




CoSAI
Commission on
Sustainable
Agriculture
Intensification

Case Study: Kenya's investment in innovation for sustainable agricultural intensification





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Introduction

Agriculture plays a key dual role in Kenya. It provides livelihoods for 75% of the country's population and supports 80% of its rural population. Crucially, it helps the country to meet its food security goals, which is increasingly challenging with Kenya's population doubling over the last 25 years. Agricultural innovation in general, and SAI innovation in particular are important for Kenya given this central role of agriculture in Kenya along with the key role Kenya plays in East Africa.

This case study accompanies the report: *Funding Agricultural Innovation for the Global South: Does it Promote Sustainable Agricultural Intensification?* The full report can be found on the CoSAI website: <https://wle.cgiar.org/cosai/innovation-investment-study>

1. Summary

The study estimates that Kenya spends ~USD 350 million annually on agricultural innovation¹ across public expenditure, investments by donors, and PE/VC firms operating in the country. The lack of granular data, especially on government funding, makes an accurate estimate for SAI difficult, but using development partner funding patterns as indicative, less than 10% of the agricultural innovation budget is channelled into SAI.

Funding for agricultural innovation: The overall funding for agricultural innovation over the last decade (2010-2019), was approximately USD 3.5 billion or approximately USD 350 million annually. Most of the innovation funding is driven by the Kenyan government (more than USD 200 million annually²) but bilateral, multilateral, and philanthropic grants play a prominent role (USD ~100 million annually, of which USD 40 million goes to the government), in addition to an active PE/VC network (USD ~40 million annually)³. Private sector funding could not be separately estimated due to a lack of disaggregated R&D data but is estimated to be a small fraction of overall innovation (see next section on sources of funding). **More than 70% of the total innovation funding (more than USD 250 million annually) goes to government agencies and research institutions. The overall focus of government innovation funding is strongly on crops – driven by programs for extension and promotion of new technologies among farmers.** Of note in Kenya is that public research funding favours R&D in livestock and fisheries.

Funding for SAI innovation: SAI innovation funding in Kenya can only be analysed appropriately for development partners⁴ since the government and PE/VC data lacks sufficient detail and sustainability descriptions. For development partners less than 10% of all the innovation funding—is spent on SAI innovation. Climate resilience for agricultural communities stands out as a key theme among programs co-funded by the government and development partner agencies. There would be value in adopting more rigorous reporting standards around sustainability and sustainability investments for innovation in agriculture in the country.

2. Sources of Funding for Agricultural Innovation and SAI Innovation

The Kenyan government is the largest funder of agricultural innovation, funding more than USD 200 million annually; development institutions (USD 100 million annually) and PE/VC investors (USD 40 million annually) are the other key players. Given the large role of agriculture in the Kenyan economy

¹ Sources for all investments include OECD stat database, FAO MAFAP database, Tracxn, Government published programmatic budgets, recurring budgets, and development budgets. These estimations exclude investments by private agribusinesses (apart from start-ups) into innovation, as well as individual investments by farmers, and other stakeholders into purchase of innovative equipment, seeds, etc.

² Including the interest value of loans by development partners - ~ USD 5 million annually. The principle is not counted as investment since that is returned.

³ Calculated using an analysis of data recorded in the Tracxn database and data on investments by AgFunder and the [McKinsey Global Private Markets Review 2019](#).

⁴ The word donor is used advisedly here since this refers to grants – loans are counted as government funding.

and employment, a significant portion of government funding goes towards improving livelihoods, specifically for the large number of smallholder farmers within the country. Approximately 30% of the total agricultural funding by the Government⁵ qualifies as innovation and most of this funding is driven through the Ministry of Agriculture, Livestock, Fisheries, and Irrigation. The next big funder category - bilateral agencies, multilateral agencies, and international philanthropies - spend around USD 100 million annually in agricultural innovation⁶. Finally, investments by PE and VC investors in the agri-tech startup landscape has been growing, cumulatively reaching ~USD 400 million in over the last decade³. 25% of all agri-tech startup investments in SSA have been in Kenya.

While data on investments by private agribusinesses in Kenya is limited⁷, private investments in agricultural innovation in Kenya is likely to be a small fraction of the total pool. For instance, the private sector in 2008 invested around USD 1.5-3 million in R&D (5% of total annual average public R&D of USD 60 million), as per a study⁸ conducted by ASTI. Even accounting for additional marketing investments towards adoption, and the growth of the private sector in the last 12 years, private sector innovation funding is likely only a small fraction of the total.

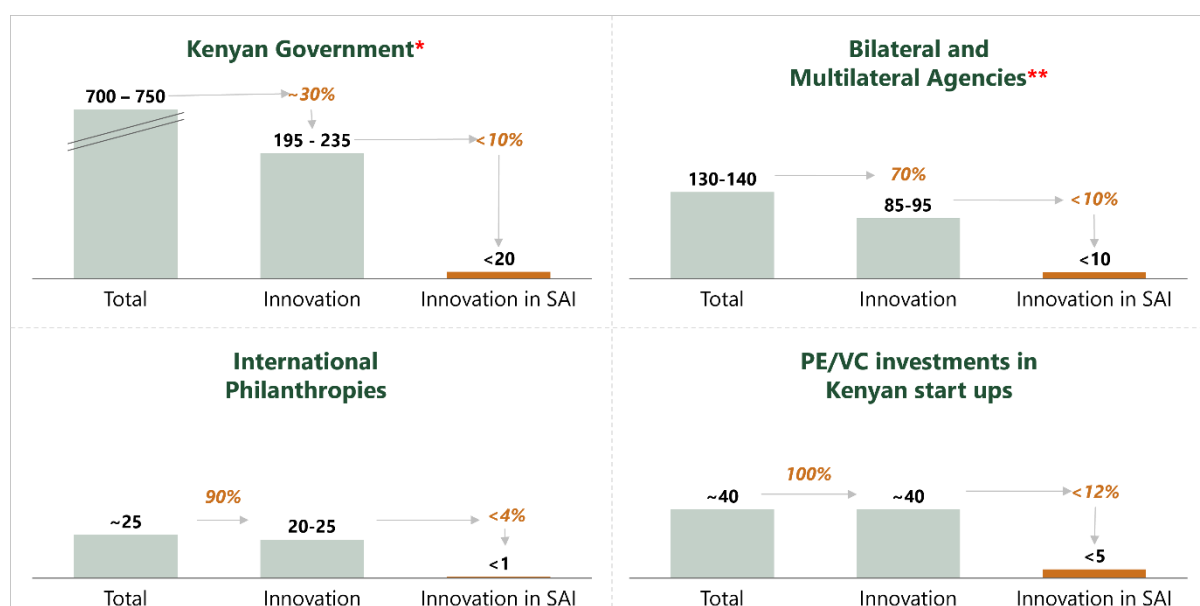


Figure 1. Funding towards agriculture, innovation in agriculture, and innovation in SAI (broad definition) USD millions (Constant 2019 prices), annual average for 2010-2019.

* SAI spends of the Kenyan government are indicative. Please refer to the methodology document.

** Bilateral and multilateral spends include innovation related funding provided to governments of ~ USD 35-40 million.

⁵ Please refer to the methodology report for calculation.

⁶ 'Innovation', as defined in Chapter 1 of the main report, includes all funding related to the creation or adoption of new agricultural technologies, practices and systems within the Global South. In addition to purely technological innovation, the study includes investments in non-technological areas such as business models, policy reforms, agricultural extension and training, process innovations, and marketing expenditure on innovative technologies.

⁷ Innovation in the sector is driven by large corporations, with R&D laboratories in the Global North. A disaggregation by region will involve false precision of data.

⁸ Carl Pay et al. "Private Investment in Agricultural Research and Technology Transfer in Africa", 2011.

3. Recipients of Innovation Funding in Kenya

Government agencies and universities/research institutes cumulatively receive ~75% of innovation funding in agriculture. Donors have historically been active in innovation funding in Sub-Saharan Africa, especially in Kenya – mainly through agricultural development programs in the country that include knowledge and extension components.

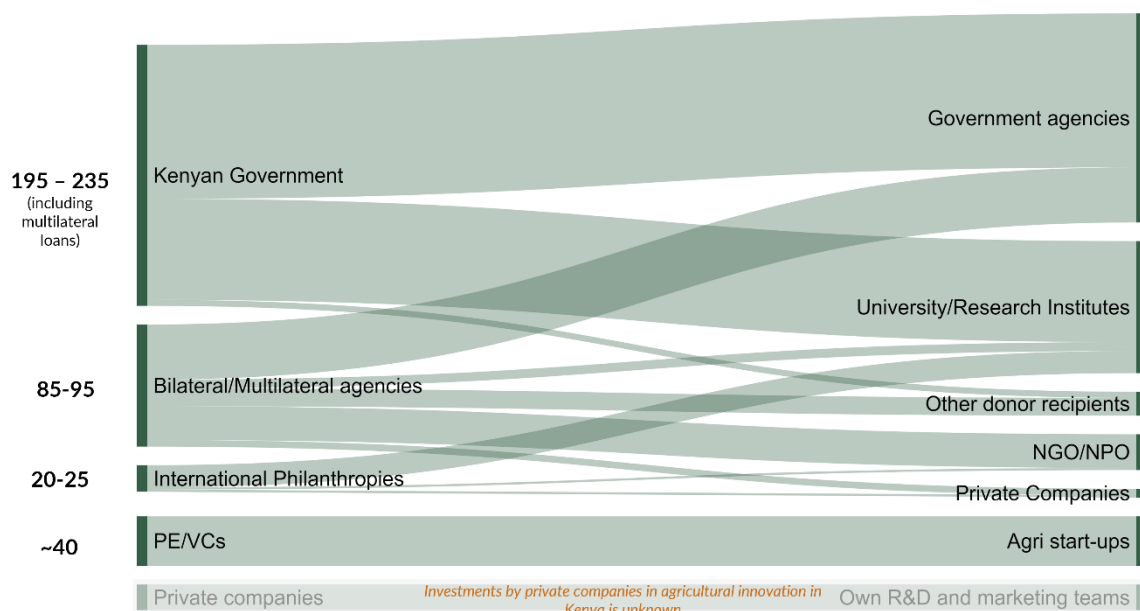


Figure 2. Funding towards innovation in agriculture and allied industries in Kenya USD millions (Constant 2019 prices), annual average for 2010-2019.

Most (~75%) of government innovation funding – ~USD 150 million – is directed towards driving adoption of new agricultural practices and technologies. A large portion of adoption spends were focused on promoting new agricultural practices to improve food security. This includes promoting crop diversification practices, driving drought resilience, cereal enhancement programs and some nutrition sensitive agriculture promotion and water saving rice culture promotion. ~20% of innovation spends were directed to adoption of agricultural technologies such as tractors, mechanization as well as development of value addition incubation centers. Other example of adoption related spends include funding for the Kenya Climate Smart Agriculture Project and the National Agricultural & Rural Inclusivity Project (NARIGP). Most of the government’s traditional agricultural research funding goes to KARLO⁹ – Kenya’s apex agricultural research institute and the Jomo Kenyatta University of Agriculture and Technology.

Development partners focus even more on adoption of innovation and new practices, only ~5% of overall funding goes to universities and research institutes. Bilateral agencies largely drive the implementation of agricultural extension programs through their own resources. Some notable examples of innovation investments include funding by the World Bank for the Agricultural Productivity and Agribusiness Project for Kenya to increase agricultural productivity and incomes of participating smallholder farmers; a Kenya Cereal Enhancement Programme driven by IFAD; funding

⁹ Kenyan Agricultural and Livestock Research Organization (KALRO).

for institution of land reforms in community lands of Kenya driven by FAO; and providing training to smallholder farmers through the USAID funded Feed the Future program. **Lastly, PE/VC investors put in an average of ~USD 40 million annually¹⁰, with agricultural technology representing 20% of all investments in start-ups.**

Crops get most of the government innovation funding in Kenya (more than 60%); livestock, dairy, poultry, and fisheries get ~15% of the government innovation funding. Like the rest of the Global South, the economic and employment potential of the crops value chain results in higher public funding, through agricultural extension and programmatic support on the ground. Furthermore, Kenya’s government-research-funding (subset of innovation funding) is highly oriented to towards livestock, dairy, poultry, and fisheries which cumulatively receive 50-60% of the government’s total agricultural research funding.

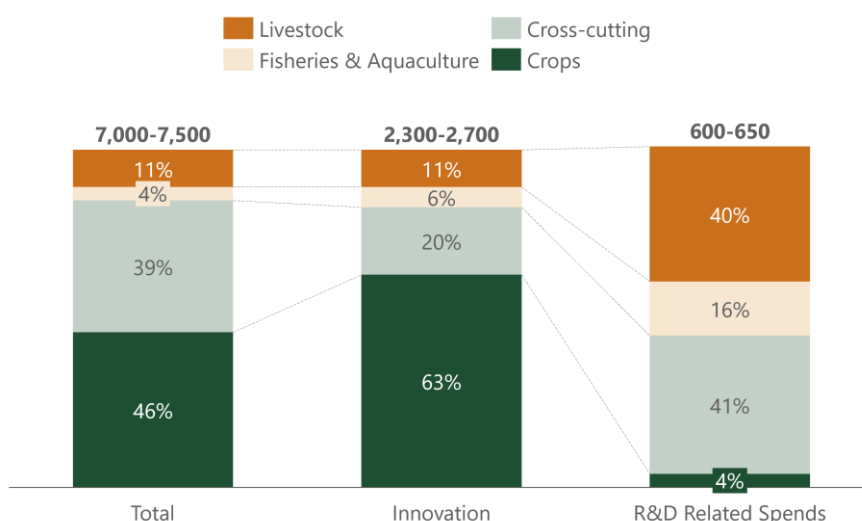


Figure 3. Value-chain wise split of government agricultural expenditure, agricultural innovation expenditure, and agricultural R&D expenditure - USD millions (Constant 2019 prices), 2010-2019.

4. SAI Innovation Investments in Kenya

The study estimates annual SAI innovation investments¹¹ in Kenya to be less than 10% of the overall agricultural innovation investments i.e. between USD 17-35 million though this estimate is limited by the granularity of the existing Government data. Kenyan government provides limited information on its investments on agricultural innovation or SAI projects. This study estimates a range of likely SAI Innovation investments for Kenya with the lower bound (USD 17 million per year) being closer to proportionate ratios for countries such as India (3-6% of the innovation spend into SAI) and the upper

¹⁰ Calculated using an analysis of data recorded in the Tracxn database and data on investments by AgFunder.

¹¹ Based on intentions around the dimensions of sustainability. According to a strict definition, investments with intentions of productivity and environment, along with one of social or human condition are tagged as SAI. In the narrow definition, investments with intentions or either productivity or environmental are tagged as SAI.

bound (USD 35 million per year) being based on proportions similar to international donor agency projects.

As for the topics of investments, a recent study by Biovision¹² stated that more than 70% of projects carried out by Kenyan research institutes focused on reducing the environmental impact (and increasing the economic efficiency) of current agricultural practices through improved pesticide practices, livestock vaccines or reductions in post-harvest losses (Gliessman scale Level 1). While this does not provide an indication of funding on SAI as defined in this report, it does indicate that most research investments look at incremental improvements to current agricultural practices as opposed to driving social and equitable access (Gliessman level 5¹³). KALRO, the largest government funded research institute in the country, along with development partners, funds important SAI related programmes such as the Kenya Climate Smart Agriculture Project and the Climate Smart Agricultural Productivity Project. This is reflected in the large portion of investments going to level 3 (~30%) in the framework that includes building systems for climate resilience.

Development partner investments fund ~USD 10 million annually towards innovation in SAI, with a significant focus on climate resilience and productivity through programmes such as the Swedish International Development Cooperation Agency's (SIDA) Agricultural Sector Development Support Programme and USAID's REGAL-IR. Most investments in agricultural innovation by development institutions have some stated intention of sustainability. However, the percentage of projects that state "productivity" and "environmental" sustainability intentions, and hence labelled as SAI, is low at ~10-11%. Most of these investments flow towards large programmes that intend to drive agricultural productivity while building climate resilience. Examples are investments by SIDA to find methods of agricultural production that are more resilient to droughts and USAID's investments in the Resilience and Economic Growth in Arid Lands - Improving Resilience (REGAL-IR), a programme that works with the Kenyan government to build capacity and local structures to improve social, economic, and environmental resilience during droughts. Funding partnerships between development partners and the Kenyan government have proven to be successful, as seen in the case of the Upper Tana Nairobi Water Fund¹⁴ that aims to solve the water scarcity challenge by working with local communities to protect biodiversity and restore local ecosystems. The USD 10 million investment in the fund is predicted to lead to a return of ~USD 21.5 million over 30 years and has served as a model for innovative SAI related investments in the region and for water conservation globally. Furthermore, Development Partner funding towards CGIAR Centers for agricultural research focused on Kenya is also significant and constitutes ~30-35% of SAI funding by Development Partners in Kenya. This includes funds allocated to Kenya under the CGIAR Trust Fund as well as funding for Kenya via other CGIAR Centers such as ILRI, World Agroforestry Institute, International Potato Centre, and others.

¹² Biovision, "Money Flows: What is holding back investment in agroecological research for Africa", 2020.

¹³ Biovision, "Money Flows: What is holding back investment in agroecological research for Africa", 2020.

¹⁴ <https://togetherstronger.com/an-innovative-solution-for-kenyas-economy-the-upper-tana-nairobi-water-fund/>

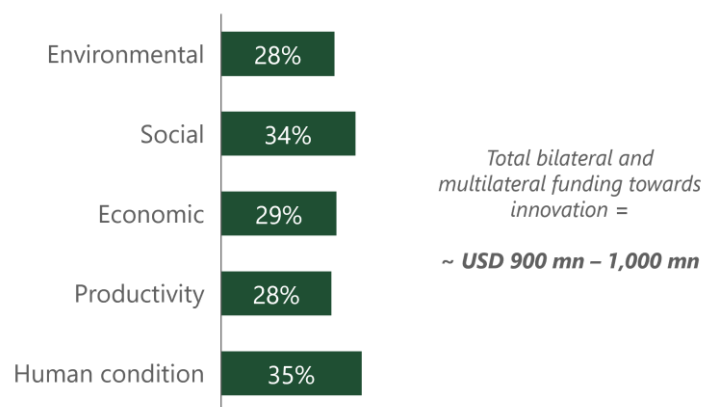


Figure 4. Percentage of innovation spends tagged by sustainability domains (based on Musumba et al.).

Based on information available from databases such as Tracxn, PE/VC investors are estimated to be funding ~USD 40 million annually in start-ups focused on SAI; some examples of SAI innovation include companies in wood tree¹⁵ plantation services and hydroponics. Specifically, Komaza, a forestry agribusiness that engages in organized farming in partnership with smallholder farmers, raised ~USD 5.5 million in its Series A round of funding in 2017, and has raised another USD 28 million in 2020¹⁶. Another hydroponics company, Ukulima Tech that designs, fabricates, and supplies hydroponic farming systems to the urban population received grant funding in 2016 to scale up operations. Furthermore, other investments that are not tagged as SAI by intention are in online marketplaces, farm inventory and outbound logistics and FinTech in agriculture.

5. Conclusion

Investments in innovation for SAI can help Kenya tackle the problems of livelihoods and food security. The Kenyan government, along with other development partners, plays a substantial role in driving innovation in agriculture; these will likely remain the main funders for sustainable innovation in the country. With arid lands in many parts of Kenya, the looming threat of droughts and irregular precipitation due to climate change, agricultural innovation and SAI will be a key priority. A successful Kenyan model around scaling up SAI innovation – backed by granular data, can serve as a replicable example for the rest of Sub-Saharan Africa and eventually, the rest of Africa.

¹⁵ Komaza claims to be working with leading conservationists to create protocols around tree species. Please refer to <http://www.komaza.com/tree-species>

¹⁶ Tracxn database.



The Commission on Sustainable Agriculture Intensification (CoSAI) brings together 21 Commissioners to influence public and private support to innovation in order to rapidly scale up sustainable agricultural intensification (SAI) in the Global South.

For CoSAI, innovation means the development and uptake of new ways of doing things – in policy, social institutions and finance, as well as in science and technology.

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