WORKING PAPER

Enhancing Food Security through Finance-Enabled Food Systems Transformation

September 2025 • **Emilio Hernandez and Somya Banwari**

CGAP

Acknowledgments

The authors would like to thank colleagues Luz Andrea Camargo, Parmesh Shah, Marie Agnes Jouanjean, and Songbae Lee for their comments and suggestions. Ideas exchanged with these colleagues strengthened our analysis. This paper also benefited greatly from peer review by CGAP colleagues, including Xavier Faz, Estelle Lahaye, and Max Mattern. Excellent research assistance was provided by ISF Advisors and MSC.

CGAP

1818 H Street, NW, MSN F3K-306
Washington, DC 20433
Website: www.cgap.org
Email: cgap@worldbank.org
Telephone: +1 202 473 9594

Cover photo by Saiyna Bashir.

Rights and Permissions

Contents

Executive Summary

GLOBAL FOOD SECURITY CHALLENGES have evolved. While past efforts successfully expanded the availability and affordability of caloric intake in all regions of the world—effectively reducing the direst forms of hunger—today's urgent food security challenges lie in combating malnutrition by making healthy diets more affordable, and reversing the environmental degradation caused by unsustainable food systems. These multidimensional challenges are most severe in low- and middle-income countries (LMICs). Today, 2.8 billion people cannot afford a healthy diet, and 3.5 billion people suffer micronutrient deficiencies. In addition, food systems contribute to one-third of greenhouse gas emissions, and 40 percent of the world's arable land is now degraded by aridity. As a result, food systems impose USD 19 trillion a year in social, health, and environmental costs globally.

This paper examines the untapped potential of inclusive finance to help address today's new food security challenges. The analysis suggests that the role of inclusive finance in addressing the pressing food security challenges of today is two-fold:

First, at the **retail level**, inclusive finance supports local financial service providers (FSPs) to tailor their services to meet investments required by key actors engaged in specific 'high-impact' agricultural value chains (AVCs) contributing the most to nutrition and sustainability outcomes in LMICs—mainly smallholder farmers and agricultural small- and medium-sized enterprises (agri-SMEs). The unlocked investments allow these key AVC actors to adopt agriculture technologies (AgTech) that help them transition to more sustainable agricultural practices and increase productivity in a way that improves their livelihoods and results in the production of more nutritious food that is affordable to growing low-income populations. The service tailoring required by FSPs includes defining the right product features, managing related risks, and developing strategies to deliver these services conveniently to these target customers.

Similarly, inclusive finance can also support local FSPs and local investors to tailor retail finance for AgTech firms—i.e., companies developing AgTech to address bottlenecks in those high-impact AVCs mentioned above. This includes FSP services like working capital loans, insurance, savings, and payment products for daily financial management; or impact investor services like long-term debt or equity required for larger investments.

Tailoring services at the retail level helps reverse a chronic lack of exposure that formal financial institutions have to the agriculture sector in LMICs.

Second, at the **wholesale level**, inclusive finance supports Development Finance Institutions (DFIs), donors, and global or regional impact investors to provide greater flexibility to local FSPs and investors—i.e., their investees—in adjusting their retail financial services as explained above. This implies defining strategies to tailor wholesale finance mechanisms (e.g., credit lines, guarantee funds, social bonds, and other blended finance initiatives) to make sure they have the right features, such as duration, repayment schedules, grace periods, interest rates, collateral requirements, customer due diligence processes, and equity investment exit strategies.

Given its role, inclusive finance is a critical component of any effort to promote inclusive, sustainable, and nutritious food systems, helping address the low AgTech adoption rates observed in LMICs, especially among key AVC actors. This low adoption rate happens despite a rise in the development of AgTechs that address chronic agriculture challenges in LMICs. To increase AgTech adoption rates, the lack of adequate financial services at the retail and wholesale levels is among the most binding constraints that need to be removed. The analysis presented suggests that often, current retail and wholesale financial offers do not match the financial needs that key AVC actors have when adopting AgTech.

To tackle this, CGAP proposes a multi-step framework to focus high-level strategies used by local FSPs and impact investors on more effectively contributing to food security. The steps in this framework are:

1. **Identify and target those high-impact AVCs** that contribute the most to improved nutrition and sustainability outcomes in a given market;
2. **Identify unique bottlenecks** in these high-impact AVCs and AgTech categories that can address them;
3. **Determine the set of tailored retail and wholesale financial solutions** that respond to the specific needs of high-impact AVC actors (smallholders and agri-SMEs) and relevant AgTech firms (those companies developing AgTech solutions) to promote greater AgTech adoption.

This paper calls on global and local stakeholders—including FSPs, DFIs, donors, and impact investors—to act:

FSPs

- FSPs aiming to contribute to food security should identify and target high-impact AVCs, the key vulnerable actors in these chains, and those AgTech firms that provide effective solutions to their bottlenecks.
- This assessment should point out untapped growth opportunities where proven AgTech solutions can be applied in high-impact AVC investments resulting in productivity gains that open new markets.
- FSPs should then assess if these key AVC actors and AgTech firms are represented in their current customer base and expand or include them as needed. To do so, FSPs will need to invest in financial product research and development (R&D), staffing, information technology (IT), risk management strategies, and distribution systems to develop financial products that meet the unique financial needs and enable AgTech adoption by high-impact AVC actors.

DFIs

- DFIs should support local FSPs in the R&D process to understand the requirements faced when tailoring their financial services to the needs of high-impact AVC actors and relevant AgTech firms.
- This knowledge can be used to adapt wholesale financial mechanisms (like blended finance mechanisms that offer credit lines and guarantee funds) to provide local FSPs more flexibility in tailoring their retail services.
- DFIs should also diversify early-stage funding for AgTech firms in high-impact AVCs, offering more flexible debt and equity options to help them scale.

Impact investors

- Impact investors working at the global or regional levels should also understand the investment requirements for AgTech adoption in high-impact AVCs to tailor wholesale solutions like debt, equity or social bonds for (1) FSPs to flexibly design adequate services for high-impact AVC actors; or (2) AgTech firms providing solutions to high-impact AVCs that need to invest to make their solutions more affordable and scalable.

Donors

- Donors can support food security by funding one-time investments to enhance capacities in a permanent way by:
  - Reducing R&D and innovation costs faced by local FSPs when tailoring services to high-impact AVC actors and relevant AgTech firms.
  - Help DFIs and impact investors conduct assessments to identify high-impact AVCs and how to make their wholesale financial tools more flexible in meeting AgTech adoption needs.
  - Strengthen agricultural extension services, data collection, and shared digital and physical infrastructure to help smallholders and agri-SMEs in high-impact AVCs adopt AgTech more effectively.
  - Support AgTech business development services to improve investment readiness of AgTech firms.

Together, these actions can help scale nutritious and sustainable food systems, boost AgTech adoption, and support smallholders and agri-SMEs who are crucial to sustainable and nutritious food supply in LMICs.

Inclusive finance—when aligned with the new priorities in food system transformation efforts—can move beyond access to finance and become a transformative force for food security.

SECTION 1

Introduction

OVER THE DECADES, THE GLOBAL FOOD security challenge has evolved. Financial services must take a new approach to contribute to food security goals. Food security is no longer only about hunger—or 'acute food insecurity', where people do not have the minimum caloric intake to survive. The new global challenges to food security are increasingly about addressing a growing problem of malnutrition and environmental and resource degradation—issues that affect a large share of the global population, mainly in low- and middle-income countries (LMICs) (IFPRI, 2024; FAO, 2024; OECD, 2021).

It is increasingly apparent that the next frontier of food security improvements requires financial solutions to unlock investments that more intentionally enable sustainable productivity gains in certain 'high-impact' agricultural value chains (AVCs). Investments in these high-impact AVCs are more effective in producing diverse and affordable nutritious food in a sustainable way, making it accessible to most low-income populations (Wineman et al., 2024; IFPRI, 2024; FAO, 2024).

Inclusive finance has a crucial role to play in enabling these types of investments.

This working paper synthesizes how inclusive finance can more effectively support nutritional and sustainability outcomes as priorities in global food security efforts. Inclusive finance is defined here as all public and private sector efforts to improve the value and viable delivery of financial services, such that these services are used by, and benefit, those vulnerable segments of the population (individuals or enterprises) that continue to be underserved by—or excluded from—formal financial markets.

The role of inclusive finance in addressing today's pressing global food security challenges is to generate retail and wholesale financial solutions that enable key vulnerable actors—mostly women who are smallholder farmers or work in agri-SMEs and participate in high-impact AVCs—to adopt new agricultural technologies (AgTechs) being developed in LMICs. These AgTechs can bring local solutions to chronic bottlenecks in high-impact AVCs. And by scaling their adoption among these key vulnerable AVC actors, inclusive finance enables the latter to transform their production, processing and distribution processes, to offer more affordable, nutritious, and sustainably produced food in local markets and feed low-income populations.

AgTech firms (i.e., those companies developing AgTech solutions) can use financial services from financial service providers (FSPs) and local impact investors. FSPs usually have a competitive advantage to serve AgTech firms by offering shorter-term debt for working capital and other financial services like insurance, payments, and savings to manage daily financial needs. However, FSPs rarely offer equity. Local impact investors by contrast usually have an edge over local FSPs when offering longer-term debt, usually for larger investments, in addition to offering equity.

It is important for inclusive finance efforts to understand evolving global food security challenges if they are to effectively tailor financial solutions in a way that enables the nutritional and sustainability outcomes being prioritized. Food security is a multidimensional concept that requires food to be physically available, economically accessible, and nutritious—consistently over time (FAO, 2024). While food security has long been a global development priority, the challenges affecting its various dimensions—availability, affordability, nutrition, and sustainability—have evolved.

Over the past decades, efforts to tackle food security have largely centered on the availability and economic accessibility dimensions. This has led to investments in certain AVCs—mainly cereals like wheat, maize, rice, soy—that have led to important productivity gains. As a result, these key staples are more widely available and affordable globally, ensuring that people have enough caloric intake. This has addressed acute food insecurity, the direst form of hunger, in most parts of the world (Barret, 2020).

This is not to say that acute food insecurity no longer happens. It does, and it requires urgent action. However, it is no longer a food system issue, but rather a social protection one. Unfortunately, increasing violent conflict across the world is the main cause for the rise in acute food insecurity. Addressing it requires the design of flexible, efficient, and well-funded social protection interventions such as food and cash transfers. These interventions are key to serving the estimated 730 million people affected by acute food insecurity (FAO, 2024; Barret, 2020).

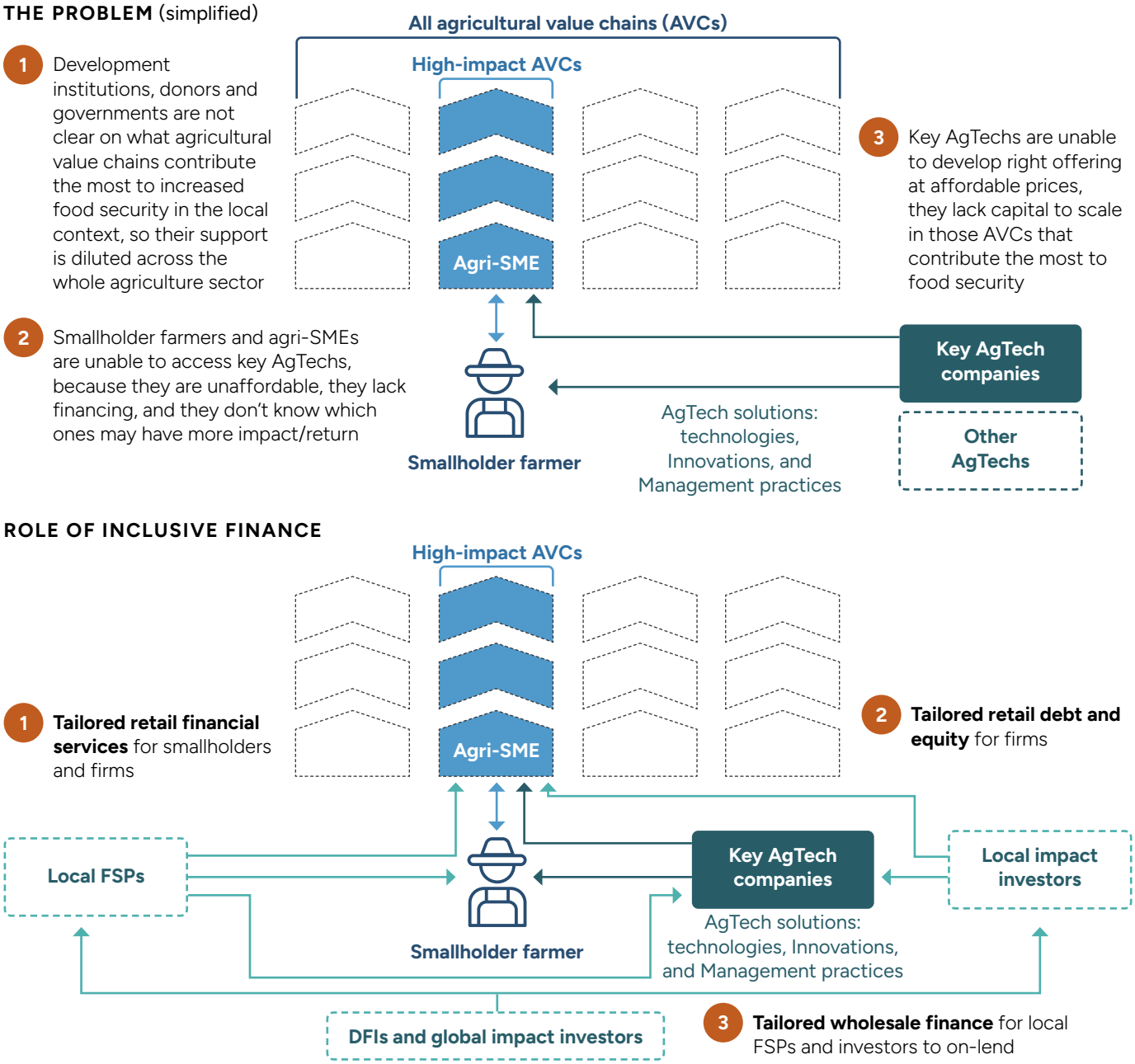
Food system transformation efforts are concerned with addressing the growing problems of malnutrition and environmental and resource degradation. Globally, about 3.5 billion people suffer from micronutrient deficiencies; 2.8 billion cannot afford a healthy diet, even if they want to eat better; and 70 percent of the world's overweight and obese population reside in LMICs. In addition, 40 percent of the globe's arable land is degraded by aridity, and current global food systems are responsible for a third of global greenhouse gas (GHG) emissions (Barret and Gomez, 2025; FAO, 2024; UN 2024; Barret, 2020).

These challenges are placing a heavy toll on countries' health systems and their ability to feed themselves in the future. As a result, current global food systems impose about USD 19 trillion per year on health, social, and environmental costs (Rockefeller Foundation, 2025).

Food system transformation efforts are now focusing on producing more affordable, nutritious food in a sustainable way—especially for local food markets that cater to low-income people. Currently, the local food industry in these markets often uses mostly highly caloric ingredients for its processing activities, given that these ingredients are more affordable. Conversely, relatively little investment has been made in those AVCs producing highly nutritious ingredients for domestic markets in LMICs. As a consequence, productivity in these AVCs remains low, making nutritious ingredients more expensive, less utilized by the food industry, and less affordable for the end customer, especially people living in poverty (IFPRI, 2024).

This scenario calls for more nuanced and targeted inclusive finance efforts to contribute to food security. Greater focus is needed to enable productivity-enhancing investments in those high-impact AVCs—e.g., vegetables, fruits, nuts, dairy, poultry—contributing most to improved nutritional and sustainability outcomes for low-income populations.

FIGURE 1. **Prioritizing agriculture investments: Enabling AgTech adoption in high-impact AVCs**



Role of inclusive finance:

1. At the **retail level**, local FSPs can offer tailored financial solutions to smallholders and agri SMEs in high-impact AVCs to enable them to adopt relevant AgTechs to increase productivity and more sustainable agricultural practices
2. At the **retail level**, local impact investors can offer tailored debt and equity to key AgTechs companies and Agri-SMEs to enable investments that make their solutions more affordable for their end-customers engaged in high-impact AVCs
3. At the **wholesale level**, DFIs and global impact investors can offer tailored blended finance solutions (e.g. credit lines, guarantee funds, and social bonds) that provide local FSPs and impact investors with more flexibility to meet the needs of their end-customers engaged in high-impact AVCs

Note: One root cause of the pressing challenges to global food security is the lack of adoption of key AgTech by those actors engaged in high-impact AVCs. Inclusive finance is necessary to unlock investments required to promote such AgTech adoption at scale.

Source: Authors.

SECTION 2

Defining Priority Investments for Improved Food Security

DESPITE THE COMPLEXITY OF GLOBAL food security challenges, there are important trends in innovation that are making inclusive finance efforts more effective in enabling AVC investments that result in improved nutritional and sustainability outcomes. This prioritization is important. Financial services should be tailored to the unique needs of key actors participating in high-impact AVCs, supporting them to adopt the right AgTech solutions for productivity gains and that result in the desired outcomes.

Innovations in Agricultural Policy Analysis Help Identify Which AVCs to Prioritize for Investment

There are advances in agricultural policy analysis that can help inclusive finance initiatives to concentrate their efforts and identify high-impact AVCs. General equilibrium models such as IFPRI's RIAPA and FAO's MAFAP leverage growing data from national agricultural accounts. They model the effects that increasing investments and productivity in different AVCs would have on all dimensions of food security, including nutrition and sustainability.

These models help unpack complex impact pathways as they estimate the net effect of investments that increase productivity in various AVCs on farmer incomes, rural wages, employment, local food prices, and GHG emissions. The net effects are used to predict improvements in nutritional and environmental outcomes at the national and sub-national levels, and to identify those AVCs that contribute the most to these outcomes (see Fuglie et al. 2022; Sánchez and Cicowiez, 2022).

These models can inform discussions between inclusive finance initiatives and local agriculture policy leaders in each country to validate and build consensus around which are those high-impact AVCs contributing the most to improving nutritional and environmental outcomes. This helps prioritize public and private investments in these AVCs. Examples of high-impact AVCs may include vegetables, fruits, nuts, pulses, poultry, dairy, among others. However, these tend to be country-specific, and may not always include important cash crops like, for example, coffee, cocoa, or rice for export or the wealthier local customers.

Building consensus on which are high-impact AVCs in each country context is important for inclusive finance efforts. Narrowing the analysis to these high-impact AVCs is essential for inclusive finance interventions aiming to promote more nutritious and sustainable food systems. The bottlenecks and investments required for high-impact AVCs will be very different from AVCs with lower impact on desired outcomes. Consequently, the features of the retail and wholesale financial services that respond to the needs of those key actors participating in these high-impact AVCs will also differ.

Identifying AgTechs that Address Bottlenecks in High-Impact AVCs

Another trend over the past decade consists of a wave of AgTech innovations in LMICs offering local solutions to local problems within AVCs, from production and processing to commercialization and distribution. Inclusive finance initiatives should prioritize financial services that enable the scalable adoption of AgTech solutions designed to overcome bottlenecks faced by high-impact AVC actors.

We define these AgTech innovations broadly to include all agriculture technology innovations that improve productivity and efficiency along all value chain segments. Examples of such AgTechs include (not exhaustively):

- Regenerative agricultural practices that show promise to improve productivity levels in a more sustainable way (Kozloski et al. 2024);
- Innovations in inputs such as high yielding seeds and bio fertilizers (CGIAR, 2023);
- Solar-powered irrigation and mechanization that increase production and productivity while cutting carbon emissions (Balasubramanya, 2024);
- E-platforms that more efficiently link producers with input providers, off-takers or FSPs (GSMA, 2019).

These AgTechs are aggregated in our analysis below in categories defined by the AgBase Platform, ensuring the application of widely used terms in the AgTech industry.

Investments in these types of AgTechs are picking up post-pandemic, reaching close to USD 30 billion globally by 2023, up from USD 13 billion in 2021 (Beanstalk AgTech, 2023).

However, most of these AgTech solutions are being adopted in AVCs that are more profitable and well-organized, but with fewer linkages to low-income livelihoods and food markets that cater to low-income populations. Inclusive finance is needed to develop financial solutions that allow key actors in high-impact AVCs to adopt AgTech that can realize sustainable productivity gains that make these AVCs more economically viable. These include working capital to, for example, adopt regenerative agricultural practices and bio-inputs; or investment credit to purchase solar-powered irrigation and mechanization services, among others.

The Economic Viability of Investments in High-Impact AVCs is Improving

The viability of inclusive finance interventions supporting investments in high-impact AVCs relies on a growing demand for nutritious and sustainably produced food for consumers in local markets in LMICs. This rising demand is represented by the following trends:

1. As LMICs experience urbanization and income growth, there's a discernible shift in dietary patterns. Consumers in general increasingly demand more diverse and nutritious foods, including fruits, vegetables, dairy, meat, and legumes. For example, the availability of micronutrient-rich food is expected to grow by 46 percent by 2050 in South Asia (FAO, 2023; CGIAR, 2025).
2. Growing school meal programs in LMICs that require nutritious and locally-produced food are generating important market signals to local AVC actors. With an estimated annual global budget of USD 48 billion, these programs are increasingly trying to source food from local markets to improve the lives of smallholder families as primary food producers and offer sustainable and nutritious food to children in low-income households (Bundy, et al. 2024; Fonseca et al., 2025).

The challenge that prevents capturing the local economic opportunities that this rising global demand of nutritious and sustainably produced food represents relates to information asymmetries in financial and agriculture markets that prevent the identification of which AVCs to invest in and the adequate management

of production, price, and climatic risks. Inclusive finance efforts help overcome this challenge, as explained in the next chapters.

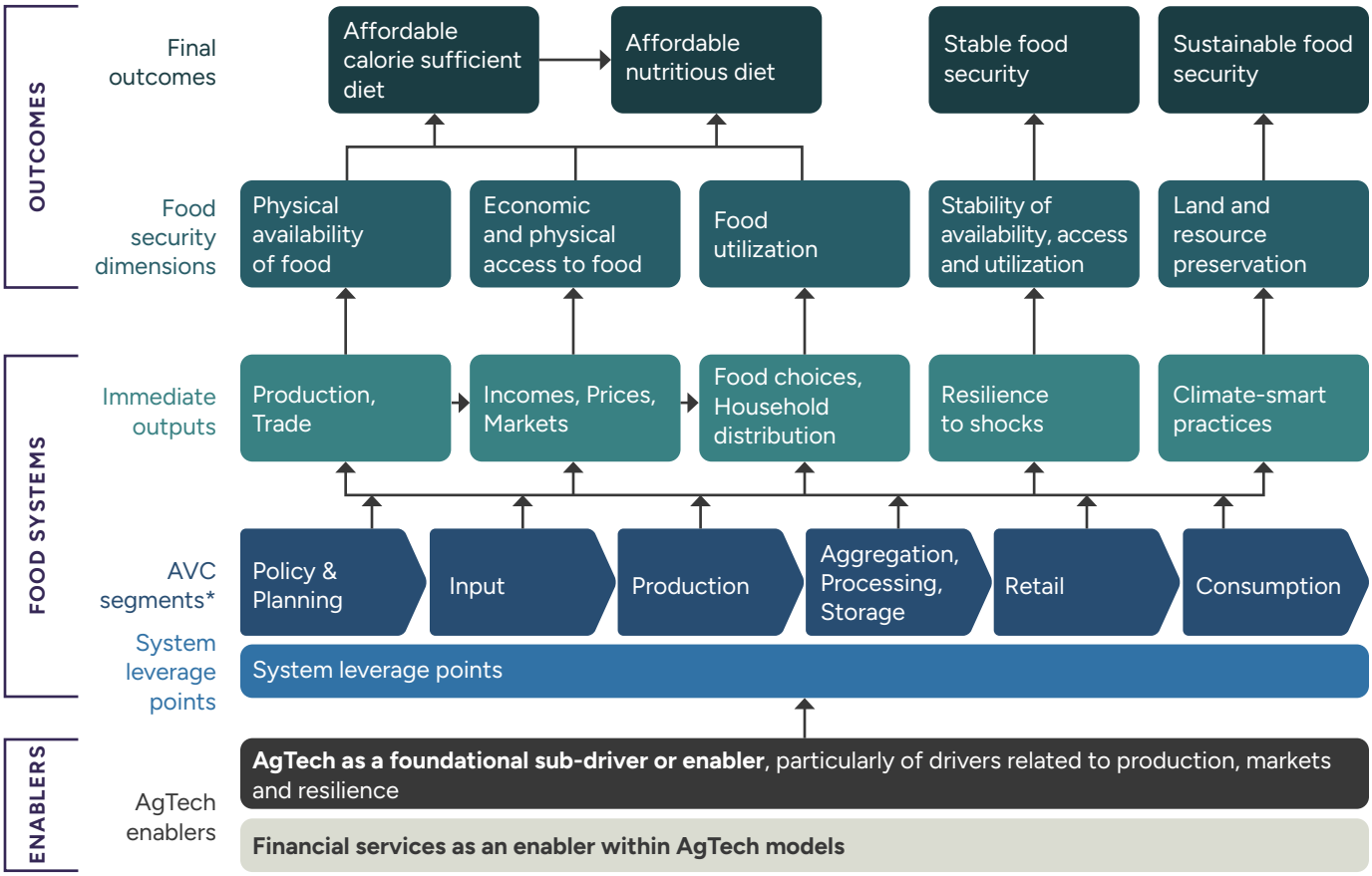
How AgTech Solutions Can Lead to Better Food Security Outcomes

Building on (1) tools that help prioritize high-impact AVCs and (2) mapping of the various types of AgTech active in LMICs, CGAP developed a theory of change that explains what happens to the different food security dimensions in a given country once various categories of AgTech are adopted across high-impact AVCs (see Figure 2).

Using the AgTech categories developed by the AgBase Platform, CGAP applied its theory of change to qualitatively assess how different types of AgTech solutions can influence various food security dimensions through changes in production, trade, incomes, food choices, resiliency, and climate adaptation. These impact pathways are detailed in the Annex.

The conclusion of this impact pathway analysis is shown in Figure 3. Based on the agriculture market system literature, the analysis shows how strongly the adoption of different AgTech categories in AVCs can positively affect each food security dimension. This is based on the number of those AVC segments

FIGURE 2. **Theory of change: How finance-enabled AgTech adoption impacts food security outcomes**



* AVC segments shown were selected based on their relevance to food security, rather than a holistic view on all the components involved in food production, consumption and waste.

Note: This theory of change helps explain how different AgTech categories can reduce constraints across different AVC segments. Reducing the constraints in each AVC segment leads to different effects on food system intermediate outputs, and then on food security dimensions, with final outcomes on people's food security.

Source: Authors.

that see their constraints reduced once the AgTech is adopted. Highly relevant AgTech for nutritious and sustainable food systems include ag biotech, bioenergy and biomaterials; farm robotics, mechanization and equipment; agriculture market places; agriculture fintech with bundled financial services; and novel farming systems. See Annex for examples.

Implications for Inclusive Finance

Understanding which AgTech categories best address the bottlenecks in high-impact AVCs enables inclusive finance initiatives to prioritize. FSPs can assess the particular financial needs for key actors in these high-impact AVCs to adopt the relevant AgTech. This would result in productivity gains that translate into more affordable and sustainably produced nutritious food.

In summary, the subsections presented earlier illustrate a thought process that seeks to help inclusive finance initiatives:

1. **Identify high-impact AVCs** and understand their bottlenecks;
2. **Identify AgTech solutions** that address their bottlenecks;
3. **Ideate tailored financial solutions** that meet the investment requirements for scaling adequate AgTech adoption in high-impact AVCs, leading to better food security outcomes.

FIGURE 3. **Expected incidence of the adoption of various AgTech categories on each food security dimension**

Taxonomy category	Examples	Affordable calorie-sufficient diet	Affordable nutritious diet	Stable food security	Sustainable food security
Agricultural FinTech: Bundled Financial Services	Bundled financial services, insurance providers, payment providers, credit/ innovative finance providers				
Agricultural Marketplace	Food delivery, fresh direct, re-stockists, commodity exchanges, agro-input suppliers, farm & input services, holistic marketplaces, commodity exchange+, farm services marketplace				
Farm Robotics, Mechanization & Equipment	Off-grid solar, mechanization				
Agricultural Biotech, Bioenergy & Biomaterials	Biofuels, biomaterials, biochemicals, water mitigation & treatment, adapted inputs				
Novel Farming Systems	Aquaculture systems & technologies, urban farming, indoor farming & protected/controlled agriculture				
Farm Management Services	Farmer advisory, weather & market data, farmer management, remote sensing & smart field equipment				
Agroclimatic Risk Intelligence Providers	Data capture & monitoring, intelligence reporting, predictive analytics platform, EWS, specialized risk modeling				
Supply Chain Management	Traceability, logistics optimization, ERP solutions				
Food Processing Technology	Food & feed processing technology, food processing management softward, active & intelligence conditioning & packaging				
Innovative Food & Beverage	Insect, algae & other sustainable proteins, plant-based proteins, cultured & lab grown meat/proteins, food additive solutions				
Logistics, Transportation, Warehousing, Infrastructure	Tech-enabled food & ag storage solutions, smart contracts & digital certification, tech-enabled food & ag logistics & transportation				

Note: The Harvey balls are a qualitative representation of how many of the bottlenecks typically found in AVC segments (for example, input, production, aggregation, distribution) are addressed by each AgTech category. The higher the coverage of the Harvey balls, the stronger the incidence of the AgTech category in promoting a given food security dimension.

Source: CGAP analysis.

SECTION 3

The Role of Financial Services in Addressing Global Food Insecurity

THE ROLE OF INCLUSIVE FINANCE IN addressing today's pressing global food security challenges is to generate wholesale and retail financial solutions that enable key vulnerable actors, like smallholder farmers and agri-SMEs, participating in high-impact AVCs to adopt new AgTech being developed in LMICs. AgTech can bring local solutions to chronic bottlenecks in high-impact AVCs. And by scaling their adoption among these key vulnerable AVC actors, inclusive finance enables the latter to transform their production, processing and distribution processes to offer more affordable, nutritious, and sustainably produced food in local markets that cater to low-income populations.

Low AgTech Adoption Limits Food Security

Despite growing momentum in AgTech innovation in LMICs, adoption rates remain low compared to high-income countries (Fox and Signe, 2022). Where adoption does occur, it is restricted to the few highly profitable AVCs that tend to have few linkages to the livelihoods of low-income people and low impact on food security indicators at the national level. These low AgTech adoption rates have contributed to a decrease in the Total Factor Productivity growth rate of agriculture in LMICs, from 2.2 percent in the early 2000s to 1 percent by the end of the 2010s, which, in large part, prevents the desired food system transformation for food security (Morgan, Fuglie and Jelliffe, 2022).

Evidence suggests that access to adequate financial services is a crucial enabler of AgTech adoption—allowing farmers, cooperatives, agri-SMEs and other value chain actors, and AgTech firms (those companies developing AgTech) participating in high-impact AVCs to make the necessary investments to apply these technologies effectively and sustainably (Ruzzante et al., 2021; FAO, 2024).

The challenge, as explained in sections below, is that most FSPs experience chronic constraints in serving high-impact AVCs, and the agriculture sector in general, relative to more informal financial mechanisms led by agribusinesses, local money lenders, and family and friends (ISF Advisors, 2019). The formal financial system's low exposure to the agricultural sector in LMICs constitutes a crucial barrier to AgTech generation and adoption.

Financial Constraints are a Major Barrier to Scalability

To better understand the financial constraints faced by AgTechs to scale in LMICs, CGAP conducted interviews with 36 different AgTech firms across India, Indonesia, and Kenya—major AgTech hubs in LMICs. This was complemented with additional interviews

with 16 AgTechs from Cambodia, Tanzania, Senegal, Colombia, and Guatemala. The goal was to assess, more granularly, how important financial constraints are, compared to other types of constraints, when scaling AgTech adoption.

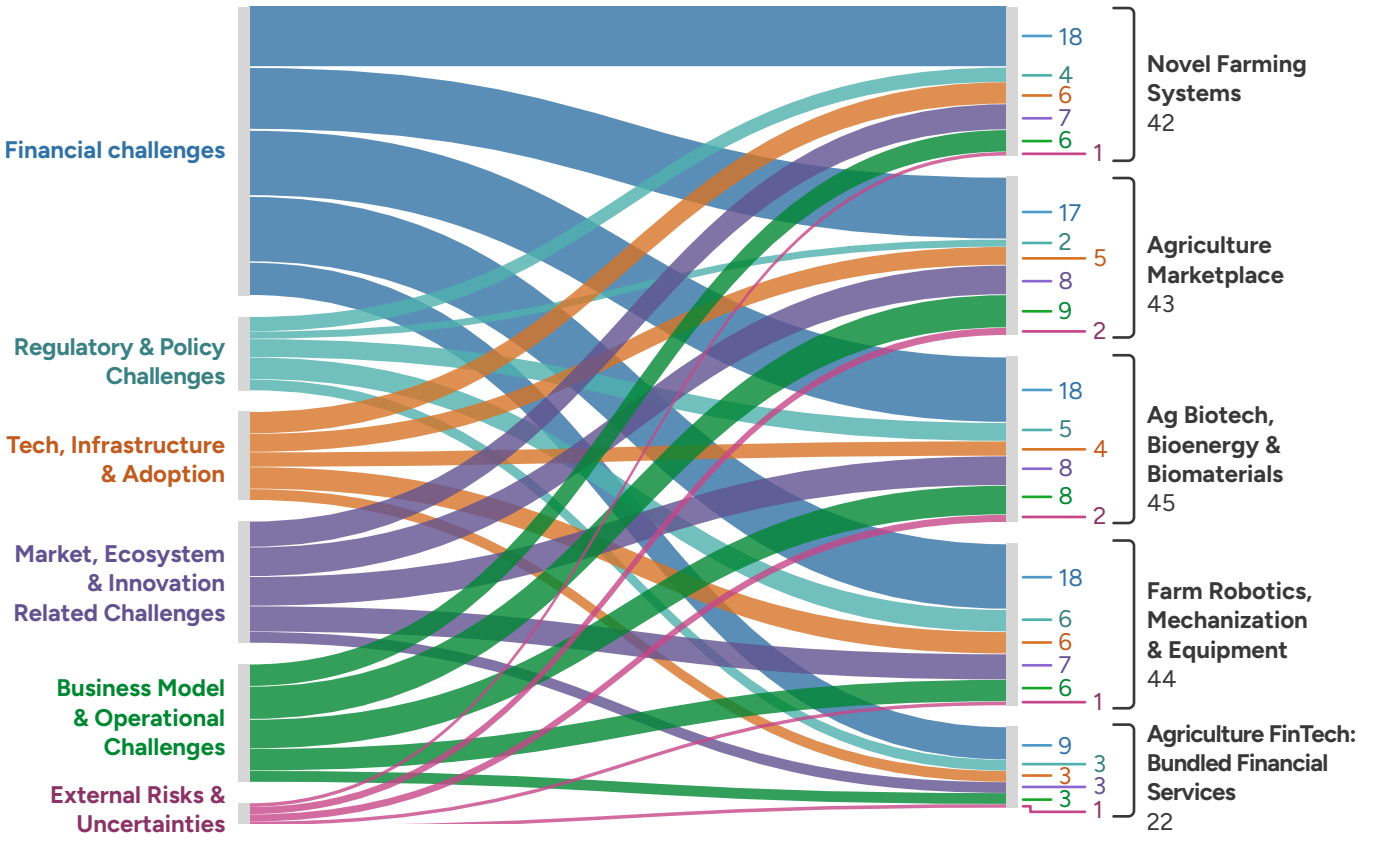
The firms in the sample represent AgTech categories that are beyond the proof point stage. That is, the selection criteria intentionally focus on constraints faced by proven AgTech solutions that now prioritize scaling with the help of more mainstream local FSPs and investors. Therefore, the analysis excludes issues faced by AgTechs in early development, or incubation, stage, where recent studies suggest good financing options are available, mainly driven by donors supporting start-ups (Brighter Bridges, 2025). The sample of AgTechs is also restricted to categories that have shown strong potential impact on nutrition and sustainability outcomes, as per analysis in the previous chapter.

Results show that one of the primary challenges hindering the adoption, growth, and scalability of AgTech is accessing adequate financial services to:

1. **Invest in AgTech R&D and firm growth**; and
2. **Finance AVC actors** who need financial services (credit, payment, savings, or insurance) to adopt AgTech solutions to enhance their productivity and efficiency.

Figure 4 presents the type and number of challenges self-reported by AgTech firms across the various categories analyzed. The interviews revealed that not only is the number of financial constraints reported larger relative to non-financial constraints, but that the growth potentially achieved by reducing these financial constraints is higher.

FIGURE 4. **Type and number of constraints reported by AgTech companies surveyed by CGAP in Indonesia, India, and Kenya**



Source: Authors.

Structural Mismatches in Financial Supply Chains

CGAP's analysis of these constraints faced by AgTechs in LMICs suggests that the way financial supply chains tend to be structured—both at the wholesale and retail levels—often does not align with the specific investment needs of AgTech firms and actors in high-impact AVCs. This mismatch between financial products and needs on the ground is illustrated in Figure 5.

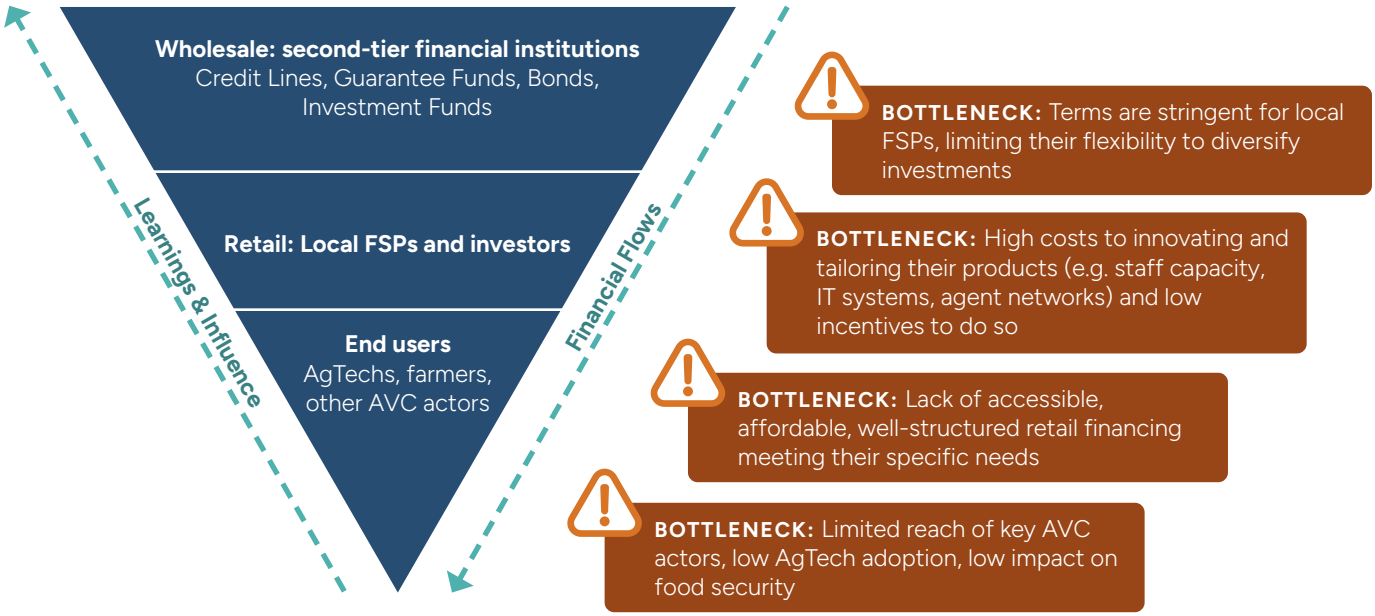
At the **wholesale level**, the existing wholesale financing mechanisms already mobilized to support agriculture and food security, upon which local FSPs rely to on-lend to the agriculture sector—such as credit lines, guarantee or equity funds, and social bonds—tend not to have the right terms, repayment schedules, interest rates, guarantee requirements, or exit strategies that match investments needed to scale AgTech adoption in high-impact AVCs. This is likely the result of a mismatch between (1) perceived and actual risks and (2) expected returns and feasible returns.

As revealed by CGAP's analysis with AgTech and financial sector stakeholders, these investment needs typically imply longer duration and grace periods, more flexible cashflow-based repayment schedules, and require alternative forms of collateral, such as forward contracts, warehouse deposits, and cashflow history.

These inadequate terms in existing wholesale financing mechanisms often used by DFIs and global or regional impact investors tend to reduce the flexibility of local FSPs to tailor their retail products to match the financial needs of high-impact AVC actors and relevant AgTech firms.

At the **retail level**, even when wholesale-level financial mechanisms are suitably tailored, local FSPs and impact investors often face capacity constraints and limited incentives to adapt retail financial services to high-impact AVC actor needs, hindering the adoption of AgTech.

FIGURE 5. **Key bottlenecks in the financial supply chain preventing investments for inclusive, nutritious, and sustainable food systems**



Note: Financial supply chains in LMICs face bottlenecks to deliver adequate financial solutions at the wholesale and micro market levels that respond to agricultural investment needs. These bottlenecks explain the limited exposure to agriculture.

Source: CGAP analysis.

Furthermore, these same capacity constraints apply when FSPs consider lending to AgTech firms directly, either through debt or equity, hindering their ability to improve the efficiency and affordability of their solutions.

Most FSPs do not know and have not served these types of customers before. For example, FSPs with agriculture credit portfolios may know actors in the coffee value chain well, but may have never worked with actors in the vegetable value chain. This limits the FSPs' capacity to design adequate retail financial services, risk management strategies, and distribution processes that match these customers' investment needs.

This chronic constraint faced by FSPs in LMICs helps explain the limited exposure of the formal financial system to agriculture in general, and smallholders in particular, in LMICs. For example, in sub-Saharan Africa, the share of total formal credit going to the agricultural sector varies between 3-12 percent. Yet the contribution of this sector to national Gross Domestic Product (GDP) can range from 20-40 percent (SAFIN, 2024). Also, in the region, only seven percent of smallholder farmers' short-term financing needs are served by formal financial institutions. Other AVC actors, like agribusinesses, acting as informal lenders, provide 20 percent of smallholders' short-term needs (ISF Advisors, 2019). This persistent financing gap exists despite the fact that smallholders produce between 30 to 70 percent of the continent's food for local consumption, making smallholders key actors in high-impact AVCs (Davis, et al. 2024).

These examples suggest that there is a number of viable investments in the agriculture sector that are being financed by informal lenders, while formal ones either consider them too risky and costly, or do not identify them in the first place.

Building FSPs' internal capacity to assess and meet the financial needs of the agricultural sector requires them to make important investments of their own. For example, recruiting specialized staff, adjusting core banking systems, and investing in customer and product R&D. FSPs often have little incentive to make these investments, given the opportunity costs implied, as more profitable opportunities exist with other types of customers who are better off. This is true even when there is a legitimate business case for serving actors in high-impact AVCs.

This market failure is addressed by inclusive finance interventions that help FSPs lower the costs of learning about and serving high-impact AVC actors and relevant AgTech firms. Providing partial technical and financial support to cover the experimentation costs faced by FSPs when tailoring financial services would incentivize FSPs to explore the new market that these types of customers represent. This support would also accelerate the provision of adequate financial services that enable investments in high-impact AVCs.

The Way Forward: Inclusive Finance as a Catalyst of Nutritious and Sustainable Food Systems

To drive the adoption of relevant AgTech solutions by key actors in high-impact AVCs, inclusive finance needs to steer the financial supply chain at the wholesale and retail levels. Given market failures that disincentivize local FSPs and investors from investing in mainstreaming such tailored services, this adjustment will not happen by itself.

The next section provides high-level insights into how inclusive finance can promote such changes across wholesale and retail financial services.

BOX 1. **Examples of how inclusive finance can unlock investments that promote Agtech adoption in high-impact AVCs**

Eggoz in India:
Eggoz is an Indian AgTech firm founded in 2017 that developed a more efficient way of raising layer hens and packing and transporting fresh eggs to deliver more affordable high-quality eggs to the domestic market worth USD 8 billion a year. The cost reduction implied in Eggoz's solution is enabling the firm to tap into this domestic demand in a way that was not possible before. Furthermore, the fresh eggs value chain is considered to have high-impact on nutritional outcomes given the low levels of protein intake among large parts of the Indian population.

To keep scaling, Eggoz increasingly relies on outsourcing the egg production and packing process to smallholder farmers. For this to happen, they require FSPs to provide adequate working capital and investment loans to smallholders so that they adopt this new egg production model developed by Eggoz. Despite the proven business concept represented by Eggoz' USD 11 million yearly revenue and two rounds of equity investments worth about USD20 million, local FSPs struggle to properly assess the risks of lending to those farmers working with Eggoz. FSPs are not familiar with how market, production and climatic risks are mitigated in Eggoz' commercial model. Furthermore, most FSPs' existing credit offer has inadequate features related to loan amount, tenure and repayment schedules and rely on strict collateral requirements that do not match the realities of smallholders in India. This is an example of an AgTech that needs FSPs to offer adequate solutions to key AVC actors in the fresh eggs value chain in order to scale AgTech adoption and improve nutritional outcomes in India.

Agrapp in Colombia:
Agrapp is a Colombian agricultural financial technology firm (Agfintech) founded in 2018 that connects investors with smallholder farmers in need of working capital loans. Its cumulative credit portfolio of USD 3 million has been financing about 500 smallholder farmers engaged in various AVCs, including some that are key to ensure nutritional and sustainability outcomes, like financing the adoption of biofertilizers among smallholders in horticultural value chains.

The main innovation proposed by Agrapp is to reduce the costs and improve the value of delivering credit to smallholder farmers. It does so by minimizing the need for loan officers to visit the plots of farmer applicants. Agrapp leverages new satellite imagery and a customer-facing app, to collect key information remotely and make faster loan approval decisions. By receiving the geolocation of the farmer's plot from the farmer's cellphone, Agrapp is able to match the plot with satellite imagery that can go back in time to show the state of the crop in various seasons. And through an algorithm that correlates the crop image with yields, it can estimate the past and current state of the crop, to assess the farmer's performance. In addition, Agrapp leverages Colombia's progress on open access to public government records, by using the plot's geolocation to verify the title of the plot, and any pending legal claim on this property; in addition to checking the farmers' credit history with the national credit bureau. Agrapp is also able to accept farmers' forward contracts as collateral, rather than relying on physical collateral. And they are charging the loan interest in a way that coincides with the farmer's cash flow. This has enabled Agrapp to reduce the loan approval time to 48 hours, relative to the industry standard of two-weeks. And they have been able to reach smallholders that value the more flexible terms of the credit contract offered with competitive interest rate.

Agrapp's scale is challenged by the features of wholesale funds for on-lending, which are too expensive and short term, and have heavy customer due diligence requirements. Agrapp is an example of an FSP making progress in tailoring its services to actors in high-impact AVCs so they can adopt better AgTech. However, they face inadequate wholesale finance mechanisms to increase funds for on-lending.

SECTION 4

Tailoring Financial Solutions to the Needs of AgTechs and AVCs Actors

ONCE INCLUSIVE FINANCE INITIATIVES identify high-impact AVCs and the subset of AgTech categories that can address their bottlenecks, the next step in the proposed framework is to understand the diverse financial needs that would scale AgTech adoption to tailor solutions accordingly.

CGAP's multi-country analysis of AgTech firms reveals quite diverse needs across AgTech categories and their target actors. Understanding these needs is critical for FSPs to innovate along the financial supply chain and allow services to match needs.

Figure 6 summarizes the most binding financial needs for scaled AgTech adoption across the top five AgTech categories with strongest impact on nutritional and sustainability outcomes. These needs vary by business model and stage of maturity, and are related to both financing for the AVC actors and AgTech firms. For example:

- **Agricultural marketplaces** require more short-term and flexible working capital loans, given the importance of operational expenses in their total costs. They also report the lack of access to retail finance for their customers, smallholders and agri-SMEs, as another equally relevant financial constraint for them to scale.
- **Biotech** and **mechanization equipment** prioritize longer-term equity that is tolerant of relatively long R&D and regulatory approval cycles.
- **Novel farming systems** may need more seed or angel funding to subsidize efforts to educate AVC actors on the nature of their solution to foster adoption. The scale of adoption is equally constrained by the lack of investment loans for their customers, smallholders and agri-SMEs.
- **Agri-fintechs** have as major constraint to scaled adoption: (1) the lack of data available for their customers, smallholders and agri-SMEs, that limit their underwriting ability; and (2) the high customer acquisition costs given their existing service distribution and risk management strategies.

Opportunities for Financial Innovation

Despite the historical challenges FSPs face to serve AVC actors, there are promising opportunities for innovation. As digital technologies are mainstreamed in both the financial and agricultural industries, growing availability of AVC transaction data is addressing critical information asymmetries that have prevented the appreciation of various financial needs, investment opportunities, and risks faced by AgTech firms and AVC actors (CGAP, IDH, and UNSGSA, 2020).

The viability of accessing and analyzing such data is increasing as more countries build and expand their digital public infrastructure (DPI). This enables a larger share of the population to have a digital

FIGURE 6. **Summary of financial needs reported by 36 AgTech firms interviewed by CGAP in India, Indonesia, and Kenya**

		Examples
Agriculture Marketplace	• AgTechs in this category face **significant challenges in securing flexible working capital financing and often rely on high-cost short-term financing to manage cash flow fluctuations.** • High working capital requirements and thin margins in agricultural input sales, necessitating high volumes result in **challenges related to balancing rapid user acquisition and profitability.**	BH, FarMart, PlantVillage
Agri-Fintechs	• Agri-Fintechs tend to have **better access to equity funding compared to other AgTech categories.** • Regulatory constraints significantly impact capital access and deployment. • Often **struggle with high costs associated with customer acquisition and education relative to small-ticket loans.**	PULA, Samunnati, Juhudi Kilimo, arya.ag
Farm Robotics, Mechanization & Equipment	• Farm Robotics and Ag Biotech have more stable working capital needs but struggle with long-term financing for high upfront capital requirements for R&D and manufacturing. . • Struggle with **long development cycles that make it extremely difficult to get early-stage funding**, making them **highly reliant on grants.**	AGRONXT, DayaTani, S4S technologies, stellapps
Ag Biotech, Bioenergy & Biomaterials	• Face the most **acute need for patient capital which is aligned with its extremely long development and regulatory approval cycles** which requires significant investments for R&D. • Often struggle to attract traditional venture capital due to long time-to-market.	String Bio
Novel Farming Systems	• AgTechs in this category face challenges related to **high initial CAPEX requirements coupled with unproven business models which requires significant efforts in investor education**. As a result they face challenges in securing equity or debt financing due to the perceived risks of unproven business models.	KHEYTI Smart Farmer Revolution

Source: Authors

identity, facilitates payments across all individuals and economic sectors, and makes it easier to share data between private and public actors (CGAP, BTCA, GPFI, and World Bank, 2024).

Making sure these opportunities are captured will enable local FSPs and different types of investors to deliver better-tailored retail financial products through:

Digital Innovation: Leverage open data frameworks that merge agricultural and financial data collected by public and private actors to unlock retail finance for prioritized AVCs by: designing adequate financial products, alternative credit scoring, more efficient customer and agent onboarding, risk analysis, and digitized processes.

Customer-Centric Financial Services: Create customer-centric internal processes for FSPs to assess financial needs, partner with agribusinesses and AgTech firms, pilot tailored products, and secure board approval for new offerings.

Policy Engagement: Provide supporting evidence to financial regulators on risk-based and proportional regulatory reforms that enable financial innovations to scale and reach relevant AVC actors and Ag Tech firms. Examples include frameworks for alternative collateral, reduced reserve requirements for unsecure lending, and simplified customer due diligence and agent onboarding requirements.

The case of Agrapp in Colombia (see Box 1) presents the convergence of inclusive finance intervention areas that result in more adequate financial services and the promotion of food security.

To capture these opportunities and generate financial innovation that improves food security outcomes, the following chapter explores the role of key global and local stakeholders in driving collective action.

SECTION 5

From Insights to Action

A Call to Action: Deliver Financial Solutions that Enable Food Security

This paper offers a high-level framework to inform the strategic focus of inclusive finance initiatives to contribute to food security efforts. This implies collaboration among stakeholders like FSPs, impact investors, DFIs, and donors.

The recommended stakeholder actions presented below are intended to provide strategic direction, rather than detailed prescriptions. The guidance offered is general enough to direct stakeholders toward agricultural investments that have the greatest potential to promote more nutritious and sustainable food systems. At the same time, it intentionally avoids more prescriptive and detailed operational suggestions, motivating stakeholders to embark on their own discovery journey for highly contextual financial solutions tailored to the realities of food systems serving local markets in LMICs.

FSPs, impact investors, DFIs, and donors can use the framework presented to:

- **Prioritize investments** in high-impact AVCs that have the greatest potential to improve pressing nutritional and sustainability outcomes at the local level.
- **Identify and support AgTech solutions** that address bottlenecks in high-impact AVCs—such as low productivity, high food loss, or poor access to markets and inputs.
- **Promote financial innovations** that tailor financial services and accelerates the adoption of relevant AgTech among key high-impact AVCs actors like smallholders and agri-SMEs.

This working paper outlines several actionable lessons for these stakeholders:

Local FSPs committed to improving food security should conduct assessments to identify high-impact AVCs in their markets and the AgTechs that can address their bottlenecks, leveraging agricultural policy tools and consultations with experts described in this study. In doing so, FSPs can assess if these high-impact AVCs and relevant AgTechs are being served in their current agricultural portfolio. This helps gauge and report their current contribution to key nutritional and sustainability dimensions of food security. If such exposure is lacking, they can initiate market analysis to identify and include this subset of AVC actors and AgTech firms in their portfolio. If they do currently serve these actors, they can commit to expanding that exposure. In either case, they will need to consider investing in staff capacity development, IT systems, and R&D to better understand finance and investment needs among relevant AVC actors. Based on lessons from their R&D, they will also need to tailor financial solutions and risk management strategies that enable profitable portfolio growth as they scale AgTech adoption in high-impact AVCs.

DFIs can support food security outcomes by conducting assessments that identify how features

of their wholesale-level financial mechanisms (such as blended credit lines, guarantee funds) can be modified in a way that provides greater flexibility to their investee FSPs in tailoring their retail financial services. These new wholesale features need to intentionally support FSPs design retail services that align with the financial needs of high-impact AVC actors. Those DFIs investing directly in AgTech firms should also consider offering a greater diversity of early-stage funding, allowing firms greater flexible between equity and debt solutions.

Impact investors working at the global or regional levels should understand the investment requirements for AgTech adoption in high-impact AVCs to tailor wholesale solutions like long-term debt, equity or social bonds for (1) investee FSPs to flexibly design adequate services for high-impact AVC actors; or (2) AgTechs firms providing solutions to high-impact AVCs that need to invest to make their solutions more affordable and scalable.

Donors supporting both the financial and agricultural sectors can promote food security by subsidizing the cost of increasing technical capacity to:

1. Accelerate innovation in FSPs by reducing the cost of R&D needed to tailor retail financial services to high-impact AVCs and AgTechs needs;
2. Support DFIs to better-tailor their wholesale-level financial mechanisms in order to strengthen local FSP responses to needs of high-impact AVC actors and relevant AgTech firms;
3. Strengthen agricultural extension, data collection, and shared digital and physical infrastructure to enable actors in high-impact AVCs to improve their knowledge of adequate AgTech solutions, such as regenerative agriculture, satellite imagery for precision agriculture, solar irrigation;
4. Provide business development support for AgTech firms relevant to high-impact AVCs to increase the effectiveness and affordability of AgTech solutions offered, making AgTechs more investable.

Collectively, these global and local stakeholders can turn the promise of more nutritious and sustainable food systems into reality. A crucial area of work is enabling FSPs and impact investors to generate financial innovations that overcome the current limited AgTech adoption levels among high-impact AVC actors, especially smallholders and agri-SMEs who produce and commercialize much of the food consumed in LMICs.

In the coming years, CGAP will work with these stakeholders in several countries to support them in testing these recommendations in their own context and defining how retail and wholesale financial services can be tailored. Lessons on mainstreaming these financial solutions more globally will be shared widely.

Glossary

The definitions provided in this glossary are general and are not intended to track the laws of any specific country.

AgTech: Agricultural technologies that improve productivity, sustainability, or resilience in farming systems.

AgTech firms: AgTech firms are those companies developing AgTech solutions.

AVC: Agricultural value chain; the full range of activities required to bring an agricultural product from farm to consumer.

DFIs: Development finance institutions are government-backed or multilateral organizations that provide finance, guarantees, or technical assistance to support private sector development, infrastructure, and sustainable projects, often in emerging markets and LMICs.

FSPs: Financial service providers are organizations that offer financial products and services such as loans, savings, insurance, or payment solutions, often targeting individuals, smallholders, or enterprises in agricultural value chains.

Retail finance: Financial services delivered by local financial service providers directly to the end-customers, which may include individuals or firms.

Wholesale finance: Financial services offered by second-tier financial institutions to local financial service providers. These wholesale finance services allow local FSPs to on-lend to their end-customers.

Inclusive finance: All public and private sector efforts to improve the value and viable delivery of financial services, such that these services are used by, and benefit, those vulnerable segments of the population (individuals or enterprises) that continue to be underserved by—or excluded from—formal financial markets.

LMICs: Low- and middle-income countries, as classified by the World Bank according to gross national income (GNI) per capita.

References

Balasubramanya, Soumya. et. al. 2024. "Risks from solar-powered groundwater irrigation." Science, 383 (6680): 256-258. https://www.science.org/stoken/author-tokens/ST-1656/full

Barrett, Christopher B. 2020. "Overcoming Global Food Security Challenges through Science and Solidarity." American Journal of Agricultural Economics, 103 (2): 422—447. https://doi.org/10.1111/ajae.12160

Barrett, Christopher B., and Miguel I. Gómez. 2025. "Fostering Healthy, Equitable, Resilient, and Sustainable Agri-Food Value Chains." Agriculture Economics 00: 1—11. https://doi.org/10.1111/agec.70007

Beanstalk AgTech. 2023. State of the Digital Agriculture Sector in LMICs: Harnessing the Potential of Digital for Impact Across Agricultural Value Chains in Low- and Middle-Income Countries. Nairobi: Beanstalk AgTech. https://www.beanstalkagtech.com/d4aglmic

Brighter Bridges. 2025. GITEX 2025: Financing AgTech in Africa. https://agbase.briter.co/research/resources/gitex-2025-financing-agtech-in-africa

Bundy, Donald, Ugo Gentilini, Lesley Brooke Schultz, Biniam Bedasso Samrat Bhattacharjee, Yoko Okamura, Indrajit Hazarika, T. M. Muralidharan, and Mia Blakstad. 2024. School Meals, Social Protection, and Human Development: Revisiting Trends, Evidence, and Practices in South Asia and Beyond. Social Protection and Jobs Discussion Paper No. 2401. Washington, D.C: World Bank Group. http://documents.worldbank.org/curated/en/099041224184540055

CGAP, IDH, and UNSGSA. 2020. Sowing the Seeds of Innovation for Smallholder Finance. New York: UNGSA. https://www.unsgsa.org/publications/sowing-seeds-innovation-smallholder-finance

CGAP, BTCA, GPFI and World Bank. 2024. G20 Policy Options to Improve Last Mile Access and Quality of Inclusion Through Digital Infrastructure, Including Digital Public Infrastructure (DPI), Consumer Protection, and Other FIAP Objectives. Washington DC: CGAP. https://www.cgap.org/research/publication/g20-policy-options-for-financial-inclusion-last-mile

CGIAR. 2023. 2023 Annual Report. Montpellier: CGIAR. https://annualreport.cgiar.org/2023

CGIAR. 2025. What Do We Know About the Future of Agrifood Systems in South Asia? https://www.cgiar.org/news-events/news/what-do-we-know-about-the-future-of-agrifood-systems-in-south-asia/?utm_source=chatgpt.com

Cosgrove, Brian, Ryan Newman, Guillaume Grosjean, Henrik Dahl, Anil Sharma, Surabhi Singh, and M. F. Zulu. 2023. "Sustainable Finance for the Transformation of Food Systems." In Transforming Food Systems Under Climate Change through Innovation, edited by Ana Maria Loboguerrero, Andrzej Nowak, Bruce Campbell, Dhanush Dinesh, and Philip Thornton, 130—143. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781009227216.012

Crippa, Monica, Emanuele Solazzo, Diego Guizzardi, Fabio Monforti-Ferrario, Francesco N. Tubiello, and Adrian Leip. 2021. "Food Systems Are Responsible for a Third of Global Anthropogenic GHG Emissions". Nature Food, 2 (3): 198—209. https://doi.org/10.1038/s43016-021-00225-9

Davis, Benjamin, Leslie Lipper, and Paul Winters. 2024. Do Not Transform Food Systems on the Backs of the RuralPpoor. IFAD: Rome. https://www.ifad.org/documents/d/new-ifad.org/70_research-pdf

FAO, IFAD, UNICEF, WFP, and WHO. 2024. The State of Food Security and Nutrition in the World 2024. Rome: FAO, IFAD, UNICEF, WFP, and WHO. https://openknowledge.fao.org/handle/20.500.14283/cd1254en

FAO. 2023. The State of Food Security and Nutrition in the World. Rome; FAO. https://openknowledge.fao.org/server/api/core/bitstreams/f1ee0c49-04e7-43df-9b83-6820f4f37ca9/content/cc3017en.html.

Fonseca, C., Y. Proença, I. Luna, and M. Saes. 2025. Transformative Policies in Brazilian Agri-Food Systems: An Analysis of Family Farm Procurement Under the National School Feeding Program. Food Policy 132. https://doi.org/10.1016/j.foodpol.2025.102856

Food Security Information Network and Global Network Against Food Crises. 2024. Global Report on Food Crises (GRFC) 2024. Rome: FSIN. https://www.wfp.org/publications/global-report-food-crises-grfc

Fox, Louise, and Signe, Landry. 2022. From subsistence to disruptive innovation: Africa, the Fourth Industrial Revolution, and the future of jobs. Brookings Institution. https://www.brookings.edu/wp-content/uploads/2022/03/4IR-and-Jobs_March-2022_Final.docx.pdf

Fuglie, Keith O., Keith D. Wiebe, Steven D. Prager, Timothy Sulser, Nicola Cenacchi, Carlo Bonilla Cedrez, and Dirk Willenbockel. 2022. Quantitative Analysis to Inform Priorities for International Agricultural Research. IFPRI Discussion Paper 2133. Washington, DC: International Food Policy Research Institute. https://econpapers.repec.org/paper/fprifprid/2133.htm?

Hendriks, Sheryl, Alejandro de G. Ruiz, María H. Acosta, Hanne Baumers, Paola Galgani, Daniel Mason-D'Croz, Catherine Godde, Katharina Waha, and Despoina Kanidou. 2021. The True Cost and True Price of Food. Rome: Scientific Group of the UN Food Systems Summit. https://sc-fss2021.org/wp-content/uploads/2021/06/UNFSS_true_cost_of_food.pdf

Husar, Matt. 2023. Aceli Africa Year 2 Learning Report. March 22. Aceli Africa. https://aceliafrica.org/aceli-africa-year-2-learning-report/

International Finance Corporation (IFC). 2011. Scaling Up Access to Finance for Agricultural SMEs: Policy Review and Recommendations. Washington, DC: Global Partnership for Financial Inclusion. https://www.mfw4a.org/publication/scaling-access-finance-agricultural-smes-policy-review-and-recommendations

International Food Policy Research Institute (IFPRI). 2024. The 2024 Global Food Policy Report. Washington, DC: IFPRI. https://www.ifpri.org/global-food-policy-report-2024/

ImpactSF. n.d. *Alliance Bioversity International — CIAT.* Accessed March 2, 2025. https://alliancebioversityciat.org/cgiar-hub-sustainable-finance-impactsf

ISF Advisors and the Mastercard Foundation Rural and Agricultural Finance Learning Lab. 2019. Pathways to Prosperity: Rural and Agricultural Finance State of the Sector Report. ***Report.*** Washington, DC: ISF Advisors. https://pathways.isfadvisors.co/

Kozloski, Michael, Sara Farley, Robert Steiner, Andrew Bashian, David Haynes, Stephanie Lang, Richard Raimond, Todd Crosby, and David Bennell. 2024. Financing for Regenerative Agriculture. New York: Rockefeller Foundation; Transforming Investing in Food Systems, Pollination Group. https://www.rockefellerfoundation.org/reports/financing-for-regenerative-agriculture/

Morgan, Stephen; Fuglie, Keith and Jelliffe, Jeremy. 2022. World Agricultural Output Growth Continues to Slow, Reaching Lowest Rate in Six Decades. USDA. https://www.ers.usda.gov/amber-waves/2022/december/world-agricultural-output-growth-continues-to-slow-reaching-lowest-rate-in-six-decades#:~:text=Data%20collected%20and%20analyzed%20for,maintain%20growth%20in%20agricultural%20output.

OECD. 2021. Making Better Policies for Food Systems. OECD. https://www.oecd.org/en/publications/making-better-policies-for-food-systems_ddfba4de-en.html

Rockefeller Foundation. 2024. Leveraging Indigenous Knowledge and Modern Science for Sustainable Food System Transformation. New York: Rockefeller Foundation. https://www.rockefellerfoundation.org/reports/leveraging-indigenous-knowledge-and-modern-science-for-sustainable-food-system-transformation/

Ruzzante, Sacha; Labrata, Ricardo; and Bilton, Amy. 2021. "Adoption of agricultural technology in the developing world: A meta-analysis of the empirical literature". World Development. Volume 146. https://www.sciencedirect.com/science/article/pii/S0305750X2100214X#:~:text=New%20crop%20varieties%20that%20are,%2C%20higher%20nutritional%20value%2C%20etc.

SAFIN, 2024. Agricultural financing in Africa: Trends and insights. SAFIN. https://safinetwork.org/agricultural-financing-in-africa-trends-and-insights/

Sánchez, María V., and Matías Cicowiez. 2022. "Optimising Policies to Achieve Agricultural Transformation Objectives: An Application for Ethiopia." *Journal of Applied Economics* 25, no. 1: 765—783. https://doi.org/10.1080/15140326.2022.2056407

Sands, Ronald D., Brian Meade, John L. Seale, Sherman Robinson, Richard Seeger, and United States Department of Agriculture, Economic Research Service. 2023. Scenarios of Global Food Consumption: Implications for Agriculture. Washington, DC: Economic Research Service, U.S. Department of Agriculture. https://doi.org/10.32747/2023.8134356.ers

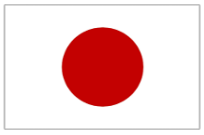
Smith, Matthew R., Renata Micha, Christopher D. Golden, Dariush Mozaffarian, and Samuel S. Myers. 2016. "Global Expanded Nutrient Supply (GENuS) Model: A New Method for Estimating the Global Dietary Supply of Nutrients." PLOS ONE 11, no. 1: e0146976. https://doi.org/10.1371/journal.pone.0146976

United Nations. 2024. The Global Threat of Drying Lands: Regional and global aridity trends and future projections. A Report of the Science-Policy Interface. Bonn, Germany: United Nations Convention to Combat Desertification (UNCCD). https://www.unccd.int/resources/reports/global-threat-drying-lands-regional-and-global-aridity-trends-and-future

Wineman, Alison, Giulia Zanello, Dawit Degefaw, Fekadu Samuel, Jessica Yates, Balaji Shankar, and Nutritious Food Systems Consortium. 2024. "A call to Action for Transformation Towards Nutritious Food Systems." Nature 5: 2-3. https://doi.org/10.1038/s43016-023-00896-6

World Bank Group. 2021. Assessment of Long-term Finance Providers for Small and Medium Agribusinesses: Stocktaking, Lessons, and Case Studies. Washington, DC: World Bank. https://doi.org/10.1596/35539

CGAP Members



CGAP members and strategic partners as of June 2025

CGAP Members (continued)

MetLife Foundation

Ministry of Foreign Affairs and International Cooperation

Ministère de l'Économie, des Finances et de la Souveraineté industrielle et numérique — Direction générale du Trésor

Ministry of Foreign Affairs of the Netherlands

Norad

PROPARCO Groupe AFD

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Agency for Development and Cooperation SDC

Sida

SIFEM

Swedfund

The World Bank
IBRD • IDA | World Bank Group

WFP
World Food Programme

UKaid
from the British people

UNCDF
Microfinance • Capital Development

UNDP

CGAP Strategic Partners

AXA

Baillie Gifford

citi

Fundación BBVA Microfinanzas

CGAP members and strategic partners as of June 2025

Transforming Lives with Financial Inclusion

cgap.org