




CoSAI
Commission on
Sustainable
Agriculture
Intensification

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





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About this Case Study

Brazil has transformed from being a net food importer, to one of the largest agricultural exporters in the world. The country is now one of the top global funders of agricultural innovation, with a special emphasis on funding R&D for sustainable agriculture. While food insecurity and environmental challenges exist in many parts of Brazil, social programs and funding in innovation have helped those in need. The study of agriculture innovation funding and sustainable agriculture innovation funding patterns in Brazil becomes important to not only direct targeted funding within the country but also to inform other countries that might benefit from the country's experience. This case study analyses overall funding flows into agriculture and SAI innovation in Brazil between 2010-2019.

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 Brazil funds USD 3-3.5 billion annually on agricultural innovation¹ including public funding, funding by Development Partners², private sector funding, and PE/VC firms investing in the country. The lack of granular data across government budgets as well as private companies based in Brazil makes an accurate estimate of SAI difficult.

Funding for agricultural innovation: The Brazilian government is the largest funder of innovation, funding more than USD 2 billion annually, followed by the private sector which contributes funding of more than USD 800 million annually on innovation. Brazil is distinct from other countries with a bigger share of public funding going to research than toward the promotion of new technologies, and with more private-funded research. Public funding is largely directed to *Embrapa*³ – the state-owned research corporation (~USD 700 million), federal research organizations, and other government agencies that implement agricultural extension programmes⁴. The private sector is estimated to fund approximately 30% of agricultural innovation in Brazil, through research in private R&D centres, as well as collaboration with public research agencies. PE/VC funders invest more than USD 100 million annually in Brazil’s booming AgriTech market. Development Partners play a relatively smaller role in the agricultural innovation landscape of the country.

Funding for SAI innovation: We estimate annual SAI innovation funding in Brazil to be in the range of USD 200-300 million. Though data⁵ on SAI innovation funding from the public sector and private sector lacks granularity, the study estimates that between USD 200-300 million is spent on SAI innovation annually in Brazil based on funding data from Development Partners and trends from other countries⁶. The stated focus on environmental sustainability in Development Partner funding remains much higher in Brazil compared to other Global South nations. Experts that we interviewed believe this to be true even within government agencies, and the private sector, in part driven by grassroots movements and export markets advocating for environmental sustainability. Brazil has one of the largest and most comprehensive Low Carbon Agriculture Program (ABC Plan) in the world, in implementation since 2010. Policies, research, and programmes focus on driving climate resilience as well as developing agricultural practices that prevent deforestation.

¹ Sources for all funding include OECD.Stat database, FAO MAFAP database, Tracxn, Government published budgets and expenses as recorded on <http://www.portaltransparencia.gov.br>. These estimations include rough estimations of funding by private agribusinesses into innovation, but exclude as individual funding by farmers and cooperatives, and other stakeholders into purchase of innovative equipment, seeds etc.

² Development Partners includes bilateral agencies, multilaterals, and international philanthropies

³ Embrapa in Portuguese: Empresa Brasileira de Pesquisa Agropecuária.

⁴ In addition to other instruments such as tax incentives and subsidized credit.

⁵ Please refer to the methodology note for complete list of sources.

⁶ This lowers the level of certainty for this estimate.

2. Sources of Funding for Agricultural Innovation and SAI Innovation

The Brazilian government is the largest funder of innovation in the country, funding more than USD 2 billion annually. The government funds innovation in agriculture across policy support, knowledge development, research and innovation and financing through various fostering systems and institutions. The National Council of Scientific and Technological Development was established to formulate science, technology, and innovation policies with a global mindset⁷. Similarly, National Economic and Social Development Bank (BNDES) has recently created a new structure for issuing green, social and sustainable bonds, with IDB's support to stimulate agricultural funding⁸. The government has increased funding into agricultural innovation over the last decade, though the funding has plateaued in recent years (see Figure 1). Embrapa had an annual budget of ~USD 1 billion (current prices) in the early part of the decade, now however its budget has fallen to ~USD 700 million per year.

The private sector in Brazil plays a strong role in promoting agricultural innovation, funding more than USD 800 million annually. Large agri-businesses such as Bayer, Cargill, and BRF, amongst others have set up innovation centres within the country.⁹ Past research by Fuglie et al.¹⁰ show that ~USD 377 million was spent in 2012 by private agribusinesses on R&D. Using multipliers from the global study of private funding to include marketing funding and adjusting for an increase in annual funding over the years, it is estimated that private corporations spent more USD 8 billion on agricultural innovations over the decade.

Development Partner funding into agricultural innovation has been lesser compared to funding by the government and the private sector. The study estimates that Development Partners have funded between USD 40-45 million in agricultural innovation annually over the past decade (Figure 2).

⁷ National Council for Scientific and Technological Development

⁸ https://www.bndes.gov.br/SiteBNDES/bndes/bndes_en/Institucional/Press/Destaques_Primeira_Pagina/20210401_new_structure_for_issuing_green_IDB.html

⁹ Company websites and press releases. Cargill: <https://www.cargill.com/static/brazil-annual-report/2014/en/03.htm>; <https://www.newhope.com/supply-news-amp-analysis/cargill-opens-innovation-center-brazi> BRF: <https://www.brf-global.com/en/about/innovation/product-innovation/> Bayer: <https://www.bayer.com/en/investors/agriculture-megatrends>

¹⁰ Fuglie, Keith. 2016. "The Growing Role of the Private Sector in Agricultural Research and Development World-Wide." *Global Food Security* 10: 29–38.

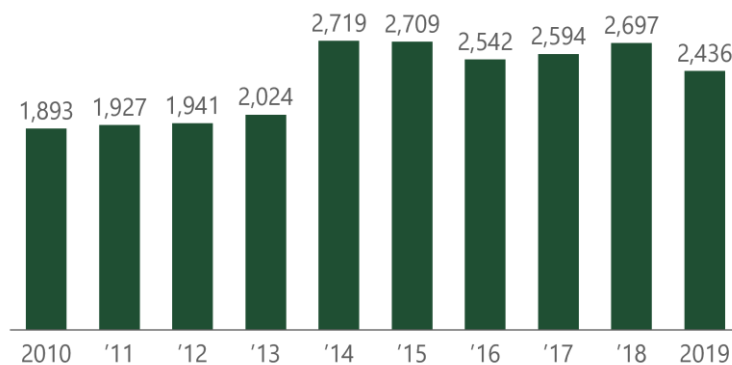


Figure 1. Funding by Brazil government on ag innovation USD millions (Constant 2019 prices), 2010-2019.

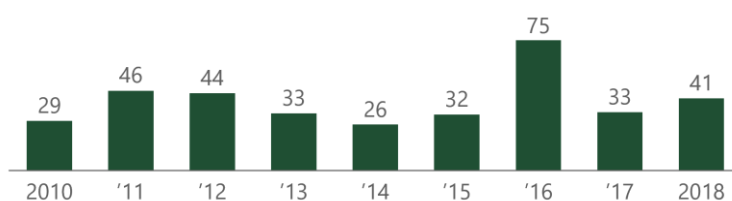


Figure 2. Funding by Development Partners on ag innovation USD millions (Constant 2019 prices), 2010-2018.

3. Recipients of Innovation Funding in Brazil

More than 50% of innovation funding is directed to government agencies, followed by 20-25% to research institutes, 20-25% to private companies and less than 10% to NGOs/NPOs (Figure 3). Given that innovation in the country is largely government-funded and research-focused, it is not surprising that government agencies, public universities and research institutes receive most of this innovation funding. Research institutes such as Embrapa and the state agricultural research organizations (OEPAs) receive a sizeable share and are important stakeholders in the overall ecosystem. The State Research Foundations (FAP) induce and foster scientific and technological research and innovation.¹¹ For instance, the São Paulo Research Foundation (FAPESP), the FAP of São Paulo, aims to enhance research collaboration between the United States and Brazil especially in agriculture.¹² Brazil has recently launched a new graduate fellowship program in agriculture in collaboration with Purdue University through the Coordination for the Improvement of Higher Education Personnel (CAPES), a public foundation for the development of graduate education in Brazil.¹³

¹¹ [DWIH São Paulo](#)

¹² [FAPESP highlights research collaboration with Brazil, United States](#), Institute of agriculture and natural resources, 2017.

¹³ Purdue university website: <https://www.purdue.edu/newsroom/releases/2019/Q2/brazil-and-purdue-launch-new-graduate-fellowship-program-in-agriculture.html>

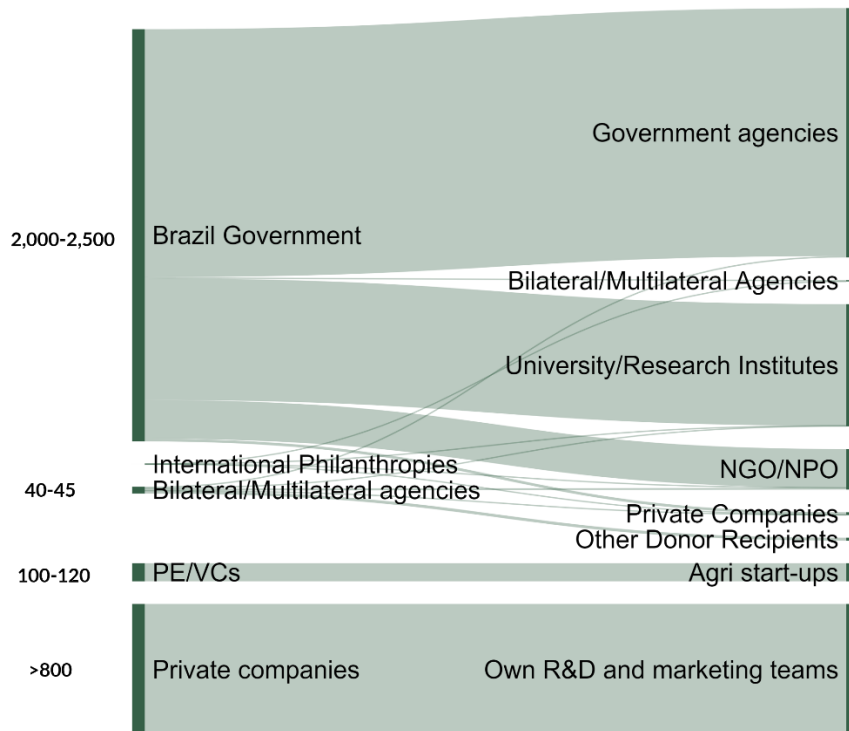


Figure 3. Funding towards innovation in agriculture and allied industries in Brazil USD millions (Constant 2019 prices), annual average for 2010-2019.

Across innovation stages, a larger share of the public innovation funding in Brazil goes to research and develop new technologies (~75%), with a primary focus towards crops. About 75% of Brazil’s public innovation funding is towards research and product development. This is much higher than other countries studied (Figure 4). Embrapa, which has a large share of Brazil’s public research funding, has driven the sustainability agenda not only through research on agricultural technologies but also through research on government policies that eventually drive innovation in agriculture. Brazil has one of the most well-developed and well-funded agricultural research systems in the developing world, ranking third in terms of public agricultural research and development (R&D) funding.¹⁴ Consequently, the share of non-R&D government funding for innovation (including funding for adoption activities) is relatively lower in Brazil.

An analysis of Embrapa’s budget data shows that more than 50% of its budget is allocated to crops, with a significant amount (more than 30%) allocated to cross-cutting themes. Cross-cutting themes include social innovation for agriculture, research on nutrition and health, and research on climate change and climate resilience amongst other topics. Further, Embrapa has led the model on collaborating with the private sector on agricultural research projects. The institution has aimed to get 40% of its projects implemented in partnership with private players. Information on project funding by OEPAs is scarcely available and thus, was not included in this analysis.

¹⁴ ASTI (2010). [Brazil Note](#)

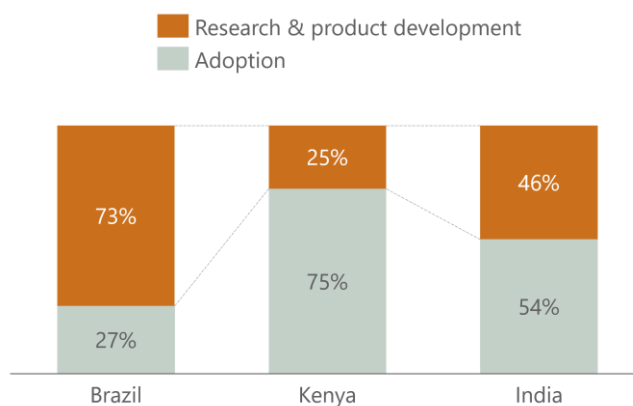


Figure 4. Funding by government by type of funding USD millions (Constant 2019 prices), 2010-2019.

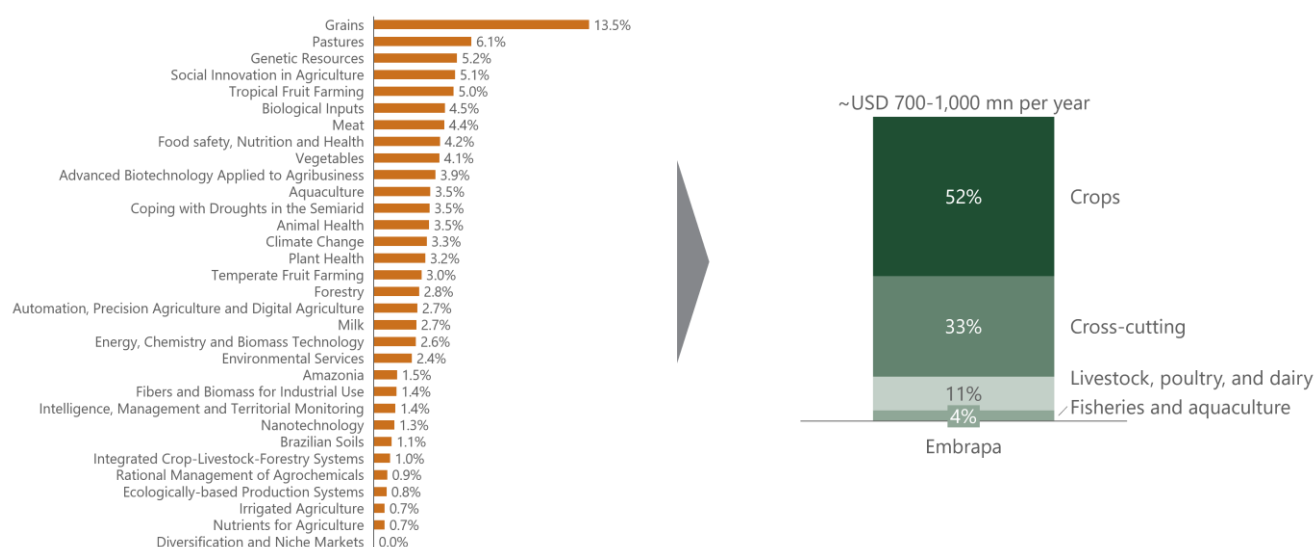


Figure 5. Break-up of Embrapa's budget (2020).

Research and product development also remains a key focus for private funding; however, absence of a detailed breakdown of private sector funding prevents quantitative analysis. Large agribusinesses have set up research centres in Brazil. For instance, Bayer opened the Tropical Agriculture Expertise Centre (CEAT) in São Paulo in 2016, to develop solutions that consider the country's specific climate and conditions, searching for the best seeds, traits, and pesticides for Brazilian agriculture.¹⁵ Similarly, Syngenta and Cargill are some of the other large agribusinesses that have established R&D centres in Brazil.¹⁶ Private sector funding in agricultural innovation have been encouraged by the Brazilian government, through intellectual property rights for new crop varieties¹⁷, regulatory approvals for the use of GM products, among others. Large global agribusinesses have operated wholly owned subsidiaries in the country as well as acquired domestic companies.

¹⁵ Gov.br (2017). [Brazilian agribusiness sector now to explore new technologies](#)

¹⁶ Company websites and press releases.

¹⁷ "Fuglie, Keith. 2016. "The Growing Role of the Private Sector in Agricultural Research and Development World-Wide." *Global Food Security* 10: 29–38.

Lastly, NGOs play a smaller but significant role, working closely with the government as well as Development Partners to implement agricultural extension and technology promotion programmes. NGOs have also driven the agenda for sustainability in the country, especially on the environmental front.

4. SAI Innovation Funding in Brazil

Brazil's overall SAI funding is likely in the range of USD 2-3 billion in the last decade (~USD 200-300 million annually). Most of this SAI funding comes from governments (~USD 130 million annually which translates to about 6% of public agricultural innovation funding) and private corporations (~USD 80 million annually which translates to about 10% of private agricultural innovation funding). Examples of government funding include funding for the implementation of The Low Carbon Agriculture policy (ABC Plan) that was adopted in 2010 to implement the consolidation of low-carbon emissions in Brazil's agricultural sector while sustaining economic growth in the sector. Embrapa has particularly invested in SAI related research such as developing and driving integrated crop-livestock-forestry systems, farming techniques with limited tillage, and nitrogen fixation amongst soybeans, amongst others.

Development Partner funding comprises a much smaller portion of overall funding but provides insights into SAI funding. Development Partners fund about USD 40-45 million annually in agricultural innovation, and less than USD 15 million annually in SAI. Although absolute numbers remain small, share of SAI innovations as a fraction of agricultural innovation funding remains high at about 30%. Development Partners have a strong focus on environmental sustainability in Brazil, higher than other major economies in the Global South, including India and Kenya.¹⁸ We believe that this is in response to the local context that has many NGOs and interest groups that drive environmental sustainability as a key agenda.¹⁹ About 70% of the Development Partner funding towards innovation comes with an intention towards environmental sustainability (Figure 7); this is a much larger share compared to other countries. A majority of Development Partner-funded SAI related programmes are focused on the promotion of sustainable low carbon land use and forest management by encouraging new technologies. Additionally, promoting effective cultivation techniques to restrict deforestation is an important area of focus of Development Partners in this region.

¹⁸ In general, for funding by donors in India and Kenya, less than 35% of funding gets tagged with environmental sustainability.

¹⁹ Expert interviews reveal that the environmental focus cuts across funder types, including the government and multilateral donors. Further, according to interviews, grassroots movements have had an important role in shaping the focus on the environment.

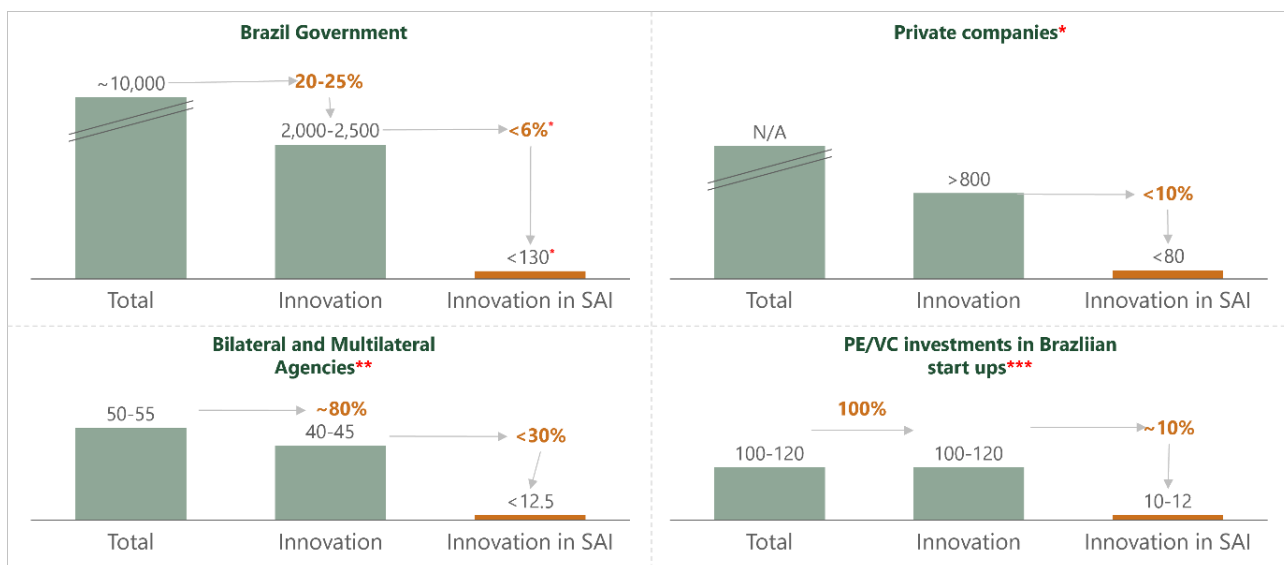


Figure 6. Funding towards agriculture, innovation in agriculture, and innovation in SAI (broad definition) USD millions (Constant 2019 prices), annual average for 2010-2019.

* SAI funding by the Brazil government is indicative based on extrapolations using percentage of innovation funding into SAI by Development Partner funding in Brazil and SAI funding by other governments.

**Development Partner funding includes innovation related funding provided to governments that are also included in government estimations. However, this is a small fraction of the total.

***PE/ VC funding is estimated using the AgFunder Agri-FoodTech 2019 investing report.

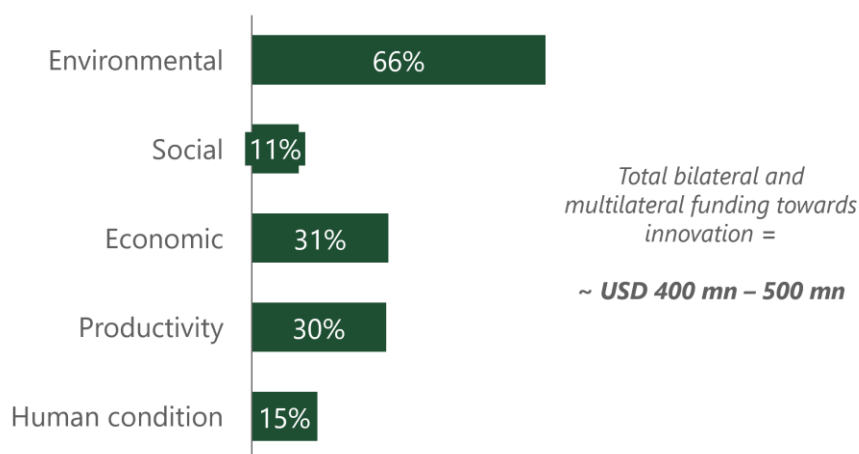



Figure 7. Percentage of innovation funding tagged by sustainability domains (based on Musumba et al.) for funding by Development Partners.

Of the funding made by PE/VC organizations, approximately 10% of the innovation funding (~USD 10 million annually) is likely to be directed towards SAI innovation.²⁰ Hydroponics stands out in the Brazilian SAI related agri-tech start-up space. For example, BeGreen is a platform offering hydroponic based products, including products for indoor farming. Pink Farms is a producer and supplier of

²⁰ Based on a sample of ~100 start-ups in the Tracxn database.



vegetables, operating a hydroponic facility in São Paulo, offering microgreens, among others. Funding for start-ups in Brazil is lower than other large markets, such as India. For instance, the available data shows that annual PE/VC funding in agri-tech companies was USD 500-700 million for India.

5. Conclusion

Brazil stands out with its higher-than-average share of funding in upstream innovation and research, contrary to the narrative that most funding in the Global South is about adoption of existing technologies. The country has many models to showcase strong public funding in research, innovative public-private partnerships, environmental sustainability supported by grassroots movements leading to mainstream funding, and collaboration across various funder types. Further granularity in published government data would be welcome.



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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