

# Report on Stocktaking of Agricultural Investments in Africa

## I. Executive Summary

As part of the support provided by the Bill & Melinda Gates Foundation towards the African Union Commission's Fertilizer and Soil Health Summit, a stock-taking review on current and ongoing donor and multi-lateral investments in soil health and nutrient management was piloted.

Objectives of the stocktaking were threefold:

- a. Gain greater understanding of the types of agricultural projects implemented across the continent and the amount and source of funding;
- b. Demonstrate whether the information could be organized and analyzed in novel ways through data visualization that may add value for key stakeholders (e.g. donors, policymakers, implementers);
- c. Share key findings from the stocktaking process (challenges and data gaps).

### Scope

The stocktaking involved: 1) the collation of international development projects focused on agriculture on the African Continent between 2015-2022; and 2) the development of an interactive, visual interface to showcase the various agricultural investments. The initial stocktaking identified over \$13 billion in investments in more than 450 agricultural development projects and 100+ donors with hundreds of implementers.

It is important to note that the results of the stocktaking are not exhaustive. Numerous projects remained excluded due to weak visibility on the internet, lack of key information (e.g. country, funding levels, etc.), and weak donor interface on access to past investments. Accordingly, absent direct communication with each donor and/or implementer *and* a recognized mandate (viz. authority) to collect the project information directly from key stakeholders, there is a strong likelihood that numerous projects would remain unaccounted for or otherwise not be included if this stocktaking exercise is to continue.

### Key Learnings

*Novel:* Examining Agricultural Development Investments with a continent-wide macro lens has never been done before at this scale.

*Complex:* Identifying and consolidating project information across 55 countries, dozens of key donors/investors<sup>1</sup> and 100's of implementers is challenging and complex. Each donor and implementer tend to use various terminology and metrics to evaluate and assess their projects. The lack of a uniform reporting structure and varying terminology made data collection and analysis a lengthy process<sup>2</sup>.

*Massive Upside Potential:* gaining greater insight into the financial flows of investments from major donors, the types of projects, and their relevance to issues concerning soil health has a massive upside potential. Greater participation and input

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<sup>1</sup> Of the more than 100 unique donors identified during the stocktaking, only about 18 contributed more than \$1 million.

<sup>2</sup> On average, once a potential project was identified through an online search, it took about 15 minutes per project to quickly review the project summary and enter the requisite data fields into a spreadsheet.

## Report on Stocktaking of Agricultural Investments in Africa

by the international community (donors, implementers, and beneficiary countries) will be essential in order to build a more complete database.

*AI & Machine Learning:* Deployment of artificial intelligence and machine-learning, could help automate the collection, organization and analysis of data. For example, rather than manually searching and reading through each webpage, web scraping uses intelligence automation methods to retrieve large data sets in a short amount of time.

### Potential Use Cases (Massive Upside Potential)

As mentioned above, the continent wide stocktaking was an initial attempt to capture recent and current investments in the agricultural development space in order to gain greater understanding into the types of projects and investments impacting soil health and fertilizer usage. Because a comprehensive, continent-wide stocktaking has never been done before, much is unknown about the correlations, emergent patterns, and utility this information could yield. However, based on the findings from this initial stocktaking, potential use cases can now be conceived that could help key stakeholders:

1. *Understand patterns and investment flows from multiples perspectives<sup>3</sup>;*
  - a. Geographic investments - amount of funding flowing into each country or region,
  - b. Crop-specific funding - amount of funding flowing into improve productivity, quality or yield of particular crops,
2. *Better track technological knowledge transfers and uptake* - for example, with a little more project-level granularity<sup>4</sup>, key stakeholders could track various types of soil health programming being introduced across the African continent.
3. *Improve collaboration and reduce duplication of efforts;*
  - a. By centralizing data on agricultural projects into a database, stakeholders can easily identify which projects are operating in a similar space and can more easily identify opportunities for collaboration, cross-fertilization of ideas, and reduce duplication,
4. *Identify correlations between International Development investments, national investments, and private sector investments;*
5. *Determine each project's relevance in regards to soil health and fertilizer;*
6. *Better evaluate what is working and what could be improved;*
7. *Design and implement more efficient and effective projects;*

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<sup>3</sup> Sankey diagrams with varying line thickness could be used to demonstrate value of investments flowing into particular countries and/or value of investments going toward particular crops or types of implementation approaches.

<sup>4</sup> For example, various approaches to soil health are being deployed across the continent: climate smart agriculture, regenerative agriculture, sustainable agriculture, conservation agriculture, ag-forestry, among others.

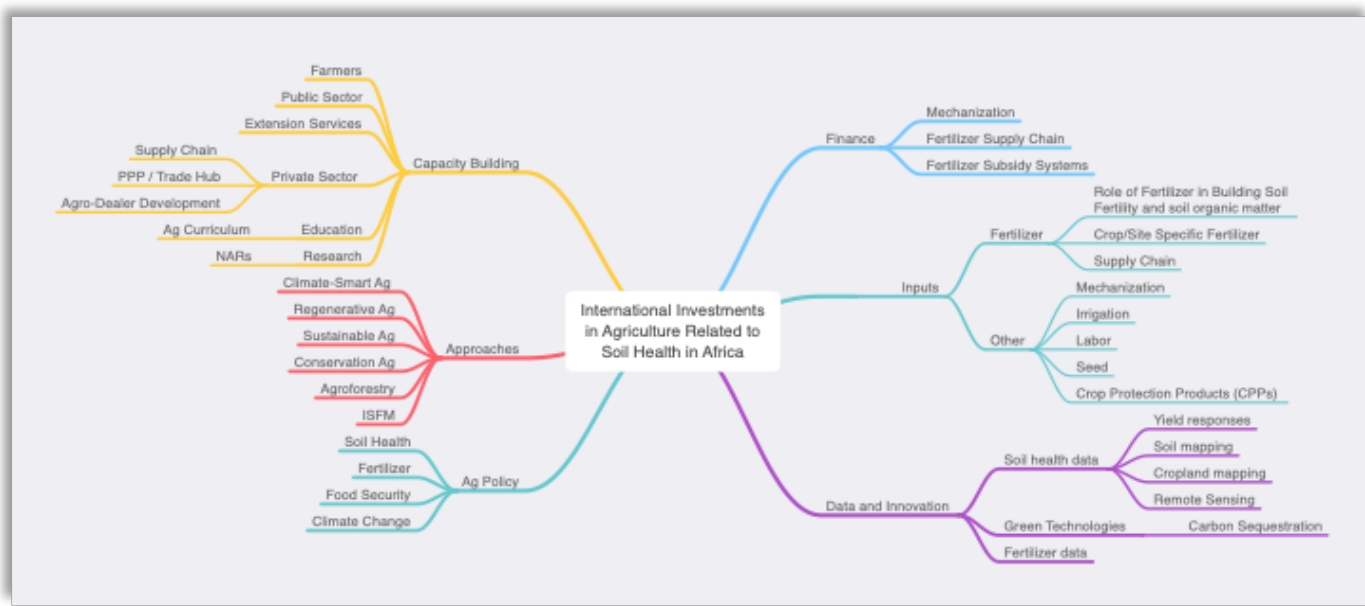
# Report on Stocktaking of Agricultural Investments in Africa

## II. Methodology

The stocktaking included:

1. Interviews with data scientists, development practitioners, international development institutions;
2. Desk research of secondary sources on similar past initiatives;
3. Internet research and review of 100s of projects<sup>5</sup>;
4. Web-scraping to extract public data residing on websites;
5. Development of a *Taxonomy of International Investments in Agriculture Related to Soil Health in Africa* (see figure 1 below);
6. Spreadsheet and database development and the design and building of a “proof of concept” platform to visualize the stocktaking data.

**Figure 1. Taxonomy of International Investments in Agriculture Related to Soil Health in Africa**



### Categorizing Donors/Investors by Type

Donors/Investors in agricultural development in Africa vary by type. For example, development finance institutions (DFIs) and larger multilateral institutions like the United Nations, World Bank, JICA, and the African Development Bank often contribute significant sums (e.g., \$100,000,000 or more) to large infrastructure projects (e.g., building grain silos, fertilizer warehouses, or cold storage facilities) that can span multiple countries. While more traditional bilateral donors (e.g., USAID, BMGF, BMZ/GIZ, UKAID, DGIS, et al.) often focus more on funding projects at the country-level concentrating on soft-skills and transfer of knowledge. Other types of investors may include private sector, private foundations, research institutions, charities, among others.

<sup>5</sup> Data was drawn from both public and direct sources pertaining to donors such as USAID, JICA, AFAP, APNI, IITA, and IFDC. Project data involving funding by many additional donors was gathered manually through 100's of internet searches.

## Report on Stocktaking of Agricultural Investments in Africa

During the stocktaking, each donor was classified according to Type. Types of Donors included: DFI, Foundation, Government, Multilateral International Development Organization, Non-Traditional Donor Organization, Research Institution, Traditional Bilateral). The assignment of “type” to each donor adds value by imbuing dashboard users with the ability to conduct more granular analysis of the agricultural investment based on the *type* of institution investing in development.

### Categorizing Implementers by Type

Similar to categorizing types of donors/investors, it can be useful to understand the type of entity or institution *implementing* the projects. Accordingly, an attempt was made to categorize implementers by type such as research institution, a government agency, a faith-based organization or a for profit international development company (e.g., Chemonics, Adam Smith International, etc.). Note: the categorization system of *implementers by type* currently requires further refinement to add greater value.

### III. Data Collection & Data Visualization

In order to compare agricultural project information involving 55 African countries, 100’s of donors and implementers, eight key project-related data points were determined to be “must haves” for the stocktaking. The eight Project-related data points included: 1) Project Country, 2) Project Title, 3) Project Description[1], 4) Investor/Donor, 5) Implementing Partner, 6) Funding Amount, 7) Start Date, 8) Completion Date.

Ancillary data points ascribed to each project included: 1) *African Union Region* (e.g., North, South, East, West, or Central); 2) *Donor Type* (see section on Methodology below) 3); *Implementer Type* (e.g., for-profit, non-profit, government, etc.).

Data for the stocktaking was collected and entered into multiple spreadsheets where it was first cleaned and integrated into a database that linked to an interactive data visualization dashboard ([click here to see data visualization](#)), which was established in collaboration with QED for the purpose of the stocktaking.

### Quantitative Engineering and Design (QED) Dashboard

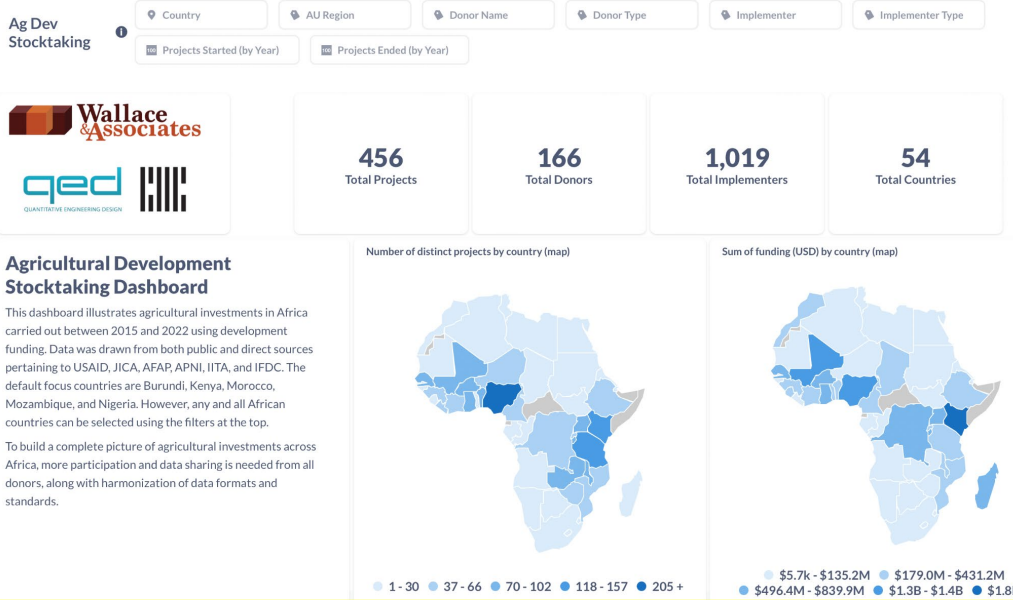
In order to make the information collected during the stocktaking useful and interactive, QED was brought on board to develop an interactive dashboard. QED builds data systems and AI for human health and agriculture<sup>6</sup>.

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<sup>6</sup> Learn more about QED’s work and capabilities here: <https://qed.ai>

# Report on Stocktaking of Agricultural Investments in Africa

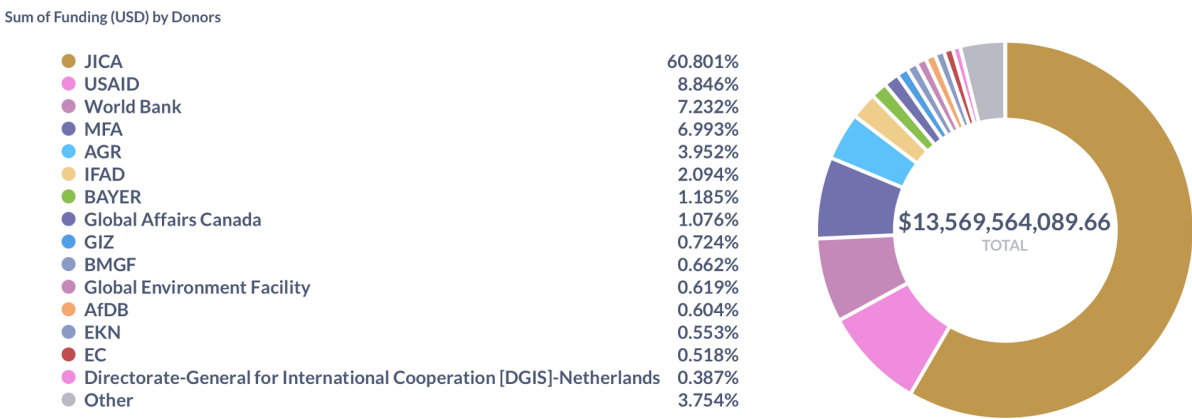
**Figure 2. Dashboard Home Screen with Headline Figures**



**Figure 3. International Development Agricultural Project Funding by Country**



**Figure 4. Agricultural Funding by Donor in Africa**



## IV. Data Challenges & Data Gaps

## Report on Stocktaking of Agricultural Investments in Africa

Many of the challenges and data gaps encountered during the stocktaking result from a lack of uniform reporting standards. For example, even when information on a project was identified, values were often missing for key data points like funding amounts, start dates, completion dates, detailed project descriptions, etc. As noted by QED (creator of the data visualization dashboard), “To build a complete picture of agricultural investments across Africa, more participation and data sharing is needed from all donors, along with harmonization of data formats and standards.”

Below are some of the challenges and data gaps encountered and recorded during the stocktaking. When possible, recommendations have been included as potential resolutions or ways forward.

### Project Descriptions

Reporting and communication styles vary depending on the donor/investor type. Many project summaries or “descriptions” contain short statements providing information about the overall objective of the project<sup>7</sup>. Unfortunately, these summaries often lack the specificity required to determine how the project relates to or impacts soil health. When this information is lacking, the overall value of the stocktaking reduces in value.

Longer project descriptions require vastly more time to read and synthesize in order to extract relevant information (viz. on how the project impacts or relates to soil health). So, currently a balance must be struck between spending more time synthesizing long project descriptions (this increases the costs of data collection) versus spending less time to understand how the project relates to soil health, which reduces the value of the data collected.

*Recommendation:* Utilize emerging AI and machine learning tools to identify and distill relevant information about each project<sup>8</sup>. For example, projects often involve multiple *components or objectives*. Use of AI and machine learning could identify and extract brief descriptions (e.g., 50 words or less) of each *component*. This could add useful information and increase the ability to discern the project’s relevance in regard to soil health.

### Soil Health Relevance

Related to the “Project Descriptions” challenge above, is the challenge of determining how relevant each project or project component is to soil health. Most projects in the agricultural space have some impact on soil health but treating each project the same reduces the overall utility of the stocktaking. Classifying projects by type and stratifying this information by assigning “soil health relevance” values could add significant value by providing stakeholders with new ways of seeing and thinking about how each agricultural project relates to soil health.

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<sup>7</sup> *Project Descriptions* were initially included as a key datapoint in the stocktaking spreadsheet, however, these descriptions varied so greatly in detail, length and utility that they were eventually dropped as a “must have”.

<sup>8</sup> Recommendation by Lindsey Moore, CEO of Developmetrics (see <https://www.developmetrics.com/our-team>) who has similarly used AI and machine learning to extract useful information from 1000’s of World Bank and USAID reports.

## Report on Stocktaking of Agricultural Investments in Africa

*Recommendation:* Develop a “Soil Health Relevance Index” to classify projects according to how they relate soil health and assign value based on this relevance. For example, relevance rankings could be something as simple as 1-5 or High, Medium, Low, Unknown, Not Applicable (NA).

**High Relevancy:** Projects that explicitly focus on soil health or fertilizer as the main project component. So, these types of projects will likely make up a very small, but highly relevant subset of ag-related projects.

**Medium Relevancy:** Many more projects include components that certainly impact soil health. For example, any project involving land preparation, or focused on increasing productivity would arguably impact the soil and by extension could be deemed a project involving soil health. This would likely make up the majority of agricultural projects.

**Low Relevancy:** E.g., perhaps an ag-irrigation project might be low relevance since the presence of moisture in soil is a major requisite for growth...or a livestock project it might be deemed to have low relevance but if the project proposes to facilitate use of manure is used to fertilize local crops, perhaps the project

**Unknown Relevancy:** Projects for which the project description is too vague to assign a relevance level. Basically, tagging something “unknown” means that it may require more time to discern its relevance ranking at a later point.

**N/A:** Ag-projects that seem to have no direct relevance to soil health.

Since only rarely do projects appear to explicitly refer to *soil health* or *fertilizer* as a key project component, assigning a relevance value helps elucidate how involved or impactful each project might be regarding soil health.

### Categories of Soil Health Work

In addition to a Soil Health Relevance Index, there may be value in developing a categorization system of soil health related activities. Categories may include:

- Research (e.g., new fertilizer blends, soil nutrient quality, etc.)
- Policy
- Financial (e.g., Fertilizer supply chain finance)
- Climate Smart Agriculture / Resilience / Conservation Agriculture?
- Data Mapping (e.g., soil analysis)
- Increased Productivity / Enhanced Food Security
- Others?

### Temporal Limitations of Stocktaking

When we “take stock” of anything, the process is finite, and the outcome or information represents a snapshot in time. This stocktaking focused on projects implemented between January 1, 2015, and June 1, 2022.

## Report on Stocktaking of Agricultural Investments in Africa

*Recommendation 1:* Update the stock taking regularly (e.g., twice/year) in order to maintain the ability to identify emerging patterns and trends of investments in soil health.

*Recommendation 2:* Include more historical information on ag-development projects pre-dating 2015 (e.g., include project data back to 1990) in order to gain insight into shifting trends in agricultural development and soil health on the African continent. This information could offer insights into ag-development failures and successes, shifting donor priorities, changing patterns in donor funding amounts, among others.

### Challenges with Projects Implemented Across Multiple Countries

Projects that span multiple countries present unique challenges. They are more difficult to estimate funding and more difficult to isolate what is being done on a country-by-country-basis. For the purposes of the stocktaking, when a project's implementation spanned multiple countries, under the Country column, those projects were designated as "Multiple Countries" and another column was added to list out all the project countries. Without specific information that disaggregates funding amounts by country, a challenge arises when trying to discern how much funding was allocated to each country.

*Recommendation 1:* Reach out to each donor that is funding a multi-country project and request a disaggregated breakdown of funds by country.

*Recommendation 2:* In the absence of learning the disaggregated funding amounts for a multiple-country project, several heuristics could be used to divide the total funding across the countries:

- divide by N, the number of countries
- divide funds in proportion to arable land area
- divide funds in proportion to population

### Projects Involving Multiple Donors

Like the challenges presented by multi-country projects, projects that are funded by multiple donors can complicate the ability to isolate funding contributions by donor by country - especially if the funding totals are not disaggregated by donor. For the purposes of this stocktaking, we focused predominantly on projects with single donors as the time it takes to accurately disaggregate spending levels between co-investors/donors was prohibitively long.

*Recommendation 1:* Contact each donor co-investing in a project and request a breakdown of their individual funding contributions.

*Recommendation 2:* Self-reporting by investors/donors would likely be the fastest way to acquire information regarding co-investments in agricultural development.

### Messy Data

Information gathered during the stocktaking was often collected from news articles, donor websites, implementer websites, project websites. The data was often unstructured, and both the manual data entry and automated data scraping processes often resulted in messy datasets that required cleaning. While an initial cleaning was conducted to increase data



## **Report on Stocktaking of Agricultural Investments in Africa**

integrity, duplicate entries and other errors likely remain. More time and energy would be required in order to improve the integrity of the data.

### Currency

Projects are often funded in different currencies. For the purposes of the stocktaking, all currencies were converted to USD so that investment values could be compared. When converting projects funded in currencies other than USD, the start date of the project was used as the date of currency conversion.

### Incomplete Information

As mentioned above, over 450 projects were collected for the period between 2015 and 2022 and there are likely many more projects not captured due to: lack of reporting, lack of use of standard/common terminology, information provided in language other than English, lack of accessibility to data, lack of detail about projects, lack of transparency by donor/investor, among others.

## **V. Potential Next Steps & Questions to Reflect Upon**

During interviews and communications with donors, implementers, data scientists and other stakeholders working in international development, there was broad consensus on the potential value inherent in the stocktaking data. If stakeholders (countries, donors, implementers, policy makers) agree that an inventory of agricultural projects impacting soil health should be maintained and updated in perpetuity, then a number of ancillary questions and issues would need to be addressed. For example:

1. Who should maintain the database and platform?
2. How should the ongoing updates and maintenance be funded?
3. How much funding would be required to update, maintain and enhance the functionality of the database?
4. How often should it be updated (annually, quarterly, semi-annually)?
5. What should the functionality be?
6. Who should have access?
7. How could the impact, effectiveness and value of the database be measured?