



Climate change and its impact urge stepping up innovation efforts. Kenya farmer Mercy Wambui measuring rain water on her farm.

Photo: Georgina Smith/ CIAT

More, but not of the same – new funding for a new type of AR4D needed

Given the ambitious targets we need to meet to transform food systems under climate change, innovation efforts need to be significantly stepped up – both in terms of innovation practice and investment volumes. New approaches to financing action in food systems are there, but they have to be linked to innovation to drive rapid transformation.

By Ana Maria Loboguerrero Rodriguez, Bruce Campbell and Alberto Millan

The 2030 Agenda for Sustainable Development sets out an extremely ambitious and transformational vision, with a world free of poverty, hunger, disease and want. The Agenda emphasises the importance of structural transformation to strengthen the productive capacities of least developed countries in all sectors and urges the world to take the transformative steps needed to shift itself onto a sustainable and resilient path.

In this regard the 17 Sustainable Development Goals (SDGs) with their 169 associated targets were announced with the purpose of defining a framework to transform the world. We are not on track to achieve the targets. To provide

some examples, we are not reducing child undernourishment fast enough, we are heading for a 3–4 °C warmer world, which would be a disaster for food production, especially for the over 500,000 smallholder farmers in the world. Furthermore, two billion people are overweight, and whereas 650 million people are obese, 690 million went hungry in 2019 (more than in 2018).

A new approach in agricultural research for development is needed

At the heart of this transformation is innovation. Many actions can be taken to align ag-

riculture and food systems on a pathway that is more sustainable, inclusive, healthy and climate-resilient. However, these actions have to enable innovation across all food systems actors – that is all 7.7 billion of us. Agricultural research for development (AR4D) is a major part of the innovation system, but it cannot be business as usual AR4D.

Current AR4D and innovation systems are often fragmented, inefficient, overly supply-based and siloed. Innovation can be hampered by fear of failure, perverse incentives that may result in duplication and redundancy, short-term orientations and a focus on “publish or perish”. In such circumstances, it is difficult to deliver

end-to-end, sustainable solutions to problems. By end-to-end, we refer to approaches that work across the innovation system for agriculture (from early-stage development to product development to large-scale deployment), where research efforts are targeted towards end-user needs and underpinned by robust partnerships with private, public and civil society actors to ensure adoption and societal outcomes. The approach also implies working on the institutions and incentives that ensure uptake and scaling.

One of the eleven actions for transforming food systems proposed by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is to significantly change the approach of public AR4D by 2025, with at least 50 per cent of public investment in AR4D providing end-to-end solutions. We will also need to offer researchers the right incentives so that they can embark on this new way of doing AR4D, where, for example, publications are not the dominant metric of success. Mechanisms such as outcome-based budgeting – where resources are allocated based on demonstrated ability of science groups to generate outcomes – should be considered as enablers of change.

Fostering new types of investment in food systems

The days when the unique challenge was to increase agricultural productivity are long gone. The challenge now is different and more complex. We need to satisfy increasing food demand while dealing with climate change impacts, increase incomes for farmers while reducing the ecological footprint from food systems, reduce inequality, enhance animal welfare and ensure better diets. Moreover, the challenges are magnified when dealing with small- and medium-sized farming enterprises, where finance, resources and information are often lacking, where poverty, vulnerability to climate change and food insecurity intersect, and where transaction costs are extremely high to reach millions of small farms.

Traditional sources of funding for AR4D have often not been sufficient; and are definitely insufficient for the new agenda. For example, in the 2014 Malabo Declaration on Accelerated Agricultural Growth, African governments committed to allocate at least ten per cent of public spending to agriculture, but few countries have met that target. According to the Biennial Review published recently, “the continent as a whole is not on track to meet the goals and targets of the Malabo Declaration...”.



Felistus Chipungu, orange-fleshed sweet potato breeder and scientist with the International Potato Center (CIP), working at a CIP facility in Blantyre, Malawi.

Photo: Chris de Bode/ CGIAR

Another example is CGIAR – the Consultative Group on International Agricultural Research – which although relatively well funded, has an AR4D budget which is less than that of some of the large agricultural companies (also see article on pages 11–13). To date, most finance for adaptation to climate change and other actions for small-scale farmers comes from public sources, such as development finance institutions, bilateral donors and climate funds. A key question is whether such funds could be used to leverage manifold more private capital. Traditionally, a number of barriers such as lack of pipeline/investable projects, high investment risk and lack of primary data and information as well as lack of intermediation to efficiently connect different pools of capital to investments has prevented private finance from flowing to food systems initiatives at scale. Public finance can help reduce the bottlenecks so that private finance flows.

Some current trends provide hope. Food and agriculture companies, investors and financial institutions are increasingly realising the climate-related risks they face, as climate change affects markets, assets, infrastructure, investments, workforce, etc. They are also being put under growing pressure from their customers, shareholders and the public at large to rise to the new challenges. Many have already started assessing their exposure and risk/return profiles, designing strategies to capitalise on new business and sustainable finance opportunities, and they have been shaping their business to improve their social and environmental standing. Thus, the time is ripe for new approaches to financing food systems innovations.

According to the Business and Sustainable Development Commission, business opportunities in the implementation of the SDGs related to food could be worth over 2.3 trillion US dollars (USD) annually for the private sector by 2030. The investment required to realise



Farmer Sita Kumari uses mobile phone apps to enhance her yields and get access to market and labour. Here she is with scientist Pratima Baral and her friend Nilam (r).

Photo: Georgina Smith/ CIAT

these opportunities is approximately 320 billion USD per year. Innovations in how public sector funding is used can pave the way to unlock the billions needed to realise these business opportunities. But what could these investments look like?

Innovations in sustainable finance

Blended finance – the use of catalytic capital from public or philanthropic sources to increase private sector investment – is an innovation that is moving rapidly forward. It allows different types of organisations to invest together in a structured way such that each accomplishes their own financial return and/or development impact objectives. To date, approximately 140 billion USD in capital for sustainable development in developing economies has been mobilised through blended finance, with agriculture representing approximately 16 per cent of this. One nice example in relation to this innovation is The Global Innovation Lab for Climate Finance that brings public and private actors together to turn innovative ideas into investable mechanisms for climate adaptation and mitigation. The Lab’s over 60 members provide expertise as well as capital for its instruments. They comprise both public-sector institutions such as the Netherlands Ministry of Foreign Affairs or KfW Development Bank and private-sector actors like BlackRock, Allianz or the Rockefeller Foundation. The Lab has launched 35 innovative financing instruments to date, enabling a mobilisation of 1.5 billion USD. Several instruments have focused on smallholders, including the Climate-Smart Lending Platform by F3 Life and the Smallholder Forestry Vehicle.

Considering the massive challenges that society faces, **impact investing** is a growing market. Many investors are incorporating measurable social and environmental impact targets

alongside their financial return targets in their investment portfolio. This growing market provides resources to address the world's most urgent challenges as demonstrated by the case of Netherlands-based Actiam Impact Investing, who decided to invest in Pro Mujer Bolivia (a microfinance institution) in an effort to provide them with the additional working capital needed to expand their client base to provide access to financial services for impoverished women in Bolivia. One fundamental aspect of impact investment is the commitment of the investor to measure and report the social and environmental performance and progress of the investments, ensuring transparency and accountability.

Tech-enabled finance also provides an opportunity to develop innovative financial and market delivery channels. Digital technology reduces transaction costs and creates economies of scale, supports transparency and risk management, and speeds and smoothes cash flows. Examples such as Hello Tractor, a US- and Nigeria-based agtech social enterprise which, through digital tools, connects tractor owners with farmers in need of tractor services, demonstrate the case of this innovation as a way to reach many smallholder farmers that lack the capital to purchase machinery. The emerging data economy and big data analytics offer the opportunity to analyse, understand and address the underlying risks of market failures. In the same manner, big data analytics can be used to more accurately evaluate farmer risk profiles. Blockchain technology can improve the credit system and the information asymmetry, build a smooth information transmission channel, improve the transaction reliability, and reduce the cost of the traditional agricultural financing. It is also consolidating as an innovation for product tracing, emissions monitoring and carbon market finance. As these technologies continue to advance, policy protecting data privacy and incentivising data usage will be necessary to prevent misuse and lack of use of data.

Promoting financial inclusion. Whereas investors may deal in hundreds of millions of dollars, an individual small-scale farmer may only be looking for a few hundred dollars in a particular season. Channelling large investments into small amounts for millions of small-scale farmers is challenging, but digital approaches – as mentioned above – will help bridge the divide. Financial inclusion is essential and can be targeted via the metrics developed for impact investing. It will also be crucial to create and implement innovative approaches to finance that move beyond private collateral as the ba-

VALUE CHAIN FINANCE

Value Chain Finance (VCF) refers to financial products and services that flow to or through any point in a value chain enabling investments that aim at increasing actors' returns and facilitating the growth and competitiveness of the chain. It is an approach that fosters understanding of the financing opportunities within a value chain and the way in which finance should be tailored to a specific value chain. As an example, the VCF approach was used in a simulation for plantain production in Nigeria, covering the period from 2016 to 2040. Plantain is considered a "high-value crop". Nevertheless, given a variable and low production, farmers usually lack access to reliable financing

measures to grow the crop. In Nigeria, a VCF approach could unlock plantain production, improving the livelihoods of many small-scale farmers. Considering four phases for the implementation of the approach (identification and evaluation of potential value chains, facilitation and leveraging of market linkages, designing of financial products and evaluation of capacity to pay, and granting, monitoring, and collection of loan), analyses show that investment in VCF for plantain in Nigeria could start yielding benefits in the third year, with benefits equalling the cost of investment in the ninth year and a total economic surplus of 2,173,900 USD at the end of the 25-year period.

sis for lending. Empowered local organisations as platforms for increased access to finance through initiatives such as revolving credit, collective savings and finance mobilisation are a crucial part of the ecosystem if scale is to be achieved. Bundling financial services with inputs, training, knowledge-sharing, climate-informed advisory services, etc. can be an important mechanism to leverage economies of scale, minimise cost of delivery, and maximise accessibility for the most vulnerable groups, including women, youth and the impoverished.

Examples where financial systems have gone the last mile include mobile money in Kenya, which has given women more control over their finances, and has supported 194,000 households in leaving poverty, the majority of which are female-headed. **Value Chain Finance** constitutes another mechanism to promote financial inclusion (see Box).

AR4D empowering and leveraging sustainable finance

The ultimate innovation is embedding AR4D in sustainable finance for food systems transformation. The vision is reorienting and leveraging large volumes of capital into food systems that drive transformation. As indicated above, investors and food companies are looking for innovative solutions, thus embedding research into sustainable finance initiatives is key.

We see this starting to happen. For example, a new impact investment fund for climate-smart food systems is being established, where CGIAR/CCAFS partners with the Swiss enterprise responsAbility Investments AG to design a structure and innovative investment solution that can help leverage and deploy

private capital at scale in low-carbon and climate resilient food systems. Under this mechanism, CGIAR/CCAFS works with an impact investor to develop its investment strategy, identify and assess key risks and investment opportunities and provide pre-investment and post-investment technical assistance. AR4D can play a profound role in terms of advancing the science towards accurately measuring the social and environmental performance of these investments. AR4D could also engage in developing guidance to rigorously assess and prioritise the major risks affecting actors along agricultural value chains and identifying actionable components of an integrated risk management strategy for the value chain.

The Agenda in food systems has to be ambitious, and we have argued that the funding for AR4D is insufficient and that AR4D cannot be business as usual. Innovations in finance to transform food systems can be the cornerstone for new ways of funding a new type of AR4D.

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