultural water management; integrated watershed management; as well as cross-cutting aspects.

Developing online soil and agronomy data training modules

The Coalition is developing online training courses in order to help explain and encourage best practice in collecting and sharing soil and agronomy data. The courses will explore data rights and licensing, relevant policy information and the importance of the FAIR data principles help address the existing challenges in soil and agronomy data in Ethiopia. The training will help guide those collecting, using and sharing soil and agronomy data to follow the policy, implement FAIR principles, and the importance of maintaining data standards.



What are we doing now?

The Coalition of the Willing continues to work towards better soil and agronomy data sharing in Ethiopia and support the Ministry of Agriculture make informed decisions. The Ministry has embarked on institutionalizing 'database development, management and sharing' as one of its priorities to transform the system. It is working towards digital data-driven agriculture and aims to employ precision agriculture as a means of advancing the agricultural value chain.

Going forward, the Coalition has the following objectives:

Increase the usability of data while protecting security, privacy and data rights by providing guiding principles and rules to the soil and agronomy community

Increase efficiency and reduce costs associated with duplication of efforts

Facilitate information-based decision making

Demonstrate how national data access and sharing can be implemented while maintaining equity, security and privacy

Facilitate the creation and population of a Soil and Agronomy Database and establish and maintain a data sharing platform

Enable researchers to more easily transform research data into actionable knowledge

Increase engagement and participation in the data sharing ecosystem

Contribute to discussions around emerging issues and support the government in taking informed decisions and tackling problems with tangible evidence

How can you help?

If we all join forces and support digital data-driven agriculture, we will impactfully contribute to the integrated agricultural transformation agenda. If you collect, steward or use soil and agronomy data following and promoting the SADS policy and the policy implementation guide along with the soil and agronomy data standardization guidelines, you will directly contribute to the digitalization of the agricultural system.

Please join the growing movement in Ethiopia around secure data sharing to benefit your department, organization and country.

Contact: Dr. Lulseged Tamene, Coordinator of the Coalition of the Willing, **LT.Desta@cgiar.org**