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Acknowledgements

Connexus Corporation would like to thank the many presenters, participants and organizations that supported Cracking the Nut 2019 (www.crackingthenutconference.com). This publication was made possible thanks to the generous contributions of our sponsors and partners who are committed to working on the tough nuts related to “Leveraging Systems for Improved Food Security.” In particular, Connexus would like to thank the following sponsors and media partners of this important learning event:

- **PLATINUM SPONSOR:** Catholic Relief Services (CRS)
- **SILVER SPONSORS:** ACDI/VOCA, Chemonics, and NCBA CLUSA,
- **MEDIA PARTNERS:** FinDev Gateway, Portail FinDev, Marketlinks, FioTV, and Beam Exchange

Connexus would also like to acknowledge the important role of the Advisory Committee, who helped to plan and develop the content for the conference, including the following members:

- Anita Campion
- Elizabeth Eckert
- Melissa Matlock
- Geoffrey Chalmers
- Shaun Ferris
- Caryl Merten
- Todd Crosby
- Nikesh Ghimire
- Nadine Sahyoun
- Alby Delgado
- Garron Hansen
- Doug Steinberg
- Hailey Dougherty
- Troy Hoppenjan
- Jo Ann Yeager Sallah

Connexus would like to also recognize our staff and consultants, whose significant contributions made the conference and publication possible:

- Laura Smith, Operations Director
- Olivier Massart, Senior Finance Specialist
- Falilou Kane, Senior Finance Specialist
- Medicke N’Diaye, Finance and Agribusiness Specialist
- Alana DeVecchio, Project Associate
- Abby Pioch, Project Associate

A special thanks to Karl Rosenberg of NCBA CLUSA, Shaun Ferris from Catholic Relief Services and Dr. Nadine Sahyoun from University of Maryland, who took the time to review this publication and suggest edits.

Acronyms

ACDI/VOCA	Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance
AFEX	Associated Foreign Exchange
ANACIM	National Agency for Aviation and Meteorology
ASPRODEB	Senegalese Association for the Promotion of Rural Development
ATTC	Alfasafe Technology Transfer and Commercialization
BAMTAARE	Base d'Appui aux Méthodes et Techniques pour l'Agriculture, les autres Activités Rurales et l'Environnement
BoP	Base of the pyramid
CFA	Currency used throughout West Africa
CIAT	International Center for Tropical Agriculture
CROPIN	Satellite imaging solution
CNAAS	Senegalese National Agricultural Insurance Company
CRS	Catholic Relief Services
DCA	Development Credit Authority
DiNER	Diversification for Nutrition and Enhanced Resilience
GARBAL	A satellite information service for pastoralist farmers in northern Mali
GIZ	German Corporation for International Cooperation
GPP	Ghana Poultry Project
IFC	International Finance Corporation
IIAT	International Institute of Tropical Agriculture
ISRA	National Institute for Agronomy Research
LINK	CIAT's methodology to define inclusive business
MARKETS II	Maximizing Agricultural Revenue and Key Enterprises in Targeted Sites II
MFI	Microfinance institution
MOOM	Market Optimization and Outreach Model
MSI	Management Systems International
MT	Metric tons
NCBA CLUSA	National Cooperative Business Association Cooperative League of the USA
NSVC	Nutrition Sensitive Value Chain
OPIC	Overseas Private Investment Corporation

PICS	Purdue Improved Cowpea Storage
PSDAG	Private Sector Driven Agricultural Growth
PSPs	Private service providers
PWDs	People with disabilities
SACCO	Savings and Credit Cooperative
SDGs	Sustainable Development Goals
SILCs	Savings and Internal Lending Communities
SMEs	Small- and medium-sized enterprises
STAMP	Sustainable Technology Adaptation for Malian Pastoralists
TASSAGHT	Malian peacebuilding organization
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USSD	Unstructured Supplementary Service Data
VSLAs	Voluntary Savings and Loan Activities
WASH	Water, sanitation, and hygiene
WOCCU	World Council of Credit Unions

Foreword

Connexus was pleased to host this tenth *Cracking the Nut*® conference in French-speaking West Africa. Dakar, Senegal was an excellent location for this event, given its focus on “Leveraging Systems for Improved Food Security.” West Africa is populated by hard working people, many whom have been struggling with food insecurity for quite some time, but continue to be resilient, relying heavily on community-level solutions and collaboration. We chose this topic because we know that in order to feed the growing population, we need to identify smart ways to rapidly scale up systems, increase efficiencies and reduce post-harvest losses, all while grappling with the unpredictable impacts of climate change. As we saw at this year’s learning event, the Cracking the Nut community is committed to identifying creative solutions that can be adapted and replicated across the globe.

It was an honor to have Mme. Aminata Mbengue Ndiaye, Senegal’s Minister of Fisheries and Maritime Economy, open the conference with warm words of welcome and a strong commitment to improving food security and women’s empowerment. Our Keynote Speaker, Larry Cooley, challenged participants to think less in terms of “projects” and more in terms of how we can scale up the use of technologies and support policies that foster more sustainable systems that improve food security in developing countries. While the King Fahd Palace Hotel highlighted the regal aspects of West Africa, this was truly a diverse, global event with 30 countries represented, including 16 different countries in Africa. With assistance from U.S. Peace Corps Volunteers in Senegal, the participants were greeted in a variety of languages, including Wolof, Pular and Malinke. I personally thank all speakers and participants for their contributions to this publication and the latest lessons learned that we plan to apply to continue our journeys to improve national-level self-sufficiency and global food security.

Sincerely,



Anita Campion
President and CEO



Executive Summary

This year's *Cracking the Nut*® conference was launched with a provocative presentation on the importance of applying a system's approach to agricultural development. Larry Cooley, Founder and President Emeritus at Management Systems International (MSI), highlighted the need for international development practitioners to move from a "project" to a "systems" mentality in order to achieve sustainable and scalable impact. To sustainably improve food security at scale, development practitioners need to apply a focus on systems change, which requires working with governments and the private sector in their efforts to:

- reduce systemic risks related to agriculture and policy, business models and financial systems;
- improve people's access to clean water, health and nutrition; and
- increase inclusion of smallholders in commercial markets, including women, youth and other marginalized people.

Theme 1. Reducing Systemic Risks

A resounding message at this year's learning event was the need to offer solutions that really meet the needs of the farmer in his/her context. However complicated the process, effective methods keep things simple and do not try to address all problems simultaneously. Simple but effective technologies and financing solutions are often best to improve the lives of smallholders. Below are some of the lessons related to risk reduction.

Lesson 1: Simple technology and information services can help to reduce risks associated with extreme weather. For example, SNV's Sustainable Technology Adaptation for Malian Pastoralists (STAMP) project helped to launch a new information system for pastoralists called GARBAL. This system uses satellite imagery to offer transitory communities with participatory mapping services and on-site verification of water and fodder locations for agro-pastoralists in security-challenged northern Mali.

Lesson 2: Digital last mile solutions can reduce systemic risks in agriculture and improve rural food security, but they must be tailored to the target user and provide high-quality information. For example, Ignitia developed a simple technology for tropical weather forecasting, focused primarily on the timing and intensity of rain, which cost-effectively reduced production risks for West African farmers. Farmers are using these hyper local weather forecasts to make better decisions on which type of seed to plant and when to plant. Being more confident about when it will rain or not helps farmers decide when to apply agrochemicals and when it is best to harvest and dry their crops

Lesson 3: Agricultural insurance can be a powerful tool for protecting smallholder producers against risks. For example, RTI's USAID/Senegal-funded Naatal Mbay activity helped the Senegal National Agricultural Insurance Company (CNAAS) to achieve profitability and cost effectively reduce risks for 193,000 subscribers in 2018 by bringing together key actors from the public and private sectors.

Lesson 4: Marketing committees and private partnerships can increase resilience and bargaining power for smallholders. Even in a high conflict environment, such as northeast Nigeria, Catholic Relief Services (CRS) was able to leverage three private sector partnerships to supply quality agricultural inputs to highly vulnerable farmers living in remote, insecure areas by reducing risks, building trust and establishing business relationships that improve resiliency for smallholders associated with production and marketing committees.

Lesson 5: Creating appropriate products and bundling financial services with technical assistance can improve smallholder resilience. WOCCU, for example, bundles credit, insurance and technical assistance to create an integrated support package for smallholders in Guatemala and Kenya. This simultaneously reduces risks and improves resilience across entire value chains.

Lesson 6: Blended finance can be an important tool to encourage risk-taking and facilitate rapid market systems development. Traditional financial institutions often consider agricultural lending too risky, but AV Ventures and Tanager have found that public sector resources that provide effective technical assistance to farmers and processors higher up the value chain combined with patient investment capital can be used to attract risk-averse investors to take a new look at pro-development investment opportunities by building skills and partially buying down the risk of investment at different points within the market.

Theme 2. Improving Nutrition, Health and Access to Clean Water

Nutrition, health and access to clean water are integral to the development of commercial food markets and food security systems. An increasing number of public sector interventions are benefiting from private sector engagement by applying commercial approaches to address needs.

Lesson 7: With the right business partner, public research institutions can tap the resources and reach of commercial markets to scale innovative products and services that solve social issues, including access to clean water, nutrition and health services. For example, the [International Institute of Tropical Agriculture](#) (IITA) research laboratories developed the product, Aflasafe, which has reduced aflatoxin in affected crops like groundnuts and maize by up to 80% over the past 20 years. But it was after IITA created the Aflasafe Technology Transfer and Commercialization ([ATTTC](#)) Program, implemented by Chemonics International and Dalberg Advisors, that it was able to demonstrate Aflasafe as a viable product to scale through commercial distributors in multiple countries.

Lesson 8: Strong seed market systems are strategically important to increase production of diverse nutritious foods as well as to ensure a sustainable supply of seeds for farmers. In Kenya, CRS is helping to boost household consumption of nutrient-rich fruits and vegetables by organizing rural seed fairs and field days, establishing community learning centers to demonstrate the value of improved seed that provides increased production and increases access to e-vouchers for farmers who can buy the seed from local agro-dealers. The long-term aim is to support vulnerable and remote communities by building their private sector market relationships over time.

Lesson 9: Integrating rural smallholders into urban food chains can improve incomes and nutrition at the bottom of the pyramid. The International Center for Tropical Agriculture (CIAT) has found that food systems can be strengthened to support more nutritious and affordable food by integrating smallholders into growth markets using its LINK Methodology to build scalable access to markets that address the key drivers of change.

Lesson 10: Although water, sanitation and health projects are not typically income generating, it is possible to expand access to clean water and sanitation by lending at commercial interest rates. In India, Sa-Dhan microfinance network is helping many MFIs to proactively finance small water, sanitation and hygiene infrastructure, at an average annual interest rate of 24% while maintaining 99% repayment. Disrupting the traditional “project based” approach, which provided free water services to a few communities, this market-based approach offers new ways for communities to finance their own water services, which is more sustainable and scalable.

Lesson 11: Improving women’s participation in dynamic value chains can improve household income and nutrition, especially when market interventions are integrated with behavior change. By addressing four key constraints to women’s participation in poultry in Burkina Faso, Tanager helped female producers contribute US\$340 each lending cycle to household income, increasing expenditures on food and nutrition from 27% to 35% of the household budget and improving women’s participation in household decision making.

Theme 3: Increasing Inclusion in Commercial Markets

For systems to be fully functional, they should be designed to be as inclusive as possible. Below are some of the specific lessons associated with increasing inclusion of marginalized populations in commercial markets and systems.

Lesson 12: Market systems should be designed to empower women and productively engage youth. For example, Tetra Tech’s Feed the Future-funded Agricultural Inputs Activity used internships and trainings to engage and increase opportunities for women and youth in Uganda.

Lesson 13: Public-private partnerships can help to increase long-term inclusion of vulnerable populations. For example, RTI’s USAID-funded Private Sector Driven Agricultural Growth (PSDAG) project proactively used public sector grants to increase sustainable inclusion of women, youth and people with disabilities in private businesses in Rwanda.

Lesson 14: Linking educational institutions to agricultural markets can provide youth with hands-on experience in agriculture and introduce incentives to create their own agricultural enterprises. In Puerto Rico, for example, Nuestra Escuela teaches youth the latest intensive agricultural production techniques using new urban farming technologies, such as hydroponics, so that they can produce high quality crops to sell in local grocery stores and markets.

Lesson 15: To ensure adequate participation of women and youth in agricultural market systems, projects must be careful to set client selection parameters that are inclusive. To improve female and youth inclusion in its USAID-funded Nigeria Markets II project, for example, Chemonics reduced the minimum amount of land required to access training and other resources.

Lesson 16. Serving marginalized smallholders requires diverse product options and blended financial services. In Senegal, CRS worked with MyAgro to help farmers save in CRS’ Savings and Internal Lending Committees. Then, using their own capital, farmers were linked with agro-dealers to buy quality seed at affordable prices. As the farmers built their financial skills and improved their production, they were also linked with formal financial institutions to expand their investment options to invest in additional farming input packages.

Conclusion

Participants left this learning event with a strong commitment to focusing on a systems approach to promote sustainable and scalable strategies for rural and agricultural development to improve food security. Development practitioners recognize their role in facilitating constructive relationships with actors in the public and private sector and agreed that a better understanding was needed on how to use blended finance and other smart subsidies to facilitate expansion of rural and agricultural markets and build more resilient food security systems.

I. Introduction

This year's *Cracking the Nut*[®] conference was launched with a provocative presentation on the importance of applying a system's approach to agricultural development. Larry Cooley, Founder and President Emeritus at Management Systems International (MSI), highlighted the need for international development practitioners to move from a "project" to a "systems" mentality in order to achieve **sustainable and scalable** impact. His comments drew heavily on findings from the *Scale Up Sourcebook*.¹ As a point of departure, Larry noted that while the number of donors and projects have been increasing, donor-funded projects have been reducing in size and term. He argues that the average project now lasts less than three years, even though the average time needed for an innovation to reach national scale is 15 years.

Larry noted that only host governments and the private sector have the incentives and infrastructure to implement large scale systemic change; and development practitioners (donors, consulting firms, researchers, and civil society actors) need to recognize the limited but still important ways that time bound, resource constrained projects can inform and influence those changes. Since "a bad system will trump a good program every time," development practitioners need to shift from a project-focus to looking for ways they can add value to support innovation and build sustainable systems through a role of facilitation or intermediation, as highlighted in the diagram below. As intermediaries, development practitioners can help change systems primarily by reducing risk, influencing policy and building capacity.

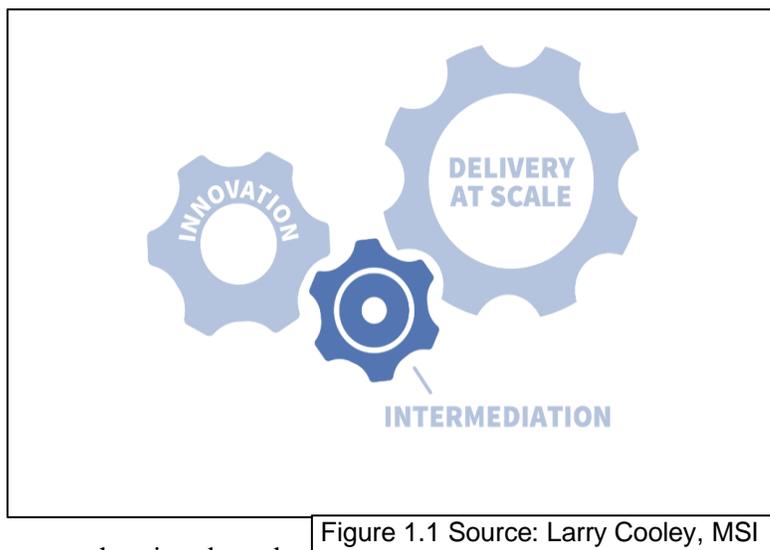


Figure 1.1 Source: Larry Cooley, MSI

Larry distinguished three phases to scaling as the three Es:

1. Effectiveness – identify and prove an innovative solution to a common problem;
2. Efficiency – the solution must be relatively cheap and easy to use; and
3. Expansion – be attractive to a large number of buyers/users.

Using the example of the Purdue Improved Cowpea Storage (PICS) bags (see photo), Larry argued that donors often focus exclusively on the innovation (i.e., the "effectiveness") phase. Had this been the case with PICS bags, sustainable scaling may never have occurred. He explained how Purdue University helped to identify an innovative solution to the problem of aflatoxin 25 years ago, but that solution only reached a



Photo 1.1 Source: Larry Cooley

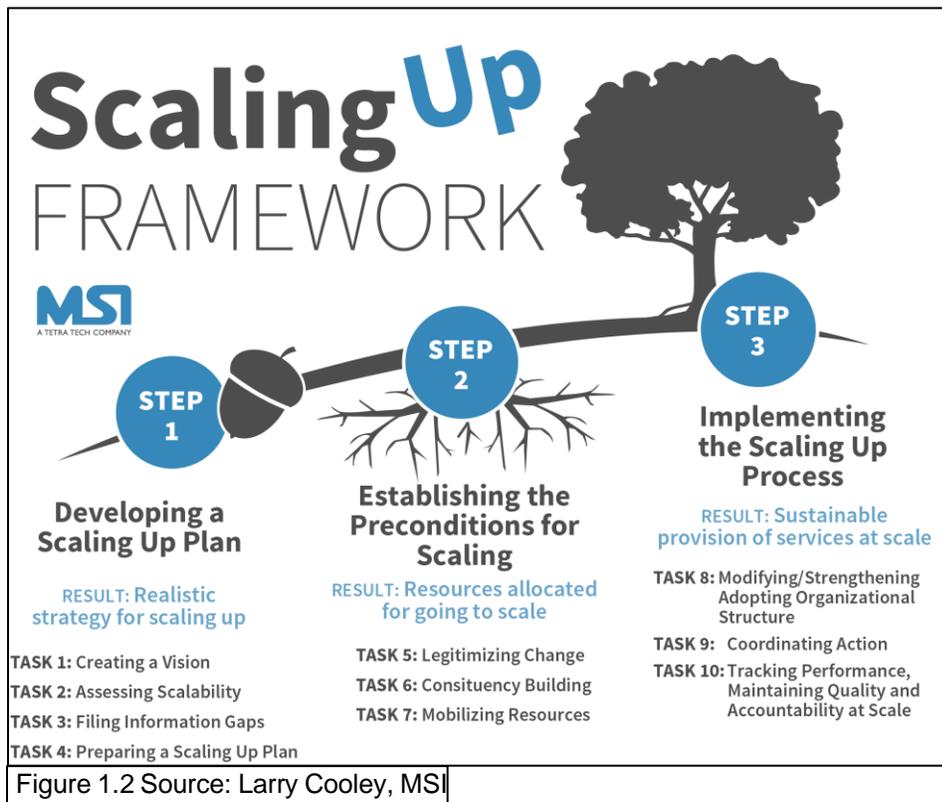
¹ Cooley, Larry & Julie Howard, produced by Purdue University and the African Development Bank Group, 2019; available for download at <https://docs.lib.purdue.edu/scaleup/sourcebook/book/1/>

scaling tipping point two decades later, when local companies were incentivized to manufacture and distribute the bags. [*Cracking the Nut 2013* documented this innovation and how it had scaled to ten African countries at that time]

Larry suggested to be successful in building scalable solutions that we should “fall in love with the problem before falling in love with the solution.” We need to thoroughly search for root causes by asking “why” the problem exists, at least five times, before beginning to identify the solution. He also cautioned that we not over-focus on over-designing the solution before moving toward expansion and scaling, as additional lessons and tweaks along the way are normal. It is a careful balance, he noted: “while one foot is on the accelerator, the other needs to stay on the brake.” Based on extensive application in agriculture and other projects, Larry summarized MSI’s Scaling Up Framework, which includes ten common tasks that help practitioners to (1) design interventions with scale in mind, (2) assess scalability, and (3) manage the transition to scale. (See MSI’s Scaling up Diagram)

In closing, Larry noted that, as development practitioners, we need to apply a focus on systems change in order to improve food security sustainably at scale. That requires working with governments and the private sector in their efforts to:

- Reduce systemic risks related to agriculture and policy, business models and financial systems;
- Improve people’s access to clean water, health and nutrition; and
- Increase inclusion of smallholders in commercial markets, including women, youth and other marginalized people.



II. Reducing Systemic Risks

When thinking of systems to improve food security and reduce risk, it is tempting to think in terms of complexity, including solutions that address all root causes of the problem. A resounding message at this year's learning event was the need to keep things simple and not try to address all problems simultaneously. Instead, simple technologies and solutions are often needed to improve the lives of the rural poor, especially smallholders.

Lesson 1: Simple technology and information services can help to reduce risks associated with extreme weather.

Technology can be helpful to reduce transaction costs and as the number of people that benefit from an information service increases, the more affordable the service becomes. The public sector can help to de-risk private sector investment by supporting innovation, such as early stage prototyping of new ideas until the private sector can step in to scale or commercialize a new product or service to become a fully profitable business model. For example, SNV's Sustainable Technology Adaptation for Malian Pastoralists (STAMP) project helped to launch GARBAL, an information service that uses satellite imagery to offer participatory mapping services and on-site verification to agro-pastoralists in northern Mali. Despite security challenges and political instability in northern Mali, GARBAL expects to break even in its fourth year of operation (in 2021). The system was designed using simple technology based on Unstructured Supplementary Service Data (USSD) messaging and minimal data to keep costs low and to mitigate negative impacts of Internet outages.

Box 2.1: Using technology to lead agro-pastoralists to water and biomass in West Africa

The STAMP project's phase 1 began in 2015 and launched the GARBAL service in November 2017 in Mali, which uses satellite data to identify water and biomass, and offers information services, including a help line, to serve agro-pastoralists in northern Mali. In less than two years, GARBAL has recorded 1,307 calls and 84,816 USSD requests from 55,821 users, demonstrating strong demand for the service. Pastoralists also benefit from pastoral farming advice, on topics such as animal health, access to inputs and financial products adapted to the needs of pastoralists. As Catherine Le Côme, SNV's Global Technical Advisor for Livestock explained that "with better information on water sources, pastoralists can make better decisions that reduce risk and improve herd management." With donor support from the Dutch Embassy in Mali, SNV started phase 2 or STAMP+ in 2019 with the objective to increase productivity by 10% on average for 100,000 pastoralists.

Mr. Amidi Ag Alwaly of TASSAGHT, a network of agro-pastoralists explained how they helped to make the system work by collecting and validating information on the ground. "This solution responded specifically to the transient nature of pastoralists. We are not just livestock raisers; we are in a conflict zone, so it is especially important to have guidance on where to go. The GARBAL information saves us a lot of time in trying to find resources, reduces risk and saves money." He explained that they are still in a pilot phase working with agro-pastoralists in Gao and Ménaka regions, but they are expanding to other areas including Mopti, Timbuktu and Kidal based on the success to date. While the information is not perfect in that the satellite imagery cannot determine volume of water or the number of animals at a given watering hole, by creating a minimal package of standardized information, GARBAL has been able to offer cost-effective services (25-72 CFA per transaction). Integrating price information services, GARBAL also helps pastoralists to move to where there is highest demand for their products or livestock; resulting in higher

revenues and improved food security. During phase 1, SNV documented that the system helped to increase milk production by 9.6% for a value of 157 Euros per pastoralist. Not surprisingly, this correlated with an overall satisfaction rate of 98% by users, with 91% confirming that they had used the information to make different decisions.

As the main distributor of the service, the telecom Orange Mali has a commitment to supporting the project for its first ten years, which has been key to building the market. Boubacar Traoré of Orange Mali explained its motivation, “Given Orange Mali’s success in building a country-wide telecommunications network, we have a moral obligation to support socio-economic development in Mali.” In other words, what is good for Mali is good for Orange Mali. Furthermore Mr. Traoré explained “We aren’t agricultural experts, so partnerships allow us to leverage our technology to reduce risks for agro-pastoralists, but we need more partners to raise awareness of this service in rural communities.”

Lesson 2: Digital last mile solutions can reduce systemic risks in agriculture and improve rural food security.

Solutions must be tailored to the target user and provide high-quality information. To reach the last-mile, digital technologies must be adapted to the local context, which often means being useable in low-income, low-connectivity, and low-literacy environments. For example, Ignitia developed a simple technology for tropical weather forecasting, focused primarily on the timing and intensity of rain, without attempting to provide all weather information, such as on temperature and wind. The weather forecast is targeted to localized regions. This allowed Ignitia to develop a low-cost way to help farmers to reduce production risks, empowering them to earn more from their agribusinesses over time (see Box 2.2 below).

Box 2.2: Ignitia’s Cost-effective Tropical Weather Forecasting Technology in West Africa

Realizing that Africa relied primarily on the US and Europe Union for weather information, Theoretical Physicist, Liisa Smits committed to developing a more reliable system for weather forecasting in West Africa. She saw a strong need as 40% of the world’s population lives in the tropics and 96% of all agriculture in the tropics relies solely on rain for water. After four years of research, Liisa and her team developed a simple system that relies on text messaging to provide useful advice to farmers. By providing 2 days and monthly forecasts on the likelihood and intensity of rain, Ignitia’s Tropical Weather Forecasting Technology helps farmers know when to plant and when to harvest, helping them to mitigate the 20-80% of production losses as a result of weather. While Ignitia spent a lot of time talking to local farmers, it wasn’t until they spent a year observing them that they identified the seven core indicators that were most important to farmers. This observation also helped to identify that the “early adopters” of the new technology tended to be young adults (age 20-25 on average) who had left the village for work and been exposed to other benefits of technology. The service is offered in partnership with telecommunications firms, currently in Ghana, Mali and Nigeria, whereby farmers can sign up to the service by USSD and pay for it from a preloaded mobile credit. Ignitia set the price for the technology as low as 4 cents per day, based on their observation that most farmers bought two bottles of soda per month. In addition, Ignitia found that it took time to build trust, with the tipping point being after they reached 25% farmers in a village. As of Sept. 2019, Ignitia had 1.1 million subscribers in their three original countries with ongoing expansion to Ivory Coast, Burkina Faso and Cameroon this year. According to several studies, Ignitia’s forecast has resulted in 65% more yield and \$480 more income on average per farmer per season.

Lesson 3: Agricultural insurance can be a powerful tool for protecting smallholder producers against the negative repercussions of erratic rainfall, and other risks.

In Senegal, as in many developing countries, the production system is characterized by outdated agricultural practices and a heavy dependence on rainfall. These high risks discourage banks from lending to smallholder producers, who have insufficient guarantees to secure loan repayment in the event of disaster. Faced with this situation, the Government of Senegal, with the support of private partners, created the Senegal National Agricultural Insurance Company (CNAAS) in 2009 and set up a 50 percent subsidy on insurance premiums to make access to agricultural insurance more affordable to smallholder farmers.

Box 2.3: RTI's Contribution to Scaling Agricultural Insurance in Senegal

In the 2013 crop year, the Feed the Future Senegal Naatal Mbay project, implemented by RTI International, joined CNAAS and its partners in supporting the design and expansion of insurance solutions tailored to the agriculture sector. The goal was for agricultural insurance to become an integral and financially sustainable part of cereal value chains, both in terms of profitability for producers, and of the financial viability of CNAAS. CNAAS has developed a portfolio of tested products and accumulated a wealth of experience in recent years. The growth of its agricultural portfolio has allowed CNAAS to break even financially, and for the past three years, has generated substantial profits. Bolstered by this growth, it is now able to attract new strategic investors, such as Banque Agricole and ASPRODEB (the Senegalese Association for the Promotion of Rural Development), which recently acquired financial stakes in the company during an increase in share capital, prompted by a new regulatory framework of the Inter-African Conference on Insurance Markets.

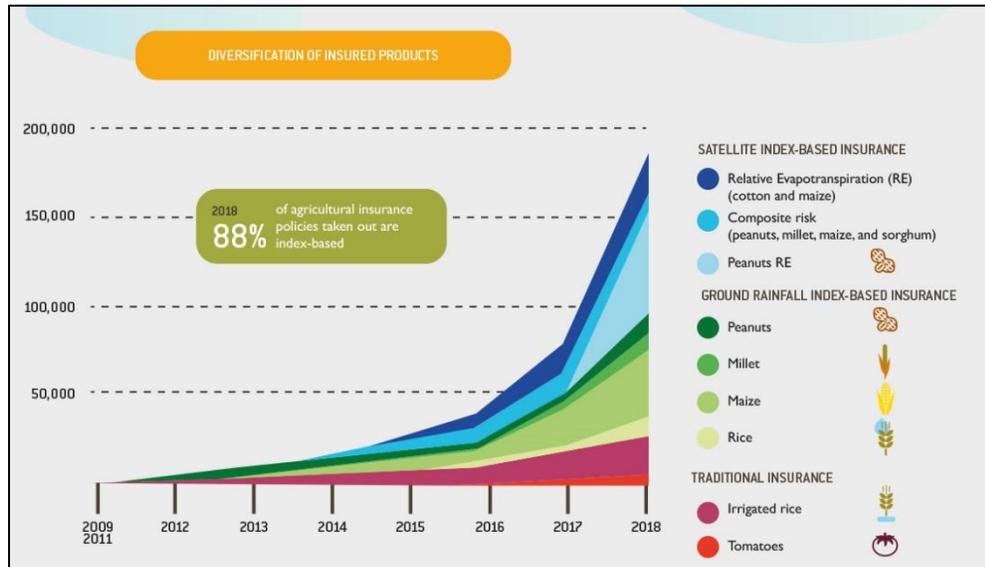
RTI attributes this effort's success to Naatal Mbay's facilitative approach that developed rain-index insurance products and brought together key actors from the public and private sector. Naatal Mbay worked with ANACIM (Agence Nationale de l'Aviation Civil et de la Météorologie), initially focusing on maize, to collect and validate the data used to develop the rain index by ISRA (Institut National de Recherche Agronomique). Feed the Future Naatal Mbay's partners also included PlaNet Guarantee Senegal and private sector insurance companies to provide technical assistance, risk reduction analysis, and re-insurance of the portfolio through international insurance companies to effectively structure the insurance premiums. The project also leveraged a US\$1 million investment from Global Affairs Canada to support the extension of the rain gauge network in the central and southern regions of Senegal.

The extension of the automated rain gauge network (via the Naatal Mbay-Global Affairs Canada collaboration), coupled with manual rain gauges managed by the producers, allowed the team to successfully develop indexed insurance products. This two-pronged system made it possible to build trust between producers and CNAAS. Index insurance now represents 88 percent of the CNAAS portfolio. The introduction of satellite-based systems, now makes it possible to develop hybrid formulas whereby ground readings can be calibrated and validated by satellite readings to maintain confidence in the system.

In the initial phase, CNAAS worked closely with producer networks, resulting in an inclusive and low-cost system for the promotion and distribution of its insurance products. These producer network members were trained to carry out grassroots extension activities on relevant aspects of the insurance. As a result, the acceptance of agricultural insurance has been growing. Since 2015, Banque Agricole and MFIs have been integrating agricultural insurance coverage into their input credit portfolios. Banque Agricole's leadership

has ensured that the distribution of agricultural insurance by banks is an accepted and effective practice that further professionalizes the insurance system.

CNAAS' agricultural portfolio has grown exponentially since 2016. It went from 40,000 subscribers in



2016 to 79,800 in 2017, then to 193,000 in 2018. According to CNAAS, the number of subscribers reached 400,000 in 2019. As of 2018, CNAAS reportedly collected US\$3.2 million in insurance premiums and paid US\$1.6 million in crop loss compensation. The bundling of input

Figure 2.1 Source: RTI

credit and insurance into a single package facilitates distribution of insurance coverage to existing bank clients, but also increases the number of producers who can now access input loans due to the reduced risks with insurance coverage. At the same time, the banks are seeing improved credit portfolio quality with a better credit reimbursement rate.

Lesson 4: Marketing committees and private partnerships can increase resilience and bargaining power for smallholders.

Producer groups can be organized into marketing committees to increase their market power and ability to negotiate higher prices for their crops. They can also have better access to storage services, extension advisory services and finance to invest in mechanization. At a minimum, marketing committees can increase farmer income through bulk purchases of inputs, but with the right links to private sector partners, even more benefits can result. Even in a high conflict environment, such as northeast Nigeria, CRS was able to leverage

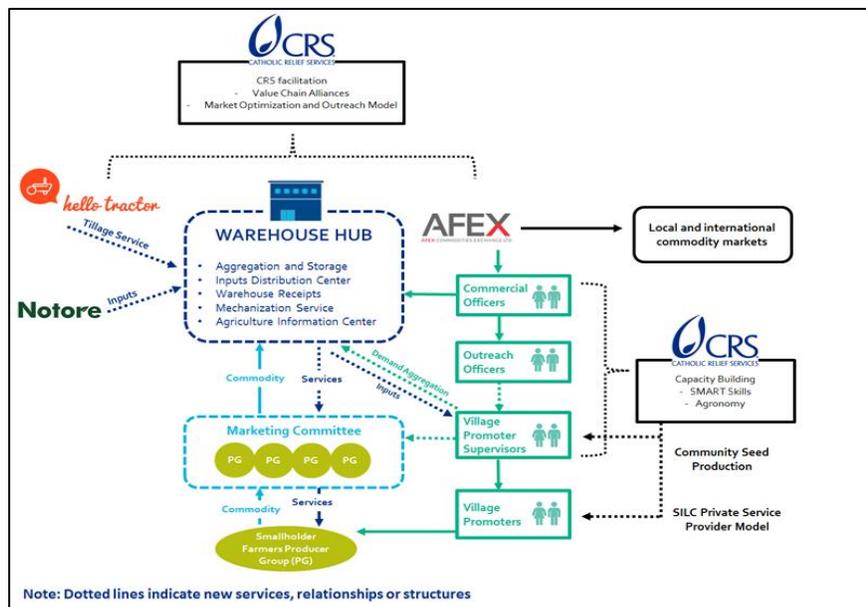


Figure 2.2 Source: CRS

three private sector partnerships: Hello Tractor, Notore Chemical Industries Plc & AFEX Commodity Exchange Limited (see Box 2.4 below). As a result, 82% of 750 households increased their adoption of adaptive technologies and management practices, thereby reducing risks and improving their resiliency in a conflict-affected environment. One beneficiary, Wakil Abbas explained, “In 2018, the committee sold 2,312 bags of maize at 7,000 Naira (US\$19.44) per 100 kg bag – as compared to selling at 5,000 Naira (US\$13.88) per bag on the open market”, a gain of \$12,854.

Box 2.4: CRS’ Market Optimization and Outreach Model (MOOM) in Nigeria

Catholic Relief Services found that it is important to start “where you can” to begin to rebuild trust in villages impacted by insecurity. While 80% of livelihoods in northeast Nigeria are dependent on rain-fed agriculture, the insurgency by Boko Haram was having a devastating impact in most communities in Borno, Yobe and Adamawa states, hindering trade and food security. As a result of the conflict, agricultural input and output markets were virtually dysfunctional. CRS wanted to support a sustainable option for the farmers and found that by working with the private sector to design interventions in support of smallholders in the region, they were able to get local production back on track and begin rebuilding trust and food security. By simultaneously bringing in multiple stakeholders and using its Market Optimization and Outreach Model (see Figure 2.2), CRS helped communities to design their own locally led development, while factoring in market opportunities, gradually moving from short-term food security needs to longer term value chain and market systems development for improved production, processing, storage, marketing and coordinated business development. Hello Tractor offered tillage services to farmers, accessible via a smart phone app through a booking agent. Notore delivered agricultural inputs to even hard-to-reach areas. And AFEX provided a warehouse receipts system to facilitate input financing to farmers. The MOOM approach clustered producer groups into marketing committees, which facilitated access to better priced input and output markets. The committee structure also allowed for the farmers to organize an advance purchase of seeds and fertilizers in bulk at discounted rates for the next crop cycle. Because of the improved ability to negotiate prices and attract buyers for their product, communities now sell their produce to the market through a marketing committee. As a result, CRS reported 150 MT of paddy rice and 125 MT of sorghum were collected and sold by four marketing committees for a total value of \$55,000.

Lesson 5: Creating appropriate products and bundling financial services with technical assistance can improve smallholder resilience.

Insurance products can be especially helpful to building resilience, as they provide compensation for losses at various stages of the production cycle. When losses occur early in the planting season, producers can be compensated with funds and / or inputs so they can replant. By integrating insurance and technical assistance with loans to agribusinesses, risks can be systematically and cost effectively reduced across an entire value chain, thereby reducing associated credit risks and strengthening the market simultaneously. For example, WOCCU bundles credit, insurance and technical assistance to create an integrated support package to smallholders (see Box 2.5)

To date, WOCCU is using this approach with 13 participating credit unions and SACCOs in Guatemala and Kenya and have financed more than 50 loan products to members of nearly 200 producer groups. To mitigate risk, the approach does not disburse cash but transfers funds directly to the input or equipment supplier. In addition, forward contracts are made with the buyer/off-taker to repay directly to the credit union, prior to disbursing the balance to the members’ savings account. So far, the 13,000 plus loans that have been disbursed are valued at nearly \$36 million in total. Additionally, more than 14,000 producers,

processors and others have adopted new management practices or technologies, resulting in over 1,500 hectares under improved practices. These practices allow smallholders to make more money and become more resilient over time.

Lesson 6: Blended finance can be an important tool to encourage risk-taking and facilitate rapid market systems development.

Box 2.5: WOCCU Bundles Finance, Inputs and Technical Assistance in Guatemala and Kenya

With USAID funding, the World Council of Credit Unions (WOCCU) designed an innovative toolkit to address some of the common risks and challenges of agri-lending. The Agricultural and Rural Finance Toolbox is designed to minimize systemic risks by attracting good clients using a credit evaluation process, based on cashflow projections with a customized disbursement and repayment schedule to fit the production cycle (rather than the traditional 200% hard collateral required for a bank loan). By bundling low cost financial services from credit unions with improved access to agricultural inputs, market information and insurance, WOCCU offers an integrated approach to increase income of rural households. To further assist with risk reduction, WOCCU uses the CROPIN application to do remote farmer field monitoring using satellite imaging. The CROPIN application geo-tags each corner of the farmer's plot, which helps to ensure realistic cashflow projections are used. As Jean Thiboutot explained, "Small farmers tend to over-estimate their land size by 20%." In addition, CROPIN offers interactive dashboards to view and analyze farm data, for comprehensive farm management, including monitoring production and maintenance costs, tracking use of training, chemicals, etc. The application also supports geo-traceability and integrates past yields and regional prices to forecast revenues. The credit officer and farmer can populate the data on first farm visit and monitor the crop online, reducing some of the costs and risks linked to crop support and loan monitoring.

Blended finance is defined by Convergence as "the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development." If properly structured, combining blended finance with a sustainable market systems development strategy can create synergies and induce longer-term market development. Blended finance can attract risk-averse investors to pro-development investment opportunities by partially buying down the risk. For the private sector, blended finance can create demonstrable effects of investment worthiness and reduce perceptions of risks if investments are successful, encouraging longer-term private sector-led development. Likewise, public sector development programs that encourage systemic change can help reduce systematic risks faced by lenders and investors in a way that builds confidence in higher risk investments.

As David Fischer of ACDI/VOCA explained, there is a US\$2.5 trillion finance gap needed to achieve the Sustainable Development Goals (SDGs), many of which will require blended finance to stimulate coverage. Fischer also described the four commonly used models or "archetypes" of blended finance:

- 1) **Concessional Capital** – whereby commercial investment is mixed with donor funds or concessional capital to lower risk or interest rates. For example, AV Ventures uses this model in Ghana.
- 2) **Guarantee/Risk Insurance** – whereby risk associated with commercial debt or equity is reduced by pairing it with a guarantee fund or insurance. USAID's former Development Credit Authority (DCA) is one example.
- 3) **Technical Assistance Funds** – whereby donor-funded technical assistance is offered to support commercial debt and/or equity. The World Bank and IFC tend to use this model.

- 4) **Design-Stage Grants** – whereby an initial grant is used to buy down risk sufficiently to mobilize enough debt and/or equity to create a new commercial market. For example, USAID’s West African Trade and Investment Hub uses USAID funds to co-invest with the private sector to temporarily increase incentives and de-risk private sector investment related to agriculture.

AV Ventures, an impact investment subsidiary of ACDI/VOCA, and the ACDI/VOCA affiliate Tanager presented two distinct models: one from Ghana (a blend of models 1&3) and one from Burkina Faso (a blend of models 2&3).

In Ghana, AV Ventures set up and is managing a **blended finance** fund to provide innovative, catalytic financing and technical assistance to agricultural small- and medium-sized enterprises (SMEs). By blending US\$2 million of catalytic donor funding from the United States Department of Agriculture (USDA) through the Ghana Poultry Project (GPP) with US\$2 million of commercial capital from the Overseas Private Investment Corporation (OPIC). AV Ventures has been able to facilitate longer-term (three- to five-year) debt investments to three growth-stage poultry SMEs. It has also facilitated on-lending to a



Photo 2.1 Source: USDA Ghana Poultry Project

financial institution to serve smaller poultry farmers, especially women. In addition, the USDA-funded Ghana Poultry Project offers **technical assistance** to investees to improve their business practices, thereby improving their investment profiles. For instance, the loan from AV Ventures to a poultry feed producer has enabled the company to improve the supply of high-quality, locally produced poultry feed to the poultry sector in Ghana. Access to competitively priced poultry feed, which accounts for about 70 percent of the direct costs of poultry production, helps to improve food security by making poultry products more affordable to local populations. The investments by AV Ventures have also helped to improve the availability of high-quality, locally produced day-old chicks and to support innovations and efficiencies in egg production, processing and marketing. Together, these investments help poultry-related SMEs capture larger margins and grow.

In Burkina Faso, Tanager coupled **guarantees** for microfinance institutions (MFIs) with a robust **technical assistance** package for agri-entrepreneurs to stimulate new agricultural investment. To date, this mechanism has facilitated access to loans worth more than US\$1 million for 5,700 female poultry entrepreneurs. The guarantee was designed to cover up to 50 percent of the loan portfolio as an incentive to MFIs to design new finance products and lend to local poultry producers. To date, the repayment rate exceeds 98 percent. Prior to the introduction of this program, there was no finance product aligned to the local poultry value chain, and female poultry producers did not have access to finance. Now, the farmers in the project report increased profits averaging US\$340 over a six- to nine-month loan cycle. Based on this success, the partner MFI plans to significantly scale up and has been integrating training on how to raise chickens with their financial literacy modules — at a cost of just US\$36 per beneficiary.

In designing these mechanisms, however, one must be careful not to damage existing commercial markets. As Romain Kenfack of Tanager said, “Blended finance is most appropriate where a market failure exist” or he added, where a temporary “smart subsidy” can establish conditions to attract more commercial capital.

III. Improving Nutrition, Health and Access to Clean Water

Nutrition, health and access to clean water are integral to the development of commercial food markets and food security systems. While the role of the local government and public sector actors is important in these areas, an increasing number of interventions are benefiting from engaging with the private sector and applying commercial approaches to address needs, as highlighted in the lessons below.

Lesson 7: With the right business partner, public research institutions can tap the resources and reach of commercial markets to scale innovative products and services that solve social issues.

Public private partnerships have great potential to create widespread positive impacts in health, climate change and agricultural production. However, those promoting promising products must first focus on the economic incentives to use the products. Without a compelling path to profitability, the private sector will be unwilling to invest in production or distribution. After economic drivers of the products are identified, well thought out business development, sales and marketing strategies anchored in prioritizing a few key buyers can help demonstrate the product's impact in context. This ensures that markets rapidly take up these products and services and scale them to their full potential.

For example, Aflasafe is a product developed over 20 years in [International Institute of Tropical Agriculture](#) (IITA) research laboratories that has proven to reduce aflatoxin in affected crops like groundnuts and maize by up to 80% to 100%. Furthermore, Aflasafe has the potential to improve the profitability of the Senegalese groundnut sector by US\$300 million by unlocking new quality-sensitive markets, like the EU and US, which impose tight regulations on aflatoxin.² Egypt (Africa's second largest groundnut exporter behind Senegal) exports groundnuts at \$1.66/kg compared to Senegal's \$0.81/kg.³ However, integration of Aflasafe into the groundnuts value chain entails additional cost and effort on behalf of value chain actors, especially farmers, and therefore represents a challenging behavior change. To catalyze large scale adoption of Aflasafe within the groundnut value chain, with initial funding from the Bill and Melinda Gates Foundation and USAID, IITA created the Aflasafe Technology Transfer and Commercialization ([ATTC](#)) Program, implemented in partnership with Chemonics International and Dalberg Advisors, to help demonstrate Aflasafe as a viable commercial product. In Senegal, ATTC selected reputed agribusiness BAMTAARE Services through an open and competitive process to hold an exclusive license for manufacturing and distribution of Aflasafe in the country. After IITA innovates and develops the Aflasafe technology for each country or region, ATTC facilitates the transfer of the technology from research to private sector distribution. ATTC convinces potential private sector investors of the business case for Aflasafe and leverages their resources to scale by: assessing the market and developing country strategies (development of commercialization strategy); identifying and vetting potential private sector partners to hold a license for the technology (public investor forum, competitive investor selection process, and signature of Transfer Technology License Agreement); and implementing effective marketing, sales and distribution strategies (business development support). The ATTC team continuously improves upon this process by learning, adapting and scaling.

² Source: <https://www.aflatoxinpartnership.org/>

³ Source: <https://www.tridge.com/intelligences/peanut/export>

The Senegal country strategy found that groundnut exporters had the greatest financial sensitivity to aflatoxin through rejected export shipments and inability to access premium markets. BAMTAARE was convinced of Aflasafe's potential and invested in an Aflasafe factory in Senegal. Now the factory is operational, BAMTAARE's business development strategy prioritizes marketing resources to target groundnut exporters and quality-sensitive buyers. To reach smallholders, who are the most affected by aflatoxin contamination in their produce, but also the least able to pay for Aflasafe, BAMATAARE begins at the end buyer and works its way along the value chains through business to business partnerships. Initial results indicate that the marketing and sales strategy is succeeding as sales of Aflasafe tripled in 2019, exceeding the combined sales during the preceding 3 years, and yet was still only able to meet half of the market demand due to limited supply and timing of production. As the company ramps up business development efforts, they will also ramp up and expand Aflasafe production efforts in 2020.

Lesson 8: Strong seed market systems are strategically important to increase production of diverse nutritious foods and to ensure a sustainable supply of seeds for farmers.

Seed security systems can support increased production of existing nutritious foods at the household level and the introduction of new varieties for improved nutrition. In Kenya, CRS is helping to boost the household consumption of nutrient-rich fruits and vegetables by organizing rural Diversification for Nutrition and Enhanced Resilience (DiNER) seed fairs and field days, establishing community learning centers and providing e-vouchers to selected farmers to enable them to purchase a range of vegetable and fruit seeds for planting in their gardens. DiNERs are an innovative response that allows farmers to learn about new, high nutrition crop varieties and then decide, which crops to grow in times of chronic stress. This strategy helps farmers to diversify and benefit from targeted subsidies. While geared to meeting short-term needs, DiNERs are not disrupting local market links, as the approach also supports local private sector involvement, by channeling farmers to access new seed varieties through local agro-dealers that honor the e-vouchers.

For DiNER seed fairs to work, they must respond to the articulated income and nutritional needs of the communities. Also, they should be informed by careful studies of key nutritional gaps in local diets, priority health concerns and emerging agricultural opportunities to improve household incomes. For agro-dealers to restock seeds, there must be a significant demand by local farmers for seeds. Seeds that do not have a strong demand are unlikely to be sustained by the agro-inputs system.

With enhanced smallholder access to horticultural seeds – delivered through existing input suppliers and local dealers – the farm uptake of important nutritious crops is increasing, in turn this approach is strengthening private seed suppliers. To date, 10,000 smallholder farmers have purchased 40,000 MT of quality seeds of improved varieties worth more than US\$500,000. The farmers planted 8,000 acres of pulses/legumes and vegetables were cultivated by 4,000 households. The private sector is increasingly participating in this approach, with 23 input suppliers and 300 local agro-dealers now involved in providing quality seeds to rural farmers. Better seeds are also improving yields as is evidenced by the greater than 37% increase in yield of green gram and cowpea production. Furthermore, growing more legumes has the advantage of improving soil organic matter, which in turn helps boost yields in the long term.

Lesson 9: Integrating rural smallholders into urban food chains can improve incomes and nutrition at the bottom of the pyramid.

When consumers at the bottom of the pyramid (BoP) have information on nutrition benefits, and access to comparable and affordable products, they are generally willing to pay for those benefits. By integrating more smallholders into value chains through the [LINK methodology](#),⁴ the International Center for Tropical Agriculture (CIAT) has found that food systems can be strengthened to support more nutritious and affordable food, while also improving the livelihoods of women and youth (See Figure 3.1 and Box 3.1).

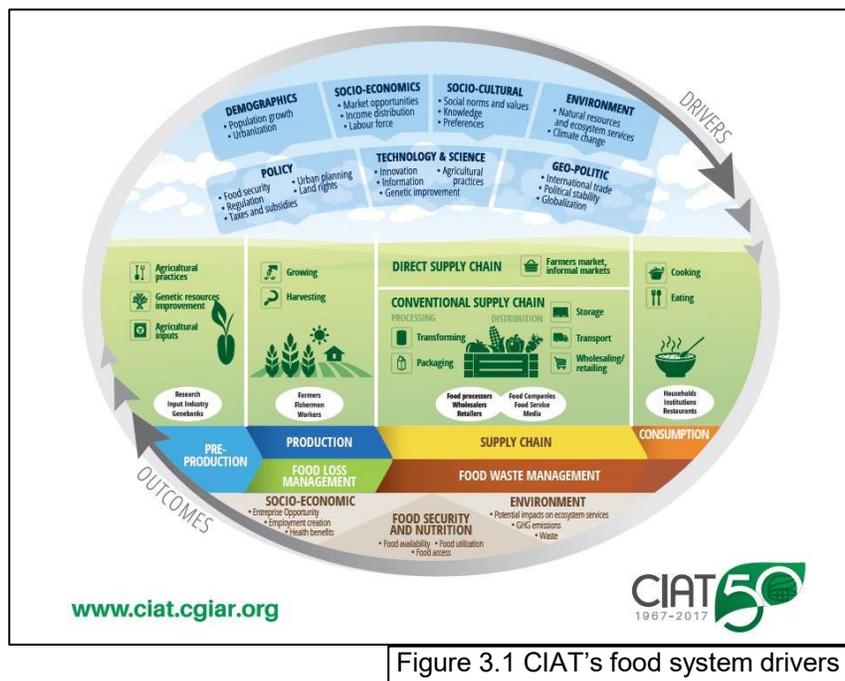


Figure 3.1 CIAT's food system drivers

To sustainably include smallholders in urban food chains, we need to go beyond the standard value chain approach and embrace a food systems approach that simultaneously tackles various drivers of change, including:

1. **The policy environment** – There is a need for a regulatory framework that incentivizes local food sourcing and quality standards. This can be done through multi-stakeholder food industry involvement and local food strategies that involve producer organizations in their design.
2. **Socio-cultural norms within producer organizations and among consumers** – The absence of a business mindset is often one of the biggest hurdles to having professional and entrepreneurial firms that can effectively participate in rural/urban food chains. There is also a need to change consumers' mindset to increase their trust in local products.
3. **Food environment** – Changing the mindset of producers, distributors, processors and traders to understand what comprises a nutritious diet will assist in making an impact on the kind of foods made available and accessible to rural and urban consumers. How food is made available and accessible to consumers (i.e., food environment) has a big role to play in determining what consumers eat. A way of intervening in the food environment is working with all value chain actors (producers, distributors, processors and traders) to sensitize them on the importance of increasing the supply of nutritious foods in the market instead of relying on ultra-processed foods.
4. **Local market opportunities and income distribution** – Inefficiencies in the food chain often make local food more expensive compared to imported food. One way of turning the tide would

⁴ Link Methodology: A participatory guide to business models that link smallholders to markets, Version 2.0, International Center for Tropical Agriculture, <https://cgspace.cgiar.org/handle/10568/49606>

be to support the development of local food production hubs and distribution platforms that enable economies of scale and allow smallholders to deliver quality food to urban markets with a minimum number of intermediaries. Such an approach would help to reduce costs for consumers and farmers.

5. **Inclusive business models.** Overall, one of the main enablers of sustainable food systems is a fair and inclusive business relationship between smallholder farmers and buyers. New production strategies are often seen as more expensive and ineffective by smallholder farmers. The promise of stable buyers and supply contracts makes them more inclined to adopt more sustainable practices and invest in technologies that are more environmentally and climate-friendly. Inclusive business models also reduce transactional costs in the value chain hence making the commodities more affordable to consumers.

Box 3.1: Supporting Nutrition Sensitive Value Chains in Kenya and Uganda

CIAT (International Center for Tropical Agriculture) partnered with national research organizations, international and local universities and local private companies to implement the GIZ-funded Nutrition Sensitive Value Chain (NSVC) project in Kenya and Uganda. The project's goals were to improve the nutrition of BoP poor urban consumers and the incomes of value chain actors while promoting the inclusion of women and youth in markets. The NSVC project started by researching nutritional gaps and product preferences of the targeted consumers, which included women of reproductive age and children under 5. The team was also in partnership with women-owned and operated processors willing to invest and work with the project. The project supported the development and launch of three new lines of safe and nutritious porridge flours (2 in Kenya and 1 in Uganda) targeting the urban poor population, especially young children and women of reproductive age. Specific activities included working with farmer groups to build the supply chain of the raw materials needed to develop the porridge flour. Of importance was having farmers produce the required commodities in a timely fashion and in the quality and quantities required by the processors. In addition, farmers, aggregators and processors were trained on food safety, how to reduce contamination and nutrient leakage along the value chain, and use of [efficient solar driers](#) to increase food safety, and decrease post-harvest loss and nutrient leakage. Other activities included conducting studies to understand [willingness to pay for nutritious foods](#) by the urban poor consumers, working with processors to transform grains into [nutritious, safe and quick to cook porridge flour](#).

The NSVC project emphasized the importance of co-development to create products that would not only be profitable for value chain actors but demanded and consumed by the targeted populations, resulting in improved nutrition. This included looking at availability, affordability, taste, packaging and nutrient values for the various types of new porridge flour. One study found that a slight change in flour color could negatively impact the consumers' demand for the flour; thus, the processors focused on producing safe and more nutritious products that retained the appearance and taste of traditionally acceptable and consumed flour. Farmers benefited from increased sales, improved incomes, product diversification and reduced post-harvest losses, while consumers gained access to new safe, nutritious and affordable porridge flours. The NSVC approach highlights the importance of educating consumers on consumption of safe and nutritious foods, and integrating their demands into value chain development to ensure improved nutrition outcomes are achieved.

Lesson 10: Although water, sanitation and health projects are not typically income generating, it is possible to expand access to clean water and sanitation by lending to implementers at commercial interest rates.

To resolve the gaps in sourcing clean water and installing sanitation infrastructure, communities often wait until donors or government agencies approach them to provide free or subsidized infrastructure, such as bore holes, toilets, water filtration and collection systems. Alternatively, Sa-Dhan microfinance network is helping many MFIs in India to proactively finance small water, sanitation and hygiene (WASH) infrastructure, including toilets and potable water, while maintaining healthy loan portfolios.



Figure 3.1 Indian community health work visiting a client

Sa-Dhan achieves this by facilitating tripartite partnerships between banks, member MFIs, and technical service providers and contractors. Sa-Dhan helps negotiate bank lending to MFIs in large batches for onlending. In turn, Sa-Dhan helps the MFI design innovative loans to finance water, sanitation and health insurance products at negotiated rates with technical service providers and contractors. Small loans of US\$250 to US\$550 are typically provided at an average annual market interest rate of 24% (typical for MFIs there) and repaid over a period of 24 months. Once disbursed, Sa-Dhan coordinates with the technicians to deliver the products to the MFI's clients.

To date, more than 60 of Sa-Dhan's member MFIs have created WASH credit products and this number is growing. To date, Sa-Dhan has facilitated over 12,000 WASH loans with high portfolio performance of 99 percent recovery.

Lesson 11: Improving women's participation in dynamic value chains can improve household income and nutrition, especially when market interventions are integrated with behavior change.

Research generated by Feed the Future has demonstrated that improving women's income can have a powerful impact on nutrition and gender equity. This lesson is being borne out by Tanager International's experience in Burkina Faso with its *Se Lever* market systems project. This project aims to improve the nutritional status of participating households by improving dietary intake of young women as measured by the Minimum Dietary Diversity score and raising that score by 25%— (from a score of 3.75 to 5.0). To achieve this goal, Tanager taps into the lucrative local poultry market—with an estimated monthly demand of 1.5 million live birds in Ouagadougou alone-- as the primary economic engine to improve the income of women producers. Presently, participating producers furnish around 1.2 million birds to the market each month, leaving an unmet potential demand for 300,000 additional birds each month in Ouagadougou alone. Also, the export markets for live birds to neighboring countries (Cote d'Ivoire and Ghana) is estimated at 529,000 live birds and is growing by 22% per year. In other words, there is a large and growing demand for poultry in West Africa.

Tanager staff observed four key constraints that prevented women from expanding their activities to meet the poultry market's unmet demand: 1) knowledge gaps around improved intensive poultry raising; 2) a lack of business capital to expand their businesses; 3) low adoption of vaccination services resulting in high poultry mortality rates; and 4) key cultural constraints that traditionally put men in charge of poultry production.

Tanager worked to resolve these issues by: 1) facilitating technical training to build skills in improved poultry raising techniques with behavior change-oriented messaging to address cultural norms and decision making about household food purchases, consumption, and health expenditures; 2) expanding women's participation in Voluntary Savings and Loan Activities (VSLAs), which in turn provided access to small loans to expand production; and 3) linking producer groups to women's village volunteers to improve access to vaccination services while also integrating delivery of nutrition and hygiene messages to the women producers.

Now after 2 years, more than 90% of participating producers report that their poultry businesses are improving and expanding. On average, these businesses contribute US\$340 each lending cycle to household income in a region where annual household income is around \$2,100⁵ per year and the gross national income per capita is \$680⁶. Household expenditures on food and nutrition have also increased from 27% to 35% of total household income. Participating women also report stronger input into household decision making on food purchases and health decisions.

⁵ <https://halshs.archives-ouvertes.fr/halshs-01535172/document>

⁶ <https://data.worldbank.org/country/burkina-faso>

IV. Increasing Inclusion in Commercial Markets

As can be observed in the lessons associated with themes 1 and 2, increasing inclusion, especially of women and youth, is becoming more automatically integrated into the design of development projects and activities. As we move toward a system-based focus, development practitioners can play a role in working with private sector actors to see the economic, social and governance-related benefits of ensuring that systems adequately accommodate the specific needs and concerns of potentially marginalized populations. For systems to be fully functional, they should be designed to be as inclusive as possible. Below are some of the specific lessons associated with increasing inclusion in commercial markets and systems.

Lesson 12: Market systems should be designed to empower women and productively engage youth.

This can best be done by identifying incentives for inclusive market behaviors; most actors in the value chain must see mutually beneficial opportunities in order to invest their time and money in changing the system. Furthermore, the public sector must listen to and proactively engage the private sector so that the end market can drive change and promote an enabling environment. For example, the Feed the Future Uganda Agricultural Inputs Activity implemented by Tetra Tech used internships and trainings to engage and increase opportunities for women and youth (see Box 4.1 below). In addition, sometimes projects need to be prepared to partner with non-traditional actors and service providers to take advantage of opportunities and existing market incentives. Monitoring systemic change needs to be integrated into traditional project performance monitoring systems, and it needs to be sufficiently nimble and qualitative to inform project approaches and activities on a regular (at least semi-annual) basis.

Box 4.1: Tetra Tech Integrates Women and Youth into Agricultural Input Markets in Uganda

Recognizing that the inclusion of women and youth has often been an afterthought in project development, Tetra Tech worked with the private sector to specifically target women and youth involvement across multiple value chains and value chain segments to improve their access to quality agricultural inputs, jobs and resources using a market systems facilitation approach. The Feed the Future Uganda Agricultural Inputs Activity focused on seven task forces to enable systemic change including anti-counterfeit, e-verification, compliance, distribution, seed certification, professional spray services and finance to encourage private sector firms to adopt improved customer service and financial management systems to increase sales. The project saw 612 firms operating more profitably and leveraged \$1.8 million in private sector investment. The project collaborated with 1,291 district-level agro-dealers including those owned by women (34%) and youth (16%) and promoted youth employment and entrepreneurship opportunities through 149 professionalized youth spray service providers. One of the key lessons learned during the project was the importance of early integration of gender and youth into project design; sufficient staff training in gender equality, women's empowerment and youth engagement; job descriptions with clear women's empowerment and youth engagement responsibilities and performance metrics; as well as continuously refining gender equality, women's empowerment and youth engagement strategies and adapting them based on learning, emerging partnerships and systemic opportunities.

Lesson 13: Public-private partnerships can help to increase long-term inclusion of vulnerable populations.

For example, RTI highlighted how its USAID-funded Private Sector Driven Agricultural Growth (PSDAG) project used public sector grants to increase sustainable inclusion of women, youth and people with disabilities (PWDs) in private businesses in Rwanda. RTI designed its grant process to be inclusive not only at the award stage, but also at the grant solicitation stage. Traditionally a grant solicitation process naturally excludes under-represented groups, as they struggle to compete due to complex grant application processes and high co-investment requirements. To combat these typical barriers, the PSDAG team invited solicitations that would specifically serve women, youth and



Figure 4.1 Source: RTI International

PWDs. They simplified the application process, lowered co-investment requirements and started negotiations at 50% inclusion rates. The team also provided additional support for its partners to adapt their business models to be more gender and socially inclusive. Box 4.2 highlights one example of how PSDAG increased inclusion of disadvantaged populations in commercial markets.

Box 4.2: Supporting Masaka Creamery's Inclusive Business Model

Masaka Creamery is a dairy processing company in Rwanda that accessed a \$250,000 grant through the PSDAG competitive solicitation process. The founder, Jon Porter, was extremely committed to creating a sustainable business model centered around social inclusion, specifically of the deaf community. He found that deaf workers excelled in the dairy processing factories because they were not distracted by the heavy machinery noise and could still communicate using sign language. The grant led to more than \$900,000 in co-investment, increased incomes by 20% for 2,000 milk farm suppliers, lifted domestic sales by 200% and created 32 new full-time jobs including 15 for women and 20 for PWDs. The Masaka Creamery example shows how the desire to create a positive social impact does not have to come at the expense of business profitability; instead business models can be specifically designed and implemented to generate both positive economic and social results.

Lesson 14: Linking educational institutions to agricultural markets can provide youth with hands-on experience in agriculture and introduce incentives to create their own agricultural enterprises.

Puerto Rico suffers from a lack of locally produced nutritious food and a dearth of arable land for agricultural production, making many people reliant on imported, processed foods that can lead to health problems. At the same time, local youth are abandoning agriculture and have lost many of their connections to the land. Nuestra Escuela, a local school and incubator, is using an innovative educational program to link kids to the production of nutritious food using urban gardens on abandoned plots of land in the city of Cagas, Puerto Rico. Nuestra Escuela works with the local government to identify and convert abandoned lots in the city center into thriving community gardens with the goals of helping youth improve their family's nutrition, learn modern farming techniques, engage in community service, and prepare for new job

and enterprise opportunities. The school has found that it is important to provide support services like an on-site child development center to allow young parents with babies to participate more easily.

Nuestra Escuela combines technical instruction in urban agriculture with strong life skills training and a cultural component. The focus is on mobilizing a national movement for youth agripreneurs around “de-colonizing food” by providing healthy, nutritious locally produced foods to their fellow Puerto Rican citizens. Youth are taught the latest intensive production techniques using new urban farming technologies, such as hydroponics, so that they can produce high quality crops that are sold in local grocery stores and markets. The community gardens provide jobs

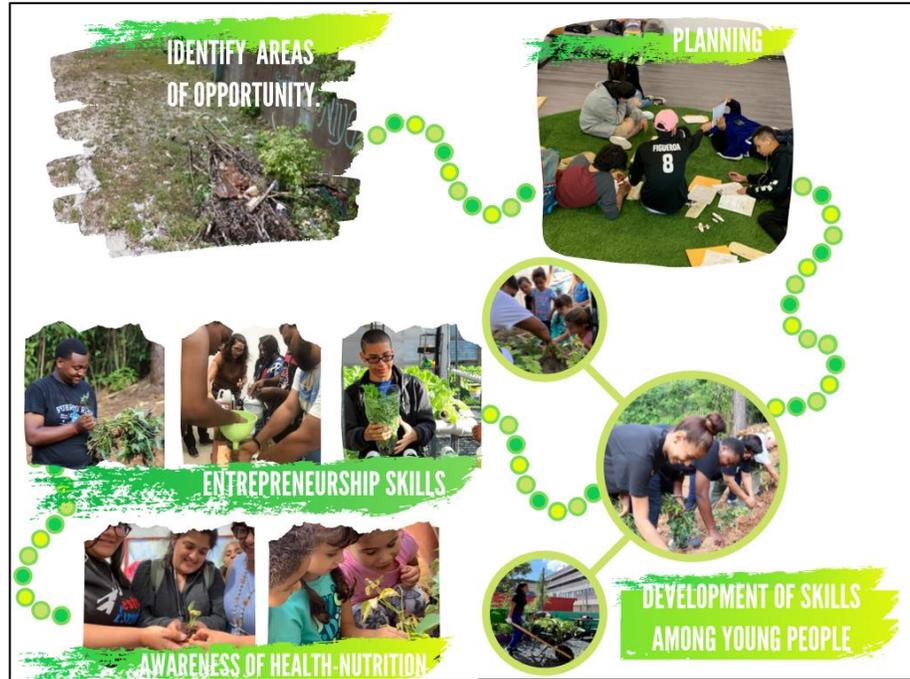


Figure 4.2 Source: Nuestra Escuela

The community gardens provide jobs for youth and produce nutrient dense fruits and vegetables for consumption by the students. Agricultural instruction is complemented with instruction in project planning, job skills and enterprise development. At Nuestra Escuela, many youth launch small business projects while at the school, which they sometimes then spin off into their own enterprises after graduation.

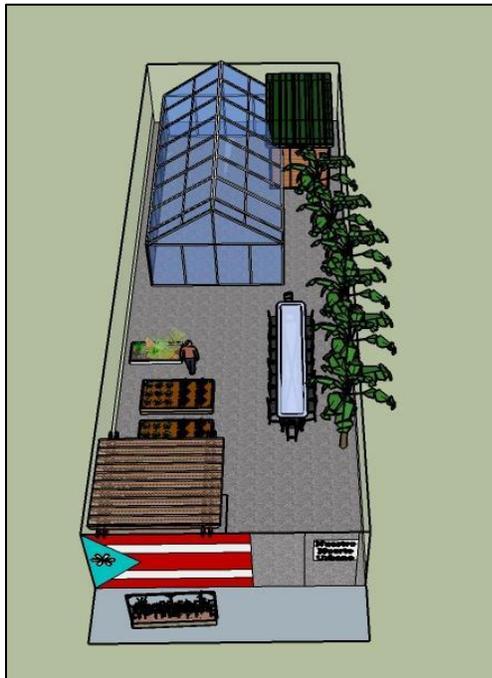


Figure 4.3 Nuestra Escuela’s greenhouse

Nuestra Escuela has been in operation for about twenty years and has expanded to seven sites around Puerto Rico and one center in Kenya. In Puerto Rico, the school has been essential in helping change government policies around innovative and non-traditional education. Nuestra Escuela’s agricultural initiatives have created 3 jobs and generate an average revenue of \$19,680 per year by producing 2,500 pounds of vegetables and 2,640 pounds of sweet potatoes. Over its lifetime, Nuestra Escuela has graduated 1,745 students, of which 64% are girls. 58% of participants report having more nutritious diets as a result of their experience at the school. Graduates from the school have established 6 agricultural businesses in Guaynabo, Bayamón, Caguas and Aguas Buenas.

Lesson 15: To ensure adequate participation of women and youth in agricultural market systems, projects must be careful to set client selection parameters that are inclusive.

In Nigeria, for example, women and youth tend to have more limited access to land and land titles. To improve female and youth inclusion in private sector-driven supply chains, Chemonics reduced the minimum amount of land required to access resources and training on good agricultural practices that would meet buyer requirements (See Box 4.3).

Box 4.3: Chemonics Minimized Participant Requirements to Maximize Inclusive Results in Nigeria

Chemonics implemented the USAID-funded MARKETS II project, which worked in cocoa, aquaculture, rice, sorghum, cassava, maize and soybean value chains between 2012 and 2017. Chemonics conducted an ex-post study of MARKETS II to assess the overall sustainability of project efforts, particularly with regards to increasing female and youth integration in agricultural value chains as a result of applying their private sector-driven value chain facilitation and market systems development technical approach. The ex-post study found that simple adaptations went a long way in improving the inclusion of women and youth in agricultural value chains, and these linkages persisted a year after project closure. Women and youth tend to have more limited access to land and especially land titles, which hinders their ability to tap resources, such as agricultural extension, agribusiness technical assistance and finance. By reducing the minimum amount of land required to access resources from 5 hectares to less than 1 hectare, Chemonics was able to achieve its target of serving 50% female and 30% youth agribusinesses. The reduced hectare requirement enabled more women and youth to participate in the project, which led to increased decision-making power in value chains from 32% to 51% among women, and increased female and youth control over productive resources that could be re-invested in their families and businesses. Moreover, the ex-post study propensity score results show that at project close, participation, including women and youth, in a MARKETS II farmers’ group was associated with statistically significant (at 95% confidence level) increases in access to crop-protection training (56% higher), and utilization of seed testing (8% higher), improved seeds (5% higher) and irrigation (3% higher).

Lesson 16. Serving marginalized smallholders requires diverse product options and blended financial services.

One-size-fits-all approaches don’t tend to work well in agricultural finance, as each crop and combination of crops require different terms and conditions, and producers have different investment needs, credit histories and risk tolerances.

The USDA-funded Millet Business Services Project implemented in Senegal by NCBA-CLUSA in collaboration with Catholic Relief Services (CRS), for example, found that rural and marginalized communities require a diverse range of financial

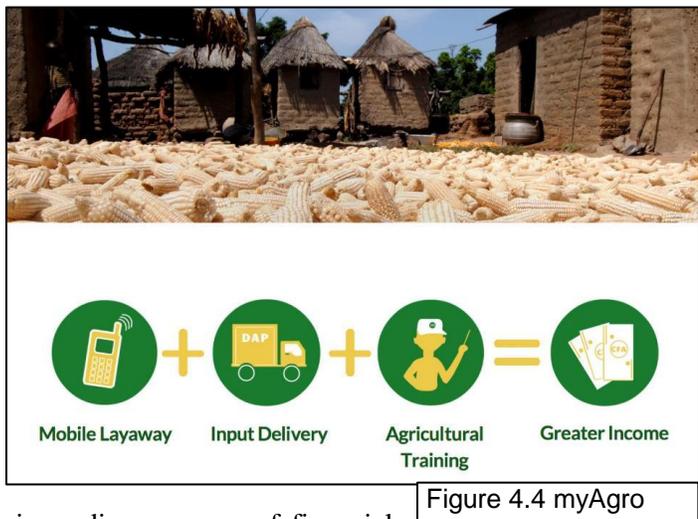


Figure 4.4 myAgro

products and services. In addition to CRS’ traditional Savings and Internal Lending Community (SILC) groups, members benefited from being linked to myAgro’s mobile layaway system to purchase agricultural

inputs as well as organizing producers to access formal credit, either individually or in groups (see Box 4.4).

Box 4.4: CRS Improves Financial Inclusion for Smallholders through Partnerships in Senegal

In an effort to expand access to finance for smallholders, CRS developed its Savings and Internal Lending Community (SILC) methodology. This community-based microfinance approach allows individuals to save and borrow within self-managed groups, without requiring a link to a formal financial institution. SILC groups help to expand access to informal financial services for many marginalized individuals for whom financial services were otherwise out of reach. Some of the SILC group members whose financing needs exceeded the amounts available in their groups have been able to access loans from several banks and MFIs, including Banque Agricole. To further diversify financial service options in Senegal, however, CRS created a partnership with myAgro to allow SILC group members to pay for myAgro's farming input packages through CRS-appointed local entrepreneurs or Private Service Providers (PSPs). Traditionally, myAgro's mobile layaway payment system required farmers to buy myAgro scratch cards from local shops and use their mobile phones to deposit the money into their layaway accounts in order to save and pay in advance for fertilizer, seed and training packages. The new partnership enabled PSPs to facilitate the purchase of myAgro's farming packages by collecting SILC members' payments and depositing it into their individual myAgro accounts. While individuals had the ability to engage directly with myAgro by purchasing scratch cards from local shops, facilitating payments through already established SILC groups improved women's access to these products because they otherwise would not have felt comfortable purchasing them as individuals. This partnership highlighted how CRS was able to leverage its relationships with marginalized rural women to overcome monetary limitations, as well as distrust that could otherwise keep women from benefitting from new services and opportunities.

V. Conclusion

Participants left the tenth iteration of the *Cracking the Nut*® conference with a strong reminder that being able to scale the use of any new or improved technology or service requires us to support systems development that is based on really understanding the client, i.e., the farmer or local business and find ways to meet their needs, in their context. Agriculture is a particularly diverse sector, with millions of farmers, crossing gender, ages and cultures, who work to produce a range of more than 200 products. Each farming family works in unique environmental and climatic conditions, with variable access to financial services and markets.

This level of variation and diversity makes food production a fascinating sector to work in, but also means that development practitioners need to really understand the context and work with public and private partners who know their clients and use that relationship to develop products and services that farmers want to buy and use on a regular basis.

The participants heard from a range of speakers, who discussed how they have worked to support food system development with different partners, farmers and communities, to support longer-term rural and agricultural development and food security. The goal being to support systems, which include technologies and services that can scale in sustainable ways over time. The participants were encouraged to take on a systems approach and consider new ways of using short-term projects to sustainably improve food security.

Finding ways to move beyond the project paradigm is a goal that many development agencies have been struggling to achieve, but this conference offered a new set of approaches to take advantage of the combination of public and private resources to create “blended models” that take good ideas out of the innovation phase, through the intermediation phase and into that scaling phase. It is at the scaling phase where the private sector can amplify access to products and services that are needed to address the growing demand for food products and services. Nonetheless, more work is needed to demonstrate how this systems approach can be applied to address the broad range of issues associated with food security. For example, more research and outcome measures are needed, especially related to impacts on food and nutrition security of household members of all ages. In addition, many suggested that more focus was needed to better understand how to use blended finance and other smart subsidies to facilitate expansion of rural and agricultural markets and food security systems in the future. Perhaps that will be basis of the next collective learning event?



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