Cracking the Nut '17

Reinforcing Food Systems to Meet Urban Demand

Lessons from the 2017 Conference

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March 27-28, 2017
Bangkok, Thailand

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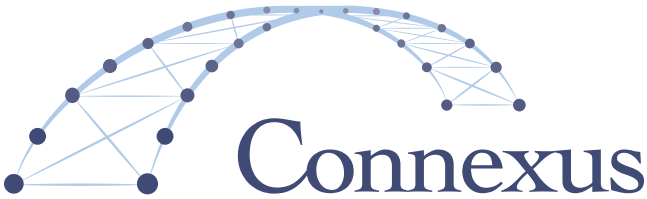


Table of Contents

Acknowledgements

Connexus Corporation appreciates the many presenters, participants and organizations that supported *Cracking the Nut* 2017 (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 "Reinforcing Food Systems to Meet Urban Demand." In particular, Connexus would like to thank the following sponsors of this important learning event:

- DIAMOND SPONSORS: United States Agency for International Development and Feed the Future
- PLATINUM SPONSOR: RTI International
- SILVER SPONSORS: Chemonics International and Catholic Relief Services (CRS)

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:

• Melissa Benn • Ali Boyer • Anita Campion • Geoffrey Chalmers • Tom Fattori • Shaun Ferris • Pam Fessenden • Rob Henning • Troy Hoppenjan • Justin Kosoris • Lori Peterson • T.J. Ryan • Laura Smith • Shannon Smith • Patrick Starr • Anna Ulbrich

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

• Laura Smith, Operations Manager • Melissa Matlock, Project Manager • Shannon Smith, Associate • Ali Boyer, Associate • Liuben Chipev, Associate • Rashmi Ekka, Consultant • Kim Ha, Consultant

A special thanks to Katie Garcia from USAID, Shaun Ferris from CRS and Rashmi Ekka, who took the time to review this publication and suggest edits.

Acronyms

ADVANCE	Agricultural Development and Value Chain Enhancement Project
ALIS	Agriculture Land Information System
ATM	Automated Teller Machine
AVC	Agricultural Value Chain
BAS	Business Advisory Services
CEO	Chief Executive Officer
CGAP	Consultative Group to Assist the Poor
CIMMYT	International Maize and Wheat Improvement Center
CRS	Catholic Relief Services
DDS	Dietary Diversification Survey
DFS	Digital Financial Services
FAO	Food and Agriculture Organization of the United Nations
F2F	Farmer to Farmer
FinGAP	Financing Ghanaian Agriculture Project
FSP	Financial Services Provider
GAP	Good Agricultural Practices
GOR	Government of Rwanda
GROW	Greater Rural Opportunities for Women Project
ICT	Information Communication and Technology
IFPRI	International Food Policy Research Institute
KDB	Kenya Dairy Board
KYC	Know Your Client
OECD	Organization for Economic Co-operation and Development
PPP	Public-Private Partnership
PSDAG	Private Sector Driven Agricultural Growth Project
RBI	Rice Bowl Index
RDMA	Regional Development Mission to Asia
SDGs	Sustainable Development Goals
SHF	Smallholder Farmer

SMASH	Smallholder Alliance for Sorghum in Haiti
SME	Small and Medium Enterprise
SMS	Short Message Service
SN4A	Sustainable Nutrition 4 All
SOLID	Supporting Opportunities in Livelihoods Development Project
STRIDE	Science, Technology, Research and Innovation for Development Project
USAID	United States Agency for International Development
USD	United States Dollar
UVAMA	Uganda Value Added Maize Alliance

Foreword

I am pleased to report that we had another successful *Cracking the Nut*® conference, with participants from 31 countries and of diverse backgrounds discussing how we are "Reinforcing Food Systems to Meet Urban Demand." Bangkok was an apt location for this learning event, given the increasing need for the global community to understand and respond to the shifting dynamics of food systems, especially for large and growing urban cities. Half of the population of Asia is expected to live in urban areas by 2020, while Africa is likely to reach a 50% urbanization rate only in 2035. For rural populations, providing food for growing urban populations represents an "opportunity for small-scale farmers, rural workers, and owners of small and medium enterprises to lift themselves out of poverty," according to Keynote Speaker, Dr. Tom Reardon, in the publication *Growing Food for Growing Cities: Transforming Food Systems in an Urbanizing World*. With rural producers already providing a large percentage of the urban food supply, strengthening of the linkages between rural and urban markets through sustainable supply chains is vital to promoting development and alleviating poverty in rural communities around the world. This event focused on new and innovative ways to strengthen the food systems of urban and rural communities in the face of changing food preferences, shifting populations, and rising pressures on rural producers to feed more urban consumers with a diverse range of high quality, safe food products.

To ensure that economic growth is responsive to the growing global population, that it is environmentally sustainable and socially equitable, we need to look at ways to increase sustainable energy and food production, as well as strengthen the links between rural production and urban demand. This learning event was designed to promote cutting edge innovations and thought leadership that will allow us to explore? solutions that continue to balance the interests of people and planet. This conference facilitated open discussions of the impacts of population growth, urbanization and agricultural development and highlighted approaches that can make a difference. Thank you to all who contributed to this version of *Cracking the Nut*'s body of knowledge.

Warm regards,

Anita Campion
President and CEO

Connexus

Executive Summary

Cracking the Nut 2017: Reinforcing Food Systems to Meet Urban Demand was the eighth *Cracking the Nut*® learning event. The conference took place March 27-28 at the Sheraton Royal Orchid Hotel in Bangkok, Thailand and generated the following lessons.

Introduction

In his keynote address, Dr. Thomas Reardon of Michigan State University highlighted some of the issues and opportunities associated with the rise and shifts of urban demand for food in developing countries:

- We need to focus on making systemic improvements in the informal, domestic markets and rapidly growing urban markets, which are driving demand;
- Dietary changes are influencing demand, especially for more offseason products, greater variety of food types and more processed foods;
- Significant opportunities lie in the "hidden middle," which includes wholesalers, brokers, logistics and processors; and
- Agricultural intensification, diversification and commercialization are helping to diversify and bolster the diets of downstream food consumers.

This keynote served as basis for discussions and extraction of lessons learned from the other conference presentations, which are summarized according to the three conferences themes below.

Theme 1: Scaling Technology and Innovation for Agriculture

Information technology and innovation can be important differentiators in whether or not agribusinesses are profitable. The following lessons highlight some of the recent contributions that information communication and technology (ICT) have made to agricultural sector and food security:

- Digital financial services (DFS) can help to reduce risks and costs associated with agricultural finance.

- Applying a people-centered design approach to technology development can be a powerful way to ensure lasting local buy-in.

- The sustainability and success of ICT is dependent upon the integration of fee-for-services into the business model.

- Collecting and analyzing data on consumers' dietary habits can empower local supply chains.

- The ICT sector offers important opportunities for re-engaging youth in the agriculture sector.

- Remote sensing technology can facilitate improved land use management, attracting investment to increase rural production.

- Opportunities to integrate digital financial services are greatest in value chains that exhibit high transaction frequency and longer selling periods.

Theme 2: Improving Sustainability and Food Security of Urban Markets

There are many ways in which public, private and civil society can improve food security in a sustainable way. Below are just a few of the lessons shared by such stakeholders.

- Private sector agribusinesses are contributing to food security by improving efficiencies and reducing waste.
- The combination of innovative technology and tailored products can increase food security for small-scale producers and urban consumers.
- Stakeholders need to align interests and focus on the end consumer to achieve sustainable, positive nutritional impacts through agri-food systems.
- Comprehensive data can serve as a catalyst for public-private dialogue to collaborate and develop sustainable, data-driven solutions to food security issues.
- To meet urban demand and ensure food security, utilize unused capacity in value chains and prioritize access to finance and investment.

Theme 3: Facilitating Links from Rural to Urban Parts of a Supply Chain

The importance of urban domestic markets for rural producers has led the growth of more sophisticated "rural to urban" supply chains, which shed light on the following lessons.

- Strengthening linkages between rural and urban areas can increase the food security of rural producers through increased incomes as well as urban consumers through the increased availability of nutritious and diverse foods.
- Developing a market for intermediary service providers strengthens the connective tissue between rural production and urban markets, as well as facilitates access to finance.
- Commodity buyers can secure domestic supplies through outgrower schemes.
- Urban food security depends not only on food production, but food distribution.
- Not all urban settings are created equally. Different approaches are needed depending upon the nature of food demand coming from urban and peri-urban areas.
- Effective intermediaries facilitate the flow of not only input supply and products, but information, technical exchange and finance.

Moving Forward

Across the themes, we recognize that certain populations are more vulnerable than others, requiring us to think of how we adapt to meet their needs, whether young agri-preneurs or female producers. Here are some cross-sectoral take-aways and debunked myths that should help to guide our work going forward.

- We can attract more youth to agriculture, especially off-farm agribusiness, through technology and market orientation.

- Bottom-up approaches to agricultural value chain development can be effective in addressing the specific needs of women.

In addition to these many lessons extracted, *Cracking the Nut* 2017 also helped to disprove the following myths:

Myth 1: Digital financial services are a panacea for access to finance. In fact, digital financial services (DFS) can lead to greater exclusion of the poor and ultra poor. While cell phones are giving more people access to finance across the globe, DFS is actually increasing the gap between rural and urban populations, often excluding the ultra poor.

Myth 2: There exists a strict rural/urban dichotomy. Different levels of urbanization within a country (including cities, towns and villages) as well as differences across countries (levels of economic growth and use of technology) impact the nature of demand for food and affect decisions in supply chains.

Myth 3: It is always better to cut out the middle men in value chains. It is no longer the case that middle men and traders regularly take advantage of farmers through unfair trader credit arrangements and price setting. As information becomes more available up and down the food chain, farmers have more power to negotiate prices and terms. Increasingly intermediaries are playing a positive role in facilitating the flow of information and resources to farmers, helping to add value to the food supply chain as a whole.

To conclude, we need to continue to seek innovative, scalable and sustainable approaches to reinforcing food systems to meet urban demand and to improve food security for rural and urban populations. As a global community, we must resist the temptation to close borders to trade and embrace global cooperation, as our lives and livelihoods are inextricably linked to the well-being of others and our planet.

I. Introduction

In the past decade, the nature of the global food market has rapidly changed and growing urban centers have broadened the markets available to rural smallholders. The importance of urban domestic markets for rural producers has led the development of "rural to urban" supply chains along two axes. On the one hand, the formal food sector including, modern food industry firms, such as supermarket chains and large processors, have increasingly sourced from specialized/dedicated wholesalers who apply their quality and safety standards and meet their commercial requirements. On the other hand, the informal rural to urban supply chains have developed in their "traditional" forms by the exuberant investments of small and medium enterprises (SMEs) in wholesale, logistics and processing. These two prongs of development, by modern large firms and SMEs, have changed the volume, seasonality, and quality requirements from small farms, as well as increasingly required more consistent and safer produce. The ever-expanding urban markets of Africa and Asia are presenting fast shifting food trends – consumers are now displacing grains from their diet and giving preference to processed products and higher value fresh fruits, vegetables, meat, fish, and dairy products. Rural producers have the opportunity to take advantage of these changes by serving new markets in a way that can create jobs and increase their incomes. In his keynote address, Dr. Thomas Reardon of Michigan State University highlighted some of the issues and opportunities associated with the rise and shifts of urban demand for food in developing countries.[1]

Our focus needs to be on domestic markets. Approximately, 90% of the food supply in Africa and Asia is domestically sourced (as opposed to imported). Only a small portion of African and Asian agricultural output is exported (approximately 5%), but little of this comes from smallholders. According to Dr. Reardon, urban demand for food is ten times more important to African and Asian economies than food exports. Supplying this domestic demand will in turn raise incomes and employment in rural areas.

Rapidly growing urban markets are driving demand. In 1970, approximately 24% of the population in Africa and Asia lived in urban areas, but by 2011 the proportion had grown to 40% in Africa and 45% in Asia. Small cities and towns are especially important as they represent 60% of urban population, but 70% of urban poverty. These smaller cities and towns represent important nodes in food supply chains, with clusters of wholesalers and processors that help link rural areas both to local retailers and food retailers in mega cities. As urban populations expand and demand for food increases, food supply chains are getting longer, with energy and transportation adding to food costs. Furthermore, the rapid spread of supermarkets, especially in Asia but also emerging in Africa, is pushing food systems toward improved quality and safety standards.

Dietary changes in urban and rural populations are influencing demand, especially for more variety and processed foods. Previously, it was thought that most farmers "eat what they grow and grow what they eat." However, an increasing percentage of farmers are purchasing their food. In Eastern and Southern Africa (outside South Africa), rural households purchase roughly half their total food budget (in value terms); in South Asia and West Africa, that share is about 60-80%; in Southeast Asia it is around three quarters. Both rural and urban populations are increasing their food consumption beyond grains to include more vegetables, fruits, fish, meat, and dairy products. In Asia, food consumption from non-cereals is 65% in rural areas and 75% in urban areas. Similarly, in Africa food consumption from non-cereals is 50% in rural areas and 65% in urban areas. As more women work outside of the home, the demand for processed foods has increased. In Asia, processed food expenditures as a portion of total food expenditures is 59% in rural areas and 73% in urban areas. Though the nutritional aspects of some highly-processed foods may not

[1] Many of these findings come from Dr. Reardon's scholarly publications and articles, including *Growing Food for Growing Cities: Transforming Food Systems in an Urbanizing World,* 2016 and "Tied Output Credit Markets have come Untied: The Fall of Traditional Agrifood Value Chain Finance in Asia," 2014.

always be positive, in general food processing helps to drive down food prices by reducing seasonality issues and integrating national food systems.

Significant opportunities lie in the "hidden middle," which includes wholesalers, brokers, logistics and processors. Approximately 60% of food costs are added after the farm gate, with one third of this from retailing and two thirds from mid-stream actors in the food chain, which Dr. Reardon refers to as the "hidden middle." Coined the hidden middle due to an over-focus on investing in farm-level production, he argues that the productivity and investment in the midstream of food systems is as important as on-farm investment. Dr. Reardon pointed to the example of mid-stream cold storage facilities for potatoes in India as an example of a mid-stream investment that is helping to building a new and growing market. Dr. Reardon argues for a market system approach, with a focus on domestic competition but with links to regional and international competitiveness. He explains that "helping farmers without helping supply chains…is not sustainable." By investing in SMEs in food value chains and their improved enabling environment, food systems can be primed for rapid development and "take off," which will simultaneously increase opportunities for smallholders.

Agricultural intensification, diversification and commercialization are helping to feed downstream food consumers. Some of the greatest increases in agricultural productivity and output have come from the increased use of external inputs, which are advanced in Asia and emerging in Africa. Diversification of farm level production greatly increases farm incomes, as well as helps to reduce risks for farmers and increases access to a diverse source of nutrition, which is important to food security. As small and medium farms operate in a more commercial fashion, they are able to improve efficiency and reduce postharvest waste. The development of farm support services, such as tractors for hire, mobile sprayer-trader teams or combine harvester services, further support the advancement and commercialization of small and medium farms around the world. As more farmers use their phones for commercial activities, they can tap into increased access to services that include weather updates, alerts on best planting dates and market information, which along with improved infrastructure gives farmers market options and helps the trader sector be competitive.

Dr. Reardon warns that longer food supply chains makes them more vulnerable to shocks, related to energy costs, food safety, and climate change. The potential rise of restrictive trade policies can also deter the efficient development of food supply chains across borders to increase scale and market outlets. He argues that we need to stay the course on reducing shocks to the development of sustainable food systems and supply chains across the globe.

Building on these concepts, the rest of this publication focuses on lessons shared on how we can strengthen food systems and improve food security around the world, especially as they relate to the conference's core themes:

1. Scaling Technology and Innovation for Agriculture
2. Improving Sustainability of Food Security of Urban Markets
3. Facilitating Links between Rural and Urban Parts of a Supply Chain

II. Scaling Technology and Innovation for Agriculture

Technology and innovation are important differentiators in the profitability of agribusinesses. However, discovering a viable technology or innovation is insufficient to have a substantial impact on agricultural development. To capitalize on innovation and achieve impact on agriculture and agribusiness, these ideas need to be scaled within competitive business models, so that they can have a meaningful impact on productivity, open new market linkages and serve low-income populations. The following lessons reflect some of the recent contributions that Information and Communication Technology (ICT) have made to the agricultural sector and food security.

Lesson 1: Digital financial services (DFS) can help to reduce risks and costs associated with agricultural finance.

In a recent blog on CGAP's Microfinance Gateway, Anita Campion of Connexus Corporation explained that DFS can help reduce transactions costs and risks associated with financing smallholders, but warned that it is not a panacea. In fact, a recent CGAP article argues that DFS could actually increase the financial inclusion gap between urban and rural clients, especially women who are less likely to own mobile phones. Nonetheless, *Cracking the Nut*'s plenary panel on "Using Digital Financial Services to Expand Outreach" highlighted various DFS providers that are working to address the gap in smallholders' access to finance (see Box 2.1). As Josh Woodard of FHI 360 explained, "Providing formal financial services to rural, often poor, smallholders tend to be costly for banks with often minimal, if any, profits. Reducing the costs required for processes, such as Know Your Customer (KYC) regulations, service delivery, and credit scoring can make it more enticing for banks and other FSPs to offer financial services to this population segment."

Box 2.1: DFS approaches to reducing risks associated with smallholder finance

FarmDrive in Kenya. Co-Founder, Peris Bosire, explained how FarmDrive is a data analytics company that works at the intersection of finance and smallholder farmers. FarmDrive uses mobile phones, alternative data, and machine learning to close the critical data gap that usually prevents financial institutions from lending to creditworthy smallholder farmers. Peris described how FarmDrive's alternative credit scoring model allows partner financial institutions to reduce risks associated with financing smallholders. FarmDrive uses a combination of farm level data as well as weather data and satellite images to monitor crops, show population and vehicular density, affluence levels and distance to markets to predict credit risks. A start-up, FarmDrive is working toward financial self-sufficiency, but has already helped to facilitate US$180K in 16 regions of Kenya in partnership with two microfinance institutions since December 2015. FarmDrive uses SMS technology to facilitate adherence to KYC regulations, which verifies clients through national data systems.

(continued on next page…)

(…Box 2.1 continued)

Esoko in Ghana. Hillary Miller-Wise, CEO, explained that, "ninety percent of farmer loan applications are rejected as farmers are very poor, especially in northern Ghana." Esoko is a private firm that provides a virtual marketplace, called Fasiba, through which farmers can lay away money for agricultural inputs. Farmers pay for these services using digital wallets. This offering takes advantage of pre-payments using the layaway model and volume discounts to attract large numbers of smallholders. Hillary explained that one of the limitations of using farmer data is that much of the data is not digitized. Esoko's approach is to identify and digitize relevant data and then figure out how to monetize the data and make it valuable to others, including financial institutions. While recent regulatory changes in Ghana are now allowing Mobile Network Operators to take the lead in digital financial services, they also now require them to pay interest to clients with savings in their digital wallets, which changes the value proposition and should make mobile savings even more attractive to customers. Nonetheless, Hillary believes that more digital and financial literacy training is needed for rural clients to reap the full benefits.

FHI 360 in partnership with Bank Asia and USAID/Bangladesh's Agriculture Extension Support Activity project. According to Josh Woodard, FHI 360's approach on its USAID/Bangladesh mSTAR project was "to connect the DFS providers with development organizations with a shared interest in extending financial services to those population segments. By working with organizations that have an existing relationship with farmers and input retailers, FHI 360 was able to lower some of the KYC burden on the DFS providers, since the development organizations already know the individuals well." This approach also makes DFS providers feel a bit more comfortable about the credit risk since the development organizations can provide them with information to facilitate their credit analyses. In addition, as the development community understands their target populations better than DFS providers, they can help to develop their financial literacy. Nonetheless, Woodard highlighted two of the several challenges associated with scaling up DFS in Bangladesh: 1) many of the mobile-based DFS platforms are only in English and do not support Bangla, and many smallholders are illiterate even if the menus were available in the local language; and 2) many of the platforms are not interoperable with the core banking platforms of their parent bank, which limits the services they can offer.

Lesson 2: Applying a people-centered design approach to technology development and application can be a powerful way to ensure lasting local buy-in.

Advances in agricultural technology have made important contributions to rural and agricultural development. These contributions include increases in smallholder incomes, more opportunities for rural employment, lower food prices, and improved environmental sustainability. However, developing agriculture technology, particularly for smallholder farmers, can be very challenging. Box 2.2 highlights how the AflaSTOP project used a human-centered design approach to develop new post-harvest handling technology, also shown in Figure 2.1.

Figure 2.1: EasyDry M500 Technology for Maize Drying

Box 2.2: From Concept to Technology: The Case of the EasyDry M500

Aflatoxins are poisonous and cancer-causing chemicals that are produced by certain fungi, which grow in soil, on the plants and then on the grain. Hermetic storage significantly arrests aflatoxin increases during storage, but to store maize hermetically, it first has to be dry enough (below 13.5% moisture content). Drying crops in areas where the rains occur at harvest is a problem. Given this challenge, the AflaSTOP: Storage and Drying for Aflatoxin Prevention project conceived and developed the EasyDry M500, a portable, affordable maize dryer suitable for smallholder farmer volumes. Using a human centered design approach, AflaSTOP carried out a cyclical approach to technology development, with research, design, building and testing, being repeated. The main lessons include:

- **Establish design parameters** – design parameters will guide the design and development of the technology. For example, for AflaSTOP considered the desired capacity of the dryer, cost structure, the investment capacity of the targeted entrepreneurs, profit expectations and investment repayment period, among others. A balanced design is a compromise between what is possible, affordable, and desirable.

- **Develop the technology locally** – in-country development will force developers to be present to the realities of the local situation. In terms of product testing, developing and testing the solar dryer in California, for example, where it is dry and always sunny will produce test results drastically different from a tropical climate that is more humid and overcast. Additionally, developing the technology using materials that are available locally will benefit local manufacturing.

- **Designing should be an iterative process** – keep testing the technology with people who are going to use it, such as farmers, operators, fabricators, transporters. It is important to understand how people use the technology to make adoption easy. If first time users get it wrong, they won't like using it and may give negative reviews to other potential adopters.

- **Make the technology affordable** – affordability is essential to adoption. Having come up with a working design, specifically look at what modifications will reduce the cost without significantly affecting the performance. For the EasyDry M500, the first design of the cost $3,500 dollars, a second prototype cost $1,400 dollars. Finally, the project was able to get the design to cost $850.

- **Develop a distribution model –** how will the technology get to the farmers? Since it was not cost effective for smallholders to invest in a dryer themselves, AflaSTOP employed a farmer service provider model, where small entrepreneurs offer tractors, shelling, and other services to farmers in high production areas. Service models allow large capital items to be used for longer periods each year, spreading investment cost over greater usage. Given that small entrepreneurs are the target market for these dryers, it is important to consider their investment capacity and the expected time to recoup the investment. For example, it takes them two to three years to raise $1,000 and about two years to recoup this cost.

- **Identify a plan for manufacturing** – consider who will manufacture and sell the technology to entrepreneurs. Formal manufacturers pay taxes, give full time employment, and offer additional services. However, these additional capabilities come at a price. The estimated cost for a formal manufacturer to produce a dryer ranges from $1,200 to $1,500, which would result in a drying service cost of $10.20 to $12.40 per batch, which farmers currently are not willing to pay. Alternatively, informal artisans, who service bespoke orders (commissioned to specifications) and engineer from sight, can produce the dryer for $850 per unit, which results in a service cost of $9.75/batch. Both types of manufacturers have the same profit margin, but formal manufacturers require a larger volume of sales.

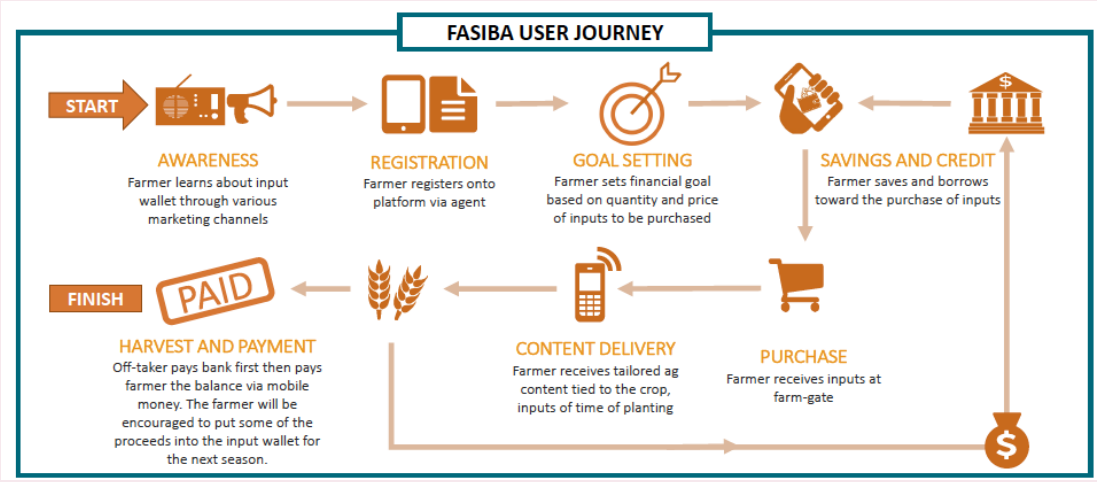
Lesson 3: The sustainability and success of ICT is dependent upon the integration of fee-for-services into the business model.

In sub-Saharan Africa, mobile phone penetration has increased by 125% from 2010 to 2015, reaching approximately 720 million users. This strong growth has inspired significant innovation for ICT and mobile applications. With a stream of new ICT applications entering the market place regularly, what makes certain technologies more successful than others? In terms of long-term sustainability, the success of ICT is dependent upon the integration of fee-for-services into the business model. Box 2.3 highlights Esoko's product offering and how it generates revenue.

Box 2.3 Esoko's Sustainable Business Model

Esoko is leveraging mobile innovation to provide information and communication services to agricultural markets in sub-Saharan Africa. The company's first product, Fasiba, is a simple and easy mobile money solution that brings together input suppliers, financial institutions and farmers into a virtual marketplace, as described below:

- **Farmers** gain improved access to inputs and financial services. As depicted in the figure below, Fasiba helps farmers lay-away money (through goal setting) and borrow money to purchase the right inputs at the right time. In addition, farmers receive tailored agriculture content, such as price information, weather alerts, as well as crop advice, to help them improve their yields and incomes.
- **Input Suppliers** benefit through aggregated demand for inputs among smallholders, increased sales to smallholder farmers via the m-commerce platform, and by building brand and customer loyalty.
- **Financial Institutions** are able to expand their loan portfolio among smallholder farmers, lower risks through partnerships with agribusinesses on the platform, and access valuable data for credit risk assessments.



As Esoko's services evolved, the company realized that farmer willingness to pay for technology was quite low, while willingness to pay for finance was quite high. Given this information, the platform was designed so that it is free for the farmer to use. The company earns revenue through commissions on input sales as well as revenue-sharing on service fees from financial institutions. This fee structure aligns incentives; Esoko grows only if more inputs are sold and if financial institutions are able to approve more loans. As it refines the platform around agricultural inputs, Esoko is considering the potential to offer additional products and services through the platform, such as insurance, solar energy and equipment.

Lesson 4: Collecting and analyzing data on consumers' dietary habits can empower local supply chains.

As Dr. Tom Reardon noted in his keynote address, Africa and Asia have experienced rapid population urbanization over the past 20-25 years. The percent of the population residing in urban areas has increased from 24% in 1970 to 40% and 45% in 2011 in Africa and Asia, respectively. This shift has led to a significant transformation in the food system. While the urban share of the population is large, the urban share of national food consumption and markets is even larger. Urban markets have shifted from being a minor market to being the dominant market now. As agricultural supply chains shift to meet this urban demand, it will be important to continue being market-oriented and designing agricultural interventions to meet the needs of this end market. To better understand the urban consumers that its supply chain was targeting, ICCO Cooperation leveraged mobile technology to collect and analyze data on consumers' dietary habits (see Box 2.4).

Box 2.4 Manq'a Culinary Schools are Connecting Urban Demand with the Local Supply Chain

Since 2014, in Colombia and Bolivia, ICCO Cooperation is working along the entire food supply chain – including small producers, cooks, and consumers – to raise farmer incomes, create economic opportunities for disadvantaged youth, and improve consumer nutrition. Manq'a started with urban consumers in the end market to better understand eating habits. The project used the internationally acknowledged Dietary Diversity Survey (DDS), adapted it to the local context of Manq'a and developed a smartphone survey to collect data on urban diets. Preliminary results revealed the disconnect between farmer production and urban demand. Using this data, the project was able to collect new insights to adapt and manage its intervention strategies at each level of the supply chain, as described below, inform project decision-making, and support internal and external learning:

Farmers – Manq'a is improving farmers' access to local markets by 1) linking growers to its culinary schools, who purchase the smallholders' produce, and 2) by stimulating demand from local communities for produce from small farmers, and from top-chefs committed to the project. Additionally, the project is providing technical assistance to farmers on how to produce in-demand crops and how to make their products traceable.

Culinary schools – Manq'a has set up culinary schools to train young people to become cooks and culinary entrepreneurs, providing them practical experience in the school-run restaurants and catering services. The majority of the students are young women (in Colombia often coming from conflict areas), so the training helps to bolster their self-esteem and provide them with economic opportunities.

Consumers – At the Manq'a restaurants and the regularly organized culinary markets, consumers are served cuisine that promotes local dishes, re-popularizing traditional gastronomy. Consumers have become more aware of the importance of healthy, high quality food, produced with local, sustainably grown produce, which is helping to shift diets away from unhealthy fast food.

To date, in Bolivia, 1,750 students have graduated from the culinary schools (70% women), 10 schools have been set up with 400 new students enrolled in 2017, alliances have been developed with 100 smallholder families, and several successful business units have been set up, including four in-company canteens as well as a catering division, to support the financial sustainability of the schools. In Colombia (where Manq'a started later), 28 students have graduated (50% women), two schools have been set up (with plans to reach seven schools by 2020), and 200 new students are expected to graduate in 2017. The Colombia program has fostered alliances with 25 farmer families and started business units, including food pick up sales points and catering services.

Lesson 5: The ICT sector offers important opportunities for re-engaging youth in the agriculture sector.

According to the Food and Agriculture Organization, in 2050, 1.3 billion people or 14 percent of the population will be between the ages of 14 and 25, when world population increases to over 9 billion.[2] The large majority of these young people will come from rural areas in developing countries where unemployment, underemployment and poverty continue to be challenges. Despite the ample opportunities for income generation in the agricultural sector, many youth have negative perceptions of farming, viewing it as dull, antiquated and unprofitable. Additionally, as much of traditional agriculture has been based in subsistence farming, youth don't see business opportunities within agriculture. Furthermore, young men and women face other obstacles as well, including limited access to information, technology and financial services. Re-engaging youth in agriculture has been a tough nut to crack. However, as agricultural development initiatives are increasingly employing ICT solutions to address challenges in the agricultural sector, ICT has revealed itself as an inherent and attractive way for young people to engage and play a role in taking agricultural development to the next level (Box 2.5 for examples from Haiti and Tanzania)

Box 2.5 There's an App for That: The Role of Youth in Driving New Technologies

Haiti. The Smallholder Alliance for Sorghum in Haiti (SMASH) is a public-private partnership that works to source local sorghum from smallholder farmers in Haiti to supply BRANA, a local subsidiary of Heineken Breweries, with quality product for use in non-alcoholic, malted beverage production. SMASH is funded by Heineken Breweries, USAID and the Inter-American Development Bank. RTI International is overseeing the development and implementation of a mobile application platform, CommCare, which supports SMASH's sorghum supply chain from field collection to aggregation and processing. The components include supplier relationship management, supply chain logistics, purchasing and inventory management, reporting and analytics. Although initially unintentional, the development and adoption of the mobile app has been completely driven by youth; however, this is unsurprising given youth's natural inclination for technology. Another unintended consequence of engaging youth as SMASH agents was the reduced need for investment in training youth on how to use the app, which was redirected toward development of the application.

Tanzania. Beyond their innate aptitude for technology, youth can play an important role in catalyzing ICT adoption. For example, in Tanzania, RTI International worked with BRITEN, a local business development service provider, and Innovify, a local, youth-owned tech company, to develop an ICT application that supports agro-dealers to better manage their day-to-day business, grow their client base and service offerings, and market geographically appropriate inputs to farmers. The application was developed as part of a pilot study to evaluate the capacity of Tanzania's technology sector to develop local software solutions for local challenges. Among its other goals, the activity aimed to identify roles for youth in driving the development, promotion, and adoption of these technologies. As both Innovify's team and BRITEN's field agents are all young people under the age of 35, the activity found that youth had important roles to play in catalyzing agricultural development, including:

- Young people's advanced digital knowledge can facilitate understanding by users that are isolated from technology advancements due to age or geographic isolation.
- Young people facilitate the sector's modernization while working in roles that suit their professional ambitions and draw upon their education levels.
- As drivers of social change and gender mainstreaming, young people can democratize access to information, training, inputs, and technologies among those who have traditionally been left out.

[2] Page xvii, "Youth and Agriculture: Challenges and Concrete Solutions" Food and Agriculture Organization: 2014. http://www.fao.org/3/a-i3947e.pdf

Lesson 6: Remote sensing technology can facilitate improved land use management, attracting investment to increase rural production.

Increased investment in productive land is key to unlocking the potential of rural production to improve food security for growing urban markets around the world. Lack of information is a major barrier to investment, especially in regions that are remote with varied topography. Advances in remote sensing applications have the potential to unlock agricultural investment in areas that were previously underutilized. Using a network of satellites, DigitalGlobe collects remote sensing data to develop high-resolution Earth imagery, data and analysis. In the past decade, the remote sensing industry has transformed thanks to advances in resolution, accuracy, speed and analytics. A leader in the industry, DigitalGlobe's imagery includes population maps, agricultural layers, human landscape, and crowdsourcing. Applied to agricultural development, some of its capabilities include delineating field boundaries to support land tenure and governance, assessing crop health to monitor plant development and production, producing crop inventories to evaluate the diversity of crops grown, as well as identifying crop areas to assess the growth of that sector, among others. Box 2.6 highlights how remote sensing technology was used to increase private sector investment in Rwanda.

Box 2.6: Improving Access to Land for Private Sector Investors

Access to land is a major obstacle to increasing private sector investment in Rwanda, as the terrain is extremely hilly, population density is 416 persons per square km, and the average farmer plot is less than 0.2 hectares. To help the Government of Rwanda (GoR) better manage more than 24,000 hectares of public land and optimize private sector land use, RTI International supported the development of an Agriculture Land Information System (ALIS) investor application. Developed under the Feed the Future Private Sector Driven Agriculture Growth Project (PSDAG) funded by USAID, ALIS is globally accessible for investors and the public to obtain information about available land. The application allows for quick access to a visual (geospatial) and textual database that provides parcel attribute information, such as size, location, elevation, etc., as well as data on soil type, agricultural suitability, current use, and infrastructure access. ALIS now allows the GoR to recommend parcels based on the needs of an investor within a matter of seconds as opposed to six months, the average time needed to ascertain and collect information before implementation of the application.

Since the launch of ALIS in October 2016, PSDAG has trained 21 technical specialists from the GoR and both the private and public sectors are using the platform. Still in the early stages of its operation, ALIS naturally faces some challenges, including the need for formal and transparent processes for requesting concessions, a limited GoR budget and staff time for expansion and maintenance, improvement of user interface and instructions, and limited climate information.

Lesson 7: Opportunities to integrate digital financial services are greatest in value chains that exhibit high transaction frequency and longer selling periods.

Digital financial services (DFS) have made significant contributions toward increasing financial inclusion by lowering the cost and increasing the security of sending, paying and receiving money. The sector continues to grow and expand as more and more countries adopt DFS. According to McKinsey Global Institute, 20 emerging economies have adopted some level of digital payments.[3] In addition, technological innovations have allowed DFS to be integrated into other sectors, including agriculture. FHI 360 conducted a market assessment on "Integrating Digital Financial Services (DFS) into Agricultural Value Chains" in

[3] "Digital Finance for All: Powering Inclusive Growth for Emerging Economies," Sept. 2016; http://www.mckinsey.com/global-themes/employment-and-growth/how-digital-finance-could-boost-growth-in-emerging-economies

Bangladesh. Among the key findings, the assessment outlined a framework for identifying potential value chains suitable for DFS integration, as presented in Box 2.7.

Box 2.7 A Framework for Identifying DFS opportunities within Ag Value Chains

The framework focuses on two key areas: value chain attributes and transaction level attributes.

1. **Value Chain Attributes**: Each value chain can be characterized by the following set of attributes. Certain attribute conditions are more or less desirable for DFS integration, as described below.

   - Number of growers – more growers indicates a greater number of customers and greater market potential.
   - Number of harvests – more harvests infers a greater number of transactions and greater utility for a payment product.
   - Degree of organization – more organized value chains have hierarchy and structure that can provide downward pressure to adopt DFS for lower level actors.
   - Duration of selling period – longer selling periods infer more transactions and a more consistent need for services.
   - Input requirements – greater input requirements indicate that smallholder farmers (SHFs) would require DFS that support both buying and selling activities. It also indicates wider usage across multiple agricultural value chain (AVC) actors.

   Table 2.7 illustrates how four value chains in Bangladesh were evaluated according to the criteria listed above. As can be seen, the rice value chain has a significant number of growers, a high degree of organization, a high number of input requirements, as well as a long selling period, indicating that the value chain has high potential for DFS integration. Although the amount of income generated seems like a logical factor to take into consideration, it is more beneficial to look at levels of expenditures and sales as greater amounts indicate a need for some sort of DFS payment service and a viable market for DFS providers.

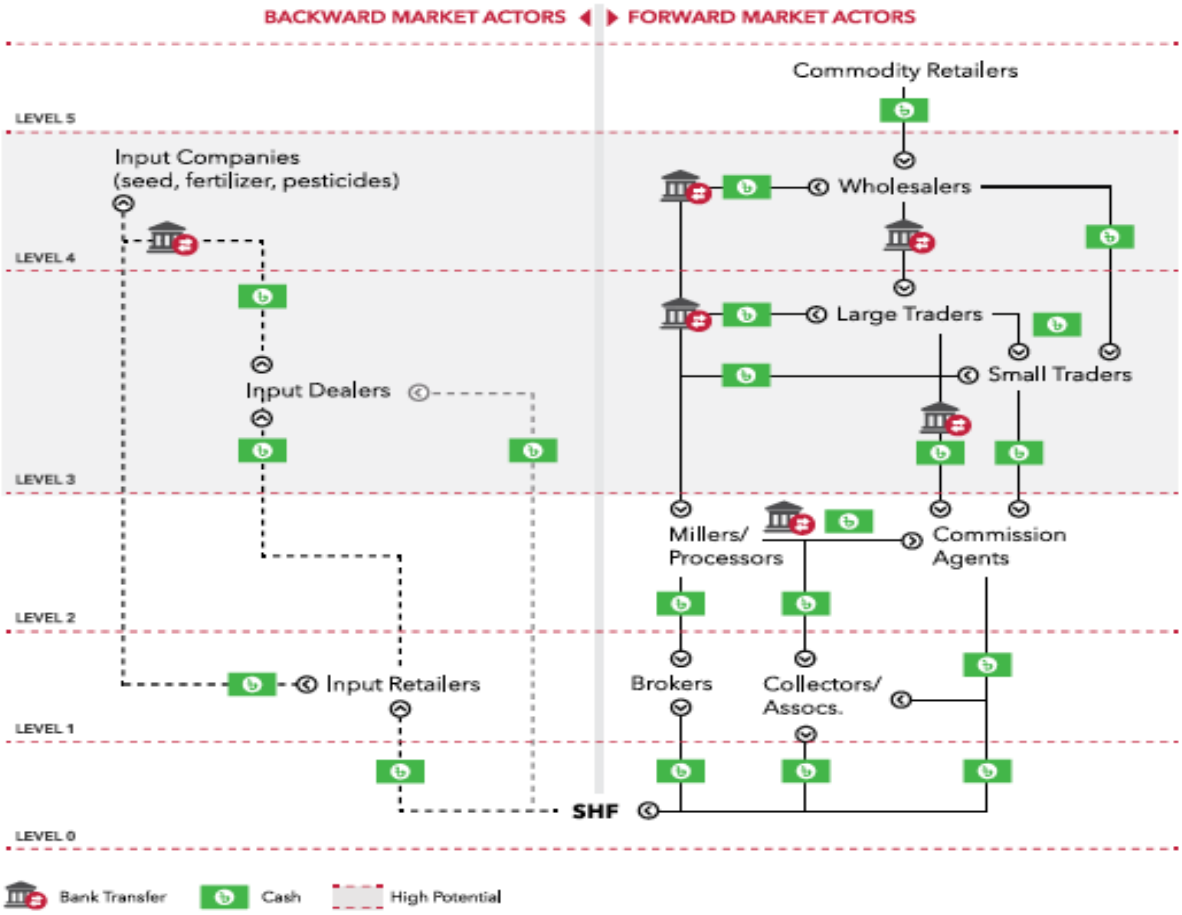
Table 2.7: Overview of Value Chain Attributes & Associated Transactions and Income

Value Chain	# of Growers	# of Harvests	Degree of Org	Input Req.	Duration of selling pd	SHF Net Income (USD/YR)	Expenditure (USD/YR)	Sales (USD/YR)	DFS Integration potential
Lentil	> 600,000*	2-3	Med	Med	4-6 mos	$120	$62	$181	Moderate
Mango	>50,000	2-4	Med	Low	2 mos	$574	$435	$1,004	Moderate
Rice	>13m	2	High	High	4 mos	$119	$193	$311	High
Winter Vegetables	>170,000	2-3	Low	Med	2-3 mos	$297	$157	$451	Low

*Number of growers represent nationwide figures except for lentils which is for the Southern delta region
Source: World Bank, USAID AVC Bangladesh, Consiglieri Market Research Report 2016

2. **Transaction Level Attributes:** This method examines the attributes of specific transactions conducted between specific AVC actors. The transaction levels and actors are delineated in the following figure. The greatest opportunities exist for actors who conduct significant transactions up and down the value chain, interact with multiple actors and engage in both digital and cash based transactions. As can be seen from the Figure 2.7, Level 3 and 4 transactions have the greatest diversity of DFS needs and therefore, represent a viable opportunity for integrating DFS.

Figure 2.7 AVC Mapping of Transaction Level Attributes



III. Improving Sustainability and Food Security of Urban Markets

Multiple stakeholders play a role in improving food security, including private sector agribusinesses, government ministries and development practitioners. In previous *Cracking the Nut* conferences, we have highlighted the importance of rural markets and stakeholders. This year, we are acknowledging the growing importance of urban markets and urban food security. Below are just a few of the lessons on how to improve urban food security in a sustainable fashion, which emphasize public-private partnerships and coordination of stakeholders and sharing of information.

Lesson 8: Private sector agribusinesses are contributing to food security by improving efficiencies and reducing waste.

Katie Garcia, Division Chief for Private Sector Engagement at USAID's Bureau for Food Security highlighted the important role that the private sector can play to improve food security. According to Ms. Garcia, "Now that we understand how complex food security is, we are at a critical juncture." She argued that, "We need to broaden our focus beyond agricultural value chains and move toward a market systems approach, including support institutions and the enabling environment needed to support agricultural development and food security." She engaged three private sector panelists in discussion of how they are helping to improve food security through more integrated supply chains and partnerships (See Box 3.1).

Box 3.1: How Three Agribusinesses in Thailand Contribute to Food Security

Tesco Lotus is the Thai subsidiary of the UK's Tesco Group, a multinational retailer that offers a variety of products, ranging from groceries to housewares and electrical appliances. Tesco has 1800 stores worldwide with 15 million customers per week, with its online sales growing even faster than its retail outlets. At the conference, Pornpen Nartpiriyarat, Director of Quality, explained how Tesco assesses supply chains to identify ways to improve efficiency, reduce costs and food waste. She explained how Thai people are increasingly demanding fresher food so Tesco Lotus starts with the customer needs and works backward down the supply chain all the way to the farmer to ensure efficient distribution centers, good planning, production and food handling. Tesco Lotus has partnered with the Thai Government extension agents to help farmers plan and understand product costs and drivers, as well as to ensure Good Agricultural Practices (GAP) so they can produce more cost effectively. Pornpen said that she has seen fresh food being rejected, often related to quality or excessive use of pesticides. Tesco has a commitment to 0% food waste by 2030 and is partnering and investing in ways to reduce waste, with an emphasis on organic fertilizer as one example. Another example, Pornpen illustrated that during the hot season in Thailand, cabbage coming on a train from Chang Mai to Bangkok can shrink to only 30% of its original weight, so Tesco Lotus is investing in a cold chain to keep food fresh and reduce waste.

Malee is a large Thai juice processing and beverage manufacturing business that sources through a network of 4000 Thai families. Part of Tesco's supply chain, Malee exports to 40 countries and supplies to brands such as Zico in the United States. During the plenary panel, Roongchat Boonyarat, Director and CEO, explained how Malee sources fruit directly from farmers, as well as through middlemen.

(continued on next page…)

(…Box 3.1 Continued)

She explained, however, that she has seen a change in the role of the middle man over the past 8 years. Given the increased emphasis on quality standards and traceability, middlemen are increasingly operating as an extension of Malee, helping it to educate farmers on global standards and how important it is for the entire supply chain to meet these standards as "a defective product found in the U.S. can result in the whole country's exports being banned." As food security is also about affordability, Malee is constantly seeking ways to increase incomes for farmers. Malee Applied Sciences was recently set up to research and identify ways to extract more value out of its products. For example, the shell and husk of the coconut goes to waste – Malee Applied Sciences is working on a bi-product using these waste materials to make a polymer substitute. With the added revenue from the bi-product that previously went to waste, Malee can afford to pay farmers higher prices without increasing the price of the primary product – coconut water.

EnerGaia is a small but rapidly growing Thai company that started in 2009. EnerGaia Co-founder, Saumil Shah describes its main product, Spirulina (blue-green algae) as a "superfood" because it is high in nutrition with minimal environmental foot print. In addition to Spirulina's nutritional contributions toward improved food security, EnerGaia has found creative ways to extract more value out of pre-existing resources. For example, EnerGaia has partnered with Novotel in Bangkok to grow Spirulina on its roof tops. Furthermore, EnerGaia is scaling up production (for which demand currently exceeds supply) by working with a large number of smallholders through a hub and spoke model, with the hub representing its processing and collection centers. EnerGaia has a new contract farming program to source spirulina from more than 800 farmers in India this year. To facilitate the expansion of the processing centers, EnerGaia is partnering with microfinance institutions to offer finance for small spirulina production tanks, which can each produce up to 20 grams of dry Spirulina per day. By focusing on female entrepreneurs, EnerGaia is helping to bring women's wages in parity with men's (increasing from 100 rupees to 500 rupees per day in India).

Lesson 9: The combination of innovative technology and tailored products can increase food security for small-scale producers and unserved urban consumers.

In Kenya, small-scale producers, owning less than 10 cows, produce 80% of milk and production is low due to lack of animal fertility and husbandry practices. The Kenya Dairy Board (KDB) regulates the sector and while the KDB has made the sale of unpasteurized milk illegal, 80% of milk is still sold raw through informal markets. Kenya has the second highest price of milk in Africa, which makes pasteurized milk unattainable for many low-income families who instead purchase raw milk from unregistered milk street hawkers. Recognizing the situation of low supply, but high demand within a certain market segment, the Kiambu Dairy Project (see Box 3.2), implemented by CRS aims to help remedy the situation. The project supports climate-smart dairy production and sales through the use of innovative "milk ATMs" (see Figure 3.1), a technology and methodology first piloted by Tarakwo Dairy. Milk ATMs are automated machines that dispense any amount of milk (as small as 0.2 litre) and are strategically placed in densely

Figure 3.1: Milk ATM in supermarket

populated, informal settlements of Nairobi. The milk ATMs are owned by farmer groups or entrepreneurs, produced locally and licensed by the KDB.

One of the most important innovations for the ATMs has been the ability to dispense small amounts desired by urban consumers. Normal tetra packs sold by large dairy companies are not only expensive, but also too big for the consumers' consumption needs. The larger dairy companies are not threatened because they target the higher-end market segment, but by offering small amounts, the milk ATMs are helping to meet the specific market demand of low-income, urban consumers. This in turn helps to increase the food security of small dairy producers through increased incomes and access as well as urban consumers through greater access and utilization of quality, pasteurized milk.

Box 3.2: Facilitating sustainable milk production in Kiambu County

The Kiambu Dairy Project works with 600 smallholder dairy farmers directly, who now sell milk at US$0.40 per litre (up from US$0.20 per litre in the past) and benefits 2,000 indirectly through improved, sustainable milk production and access to markets. The project facilitates the formation of farmer groups, which then receive training on dairy production with emphasis on climate-smart approaches like fast-maturing fodder and water conservation, as well as best practices in breeding and animal husbandry. Additionally, the project has integrated an ICT component, partnering with a company that provides iCow e-extension services in which farmers receive SMS messages on a range of issues from production to how to deliver milk to the cooperative properly. The project also provides training to farmers to increase their abilities to lobby and advocate for their rights as well as training to the farmer organizations to convert them into farmer-owned companies that process and pasteurize milk. Following the milk ATM methodology developed by Tarakwo Dairy, the project links companies to milk ATMs that are owned by small-scale entrepreneurs for distribution in low-income, urban settlements in Nairobi.

The milk ATM methodology was created by Tarakwo Dairy, which is a host organization that participates in the USAID Farmer to Farmer (F2F) program, also implemented by CRS. Through the F2F program, US agricultural volunteers provide technical assistance to host country farmers or agribusinesses. The program provided technical assistance on production to Tarakwo as well as assisted them in developing a business plan for the milk ATMs. Tarakwo owns several milk ATMs in Nairobi and has also developed a franchise model in which the company provides fresh milk to individual entrepreneur owners of milk ATMs. By partnering with a local microfinance institution, the project has helped youth and women's groups to finance the small ATMs, which cost $2500 with a small down payment of $250-$500. This approach has facilitated a rapid scaling up of milk ATMs in Nairobi.

Lesson 10: Stakeholders need to align interests and focus on the end consumer to achieve sustainable, positive nutritional impacts through agri-food systems.

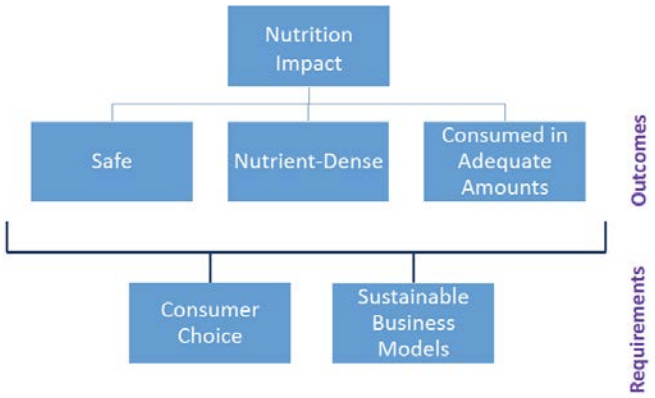
In studying[4] the linkages between agricultural value chains and nutrition outcomes, the Institute of Development Studies (IDS) has found that there is a disconnect between these two areas of work. Many agricultural value chain policies and interventions over-focus on the supply side, either on increasing yields of staple crops; or increasing the production of some nutrient-dense foods (livestock, horticulture), without looking into the nutrition outcomes for the consumer at end of the chain. Furthermore, policies that focus

[4] https://authors.elsevier.com/a/1UN4d15oGotDAr

on increasing yields or production of different products tend to ignore the importance of connecting delivery channels to end consumers and increasing dietary diversity. Thus, while the "availability" component of the food security framework is addressed, "access" "utilization" and “acceptability” are often overlooked. To overcome silos between agriculture and nutrition sectors, all stakeholders need to align their interests and capabilities to improve nutrition, including agricultural experts, nutritionists, public and private sector representatives from all the stages of the food chain, development practitioners and others. Achieving food and nutrition security requires coordination among various actors along the value chain and within the wider market system to overcome constraints on both the supply and demand side. Key supply side issues include cost, nutritional quality and effective targeting to ensure foods reach those most at risk of undernutrition. On the demand side, increasing customer awareness of nutrient-rich foods and proper utilization of food remains challenging. This is not always as easy as simply communicating the importance of increased nutrient intake to consumers. Because nutrition is a credence good, and the nutritional value of a particular product cannot usually be assessed by sight, the consumer must trust not just claims about the importance of nutrition but also claims about the nutritional value of a particular product.

A conceptual model developed by IDS shows that to have nutrition impact, there are three conditions that must be met: food must be safe, nutrient dense, and consumed in adequate amounts, as highlighted in Figure 3.2. To achieve these outcomes there are two requirements for nutrition programs, which are: ensuring the target population chooses to eat the product and having a sustainable business model with aligned interests for actors, private and public, along the value chain to produce, process and distribute the food. For consumers, the question is to what extent are the targeted vulnerable groups consuming the nutrient-dense food? Issues such as nutritional awareness, signaling nutritional value, availability, acceptability and affordability would be important. There is no single business model that is a perfect solution. There are a number of different options which include private sales, public-private partnerships, public distribution, cross-subsidization, mandatory or voluntary fortification, which each provide different opportunities and challenges. Public distribution might reach the poorest and most vulnerable to undernutrition but is difficult to scale and may not be sustainable as it relies on external funding. Mandatory fortification can provide a level playing field for all companies producing a certain product, but insufficient capacity to monitor compliance in many countries presents a challenge.

Figure 3.2: IDS Conceptual Framework for Nutrition Impact

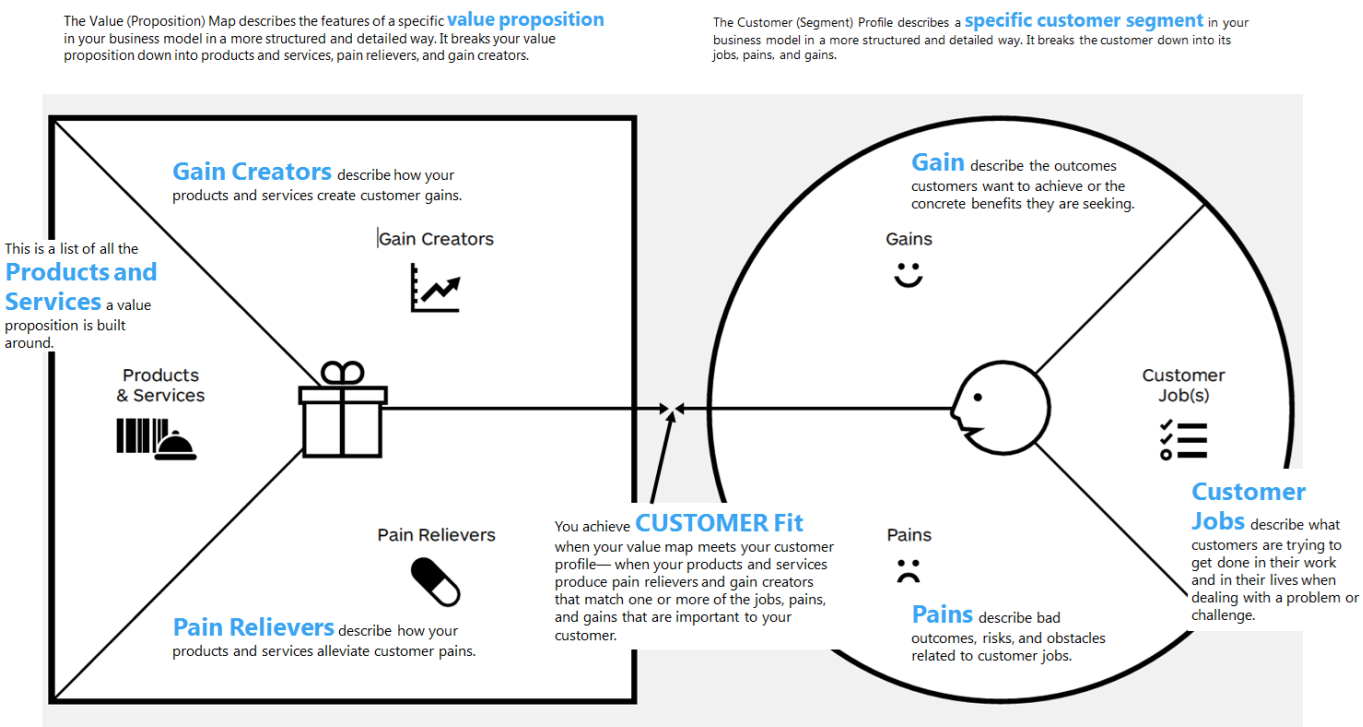


Source: Henson and Humphrey 2015

To better understand consumer preferences for nutritional products or services, Chemonics International presented Strategyzer’s Value Proposition Canvas (see Figure 3.3) in an interactive session focused on matching the value add of a product or service with a specific customer segment. Recognizing the differences in food security characteristics between urban and rural consumers, Chemonics sees the tool as a valuable way to ideate minimum viable products or services that meet the need of the end consumer, particularly through a focus on the post-farm segment of the food system or, in other words, the access and utilization aspects of food security. Integrating human-centered design concepts, the map first demands analysis of the “pains” and “gains” of a customer or customer segment by researching and identifying key insights on the daily life of a customer, including their food-related needs, preferences, purchasing

behaviours and consumption patterns, aspirations, and attitudes and beliefs about diets. This information is then used to create products or services that achieve "customer fit" by helping them achieve desired nutritional outcomes or overcome nutritional obstacles within their given context, thus creating value add. Finding a fit between a product's value proposition and the end customer's needs or preferences is essential. As Chemonics' David Dyer pointed out, "72% of innovations fail to meet customer expectations." By starting with the end customer to design a value proposition, practitioners are better equipped to avoid this type of failure and build a more tested and tailored business model that is responsive to market and customer demand. This in turn can facilitate the nutritional outcomes articulated in the IDS conceptual framework, which ultimately contributes towards positive nutrition and food security impacts.

Figure 3.3: Value Proposition Map



Lesson 11: Comprehensive data can serve as a catalyst for public-private dialogue to collaborate and develop sustainable, data-driven solutions to food security issues.

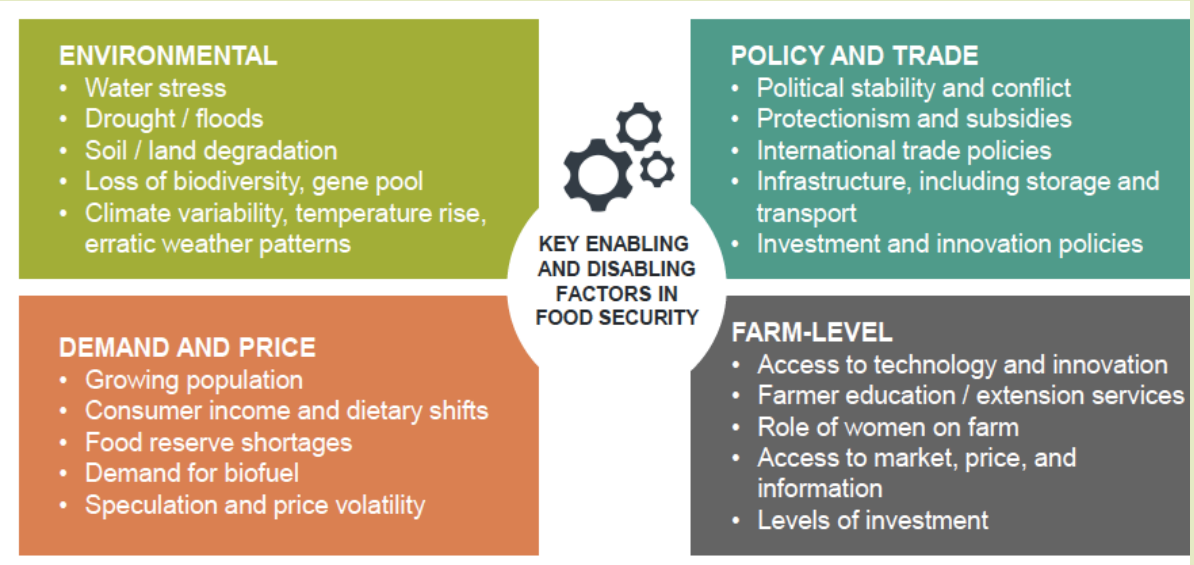
In Asia, food security is becoming increasingly complex as landscapes for production are changing rapidly, as well as population demographics. While food security is high on many policy agendas, the debates can be fragmented, problem-centric, and opinion-driven. The Rice Bowl Index (RBI), which measures the robustness of food security systems in 15 Asian countries (see Box 3.3), was developed in response to some of these issues. Its purpose was to shift the focus of discussion from problem to solution, using evidence-based dialogue and partnerships among a range of stakeholders.

Eddie Chew from Syngenta discussed how the company has used the RBI as a basis for data-driven discussions with partners and policy makers. Syngenta recognized the need for partnerships and collaboration. The structure of the RBI made information more manageable by breaking it down into different pieces and providing a holistic view. The RBI allowed Syngenta to make data-driven forward projections, understanding where market gaps and opportunities will be, as well as identifying where it can add value. Mr Chew mentioned how food is a vital part of social stability and if there is food insecurity,

then markets, especially urban markets, are more vulnerable to social breakdowns (riots, protests, etc.). This makes it difficult to work in that environment profitably, which is why food security information is so important to Syngenta's country operations. On the policy side, information on the robustness of a country's food security system has allowed for meaningful debates between the company and public policy makers.

Box 3.3: Measuring Food Security Robustness

Developed in 2012, the Rice Bowl Index (www.ricebowlindex.com) is comprised of four rubrics (farm-level factors, environmental factors, policy and trade, and demand and price) which in turn are made up of 32 indicators that are considered to have a direct or indirect enabling or disabling effect on food security (see figure below). The RBI provides an overall score for a country and open sources its data from reputable sources, such as OECD, FAO, IFPRI, etc., which has allowed the data to be more robust and comprehensive. The index is constantly evolving with indicators being fine-tuned or changed. In contrast to other indices, the RBI measures food security system robustness or the capacity to withstand disruptions to the multiple dimensions of food security, thereby ensuring an acceptable level of stability commensurate with local needs. Moving forward, it would be good to expand the number of countries included in the index, but the RBI faces challenges in sourcing data.



Data can be useful in other ways. The USAID Supporting Opportunities in Livelihoods Development (SOLID) project in Sri Lanka, implemented by Chemonics International, focused on using data to identify market opportunities for rural smallholder farmers. The project started by looking at market information and demands and identified 14 areas of intervention to improve agricultural production and nutrition. Chemonics was able to form public-private partnerships with a number of leading private sector businesses, including one with Sri Lanka's largest private supermarket chain, Cargills Ceylon PLC, which established collection networks and payment systems throughout the country that allowed them to directly source from more than 10,000 farmers. The project partnered with Cargills to produce passion fruit and Cargills agreed to buy the entire production of the smallholders. The company also hired two full time employees to work with the project to conduct technical trainings. Through the partnership, farmers increased their incomes and food security and Cargills increased access to fresh fruit for its urban customer base.

Lesson 12: To meet urban demand and ensure food security, utilize unused capacity in value chains and prioritize access to finance and investment.

In Senegal, there is a growing urban demand for rice, which was historically met by imported rice from Asia. Although Senegal has two rice-producing regions in the north and south, challenges like quality, marketing, distribution and finance put local small producers at a disadvantage. Furthermore, the national infrastructure was not set up for domestic production; it cost more to transport rice from Podor in the north to Dakar than from Thailand or India to Dakar. To increase Senegalese rice self-sufficiency, meet urban demand and improve food security, the USAID Naatal Mbay project, implemented by RTI International, employed a layered approach to its value chain interventions starting at the bottom and working up. Round 1 of activities worked with farmers, farmer organizations, millers, input suppliers and others to provide basic skills and tools to increase quality and bridge the value gap between imported and locally produced rice which helped to meet urban customers' preferences. The project found that there were 400 active millers in the region with enough installed capacity to nearly meet self-sufficiency. However, the quality of rice milled was not adequate for Dakar and other urban markets. Recognizing the importance of finance for upgrades, the project brought in banks as leads, providing working capital credit and equipment leasing to farmers and millers. Round 2 of interventions focused on risk management and investment and in this phase, the project facilitated the scaling of business models. The project focused on larger investments in this phase, including upgrading of small mills, piloting warehouse receipts and promoting index insurance. In the final round, the project focused on larger agro-industrial systems and their transformation. It was not only about scaling systems and doing more of the same, but making them more sophisticated. The project launched an e-warehouse receipts system, grain trading platform, urban distribution centers and other interventions. By starting with producers and local millers, and then moving to larger agri-food systems, and prioritizing finance and investment, the rice value chain has been transformed and Senegal's high-quality rice brands now compete with imports through a supply chain of 20 local mills sourcing from more than 40,000 farmers.

IV. Facilitating Links from Rural to Urban Parts of a Supply Chain

In the last decade, the global food market has rapidly changed as urban consumption has broadened the markets available to rural smallholders. The rise of urban domestic markets for rural producers has led the growth of larger and more sophisticated "rural to urban" supply chains. Increasing incomes and changing food preferences have expanded the types and range of products with a shift from basic raw grains to a combination of value-added processed goods. Rural producers now have the opportunity to take advantage of these changes by serving new markets in ways that both create jobs and increase incomes. This chapter highlights some of the approaches and lessons learned related to facilitating rural to urban links.

Lesson 13: Strengthening linkages between rural and urban areas can increase the food security of rural producers through increased incomes as well as urban consumers through the increased availability of nutritious and diverse foods.

As evidenced by IFPRI's flagship 2017 Global Food Policy Report[5], food systems have the potential to be reshaped in the context of rapid urbanization to benefit the food security and nutrition of both urban and rural populations. Growing cities and changing diets can present possible win-win opportunities for small producers in rural areas and low-income urban consumers. IFPRI also reports that urbanization is moving fastest in Sub-Saharan Africa where large urban low-income populations rely heavily on the informal economy for accessible, affordable food. In Kenya, for example, there are many challenges in the fruit and vegetable markets, including poor food safety, high postharvest losses, and the exclusion of small and medium farmers from commercial value chains. As IFPRI's research notes and SNV's project experiences support (see Box 4.1 for one example), rural-urban linkages are crucial for ending hunger and malnutrition sustainably, growing cities and dietary changes can create opportunities for rural producers to improve their livelihoods, and investment in rural infrastructure can build connections and create hubs of economic activity benefiting both smallholders and cities.

Box 4.1 SNV's Approach to Developing Nutrition-Sensitive Value Chains

SNV is applying a nutrition sensitive value-chain approach through the Kenya HortIMPACT project to build sustainable and inclusive horticulture markets that supply safe produce to urban centers and supermarkets. The approach integrates improved food supply, employment creation and income generation, and development of a successful enabling environment. Through the HortIMPACT project, SNV tests different innovations and then establishes business cases and public-private partnerships (PPPs), which feed into overall sector development and can be scaled through accelerated investment by private sector actors, farmers, SMEs and the government. To improve food supply and create jobs and income, the project is strengthening rural food production and rural-urban linkages through a variety of activities, including development of joint value propositions and business cases for SMEs, and by providing technical support for production and post-harvest losses.

(continued on next page…)

[5] http://www.ifpri.org/publication/2017-global-food-policy-report

(…Box 4.1 continued)

While the project is still in the early stages, it has already developed 7 business cases to be scaled, aiming to reach 25,000 farmers, and has identified four providers who offer capacity building services on advocacy for integrated pest management. Through this approach, rural Kenyan small and medium horticultural producers are increasing their incomes and reducing post-harvest losses, while at the same time, urban consumers are benefiting from safe and healthy foods, creating positive impacts on food security in both areas. The approach also helps to ensure the sustainability of food security impacts to carry on after the project has finished as it develops PPPs and generates outside investment, creates consumer demand, and builds local capacity to advocate for a successful enabling environment.

Lesson 14: Developing a market for intermediary service providers strengthens the connective tissue between rural production and urban markets, as well as facilitates access to finance.

For many producers, a lack of market infrastructure limits their access to finance as well as opportunities and incentives to ameliorate their own performance. An intermediary that provides a service to connect more rural producers with finance or urban market opportunities can be key to unlocking producers' potential. In the USAID Financing Ghanaian Agriculture Project (USAID-FinGAP), business advisory services (BAS) providers have been able to unlock capital for those with smaller financing needs, especially women. By bundling loan applications, they are able to reduce the due diligence costs for financial institutions, and facilitate finance for previously underserved actors. Similarly, the Uganda Value Added Maize Alliance (UVAMA) focused on bridging the gap between farmers and modern food companies, in this case specifically Nile Breweries. UVAMA worked in partnership with Agroways, a local maize processor, to work backwards from market opportunities and encourage smallholder farmers to make the investment necessary to increase the quality of their produce. Also important, is that each actor sees the value of these relationships. In the USAID-FinGAP project, the original intention was that ultimately SMEs would eventually pay the BAS providers directly; however financial institutions have seen the value that they provide, and are willing to contribute to the cost in order to continue facilitating the resulting finance. UVAMA demonstrated that the bottom of the pyramid can be attractive, and that there is a clear value in investing in smallholder producers, especially encouraging the uptake of new technologies. See Box 4.2 for a description of Palladium's work in Ghana and Uganda.

Box 4.2: Palladium's Approach to Link Rural Production to Urban Markets

Palladium Group operates globally to deliver positive impact through innovative solutions. Currently, they are engaged on two projects focusing on the connective tissue between SMEs and market opportunities.

Northern Ghana. USAID-FinGAP provides a comprehensive and integrated approach to financing actors and increasing competitiveness in the maize, rice, and soy value chains in northern Ghana that serve urban consumers. Through incentives, training and technical assistance, USAID-FinGAP builds the capacity of Financial Institutions (FIs) and Business Advisory Services (BAS) providers to facilitate private finance and investment to thousands of Micro, Small, Medium, including Large Enterprises in the target value chains.

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(…Box 4.2 continued)

As a result of the project's involvement, FIs and BAS providers are reducing loan processing time, increasing the likelihood that loans are approved, and building trust and cooperation between actors, enabling the financial sector to engage more deeply in agriculture.

Uganda. UVAMA is a partnership between USAID, AgroWays Ltd, and Palladium to assist AgroWays to invest in additional infrastructure, modern processing equipment, while also building a training and extension program for farmers in the region. The Alliance is using requirements for quality-grade maize and accompanying higher prices to incentivize smallholders to adopt better production and handling practices for increased marketable yields, as well as to facilitate investments in storage capabilities needed to integrate a growing number of farmers into the supply network of a local maize trader and processor.

Lesson 15: Commodity buyers can secure domestic supplies through outgrower schemes.

When large commodity buyers and agro-processors invest in downstream production in an agricultural value chains in the form of input credit to farmers, they are driven primarily by the need to secure their supplies and raw materials, and not by profits from financing. ACDI/VOCA employs an outgrower business model that links smallholder farmers to urban markets through aggregators, nucleus farmers and farmer cooperatives. Outgrower businesses provide mechanization and extension services to smallholder farmers, link them to input suppliers, and also serve as a distribution channel for the sale of the farm harvest to urban-based aggregators and processors. Outgrower businesses can respond to the very specific needs of any interested buyer. Their intermediary and aggregation role in the value chain reduces risks and transaction costs for smallholders, input suppliers and commodity buyers. When end-market buyers see that they are getting quality products at competitive prices, they invest more in downstream farming by providing quality inputs to farmers that increases crop yields and increases food supplies to urban markets. See Box 4.3 for a description of ACDI/VOCA's work in Ghana.

Box 4.3: ACDI/VOCA's work with outgrower schemes in Northern Ghana

The USAID ADVANCE project aims to increase the competitiveness of maize, rice, and soybean value chains in Ghana with the ultimate results of increasing incomes for 113,000 smallholder farmers. To facilitate this process, ACDI/VOCA uses the Outgrower Business model to connect producers with inputs, finance, technical assistance and markets. This model has helped promote inclusive economic growth, and as farmers continue with the project, they increasingly apply improved technologies. Most strikingly, the access to improved seeds and application of knowledge of the correct plant population density has had the most impact on yields. This has been facilitated by the outgrower business model, which disseminates knowledge in a variety of formats, such as through demos, radios, exhibitions, SMS, and more. The outgrower business model also provides farmers with better quality inputs. Actors all along the value chain benefit from these improvements, making the investments valuable and sustainable.

Lesson 16: Urban food security depends not only on food production, but food distribution.

Over the past decade, there is an increased consciousness of where food comes from for climate and health purposes and many cities are now focused on making food healthier and more sustainable. In October 2015, the City of Milan and the consortium Food Smart Cities for Development signed the Milan Urban Food Policy Pact, an international protocol that engages cities in sustainable and fair urban development via food policies.[6] This framework is built on the United Nations' Sustainable Development Goals (SDGs) to encourage cities and private companies to take action to align business goals with the SDGs, especially related to sustainable food security. In attempting to support the implementation of the pact in cities around the world, VECO has found that ensuring efficient food distribution is equally important to urban food security as reasonably priced food production. By assessing the flow of food to and through cities, VECO has seen that improved food storage, processing, handling, transportation and logistics management were important elements required to ensure food security in urban areas. See Box 4.4 for a description of VECO's work and findings per country. VECO aims at influencing the international agenda and strengthening the cooperation between cities on urban food security with evidence of inclusive business models and sustainable food distribution and procurement practices.

Box 4.4: Creating Sustainable Cities for Food Security

VECO is an international non-profit organization, headquartered in Belgium, that seeks to improve living conditions for small farmers by connecting them to urban markets through the development of sustainable food chains. VECO uses bottom-up initiatives to influence local and international food agendas and to support food smart cities.[1]

Ghent, Belgium. In 2013, the City of Ghent launched "*Gent en Garde*," a food policy that includes five strategic goals to pave the way for a sustainable food system for Ghent. These goals were decided upon based on various stakeholder discussions, input from the city administration and political agreement and included:

1. A shorter, more visible food chain – For example, school food catering was targeted to improve the organization of healthy and sustainable food chains, which included legal and market-related issues.
2. More sustainable food production and consumption – For example, "Veggie Thursday" was created during which no meat should be eaten. This policy has had a huge impact as now most restaurants now offer vegetarian meals, and not just on Thursdays.
3. The creation of more social-added-value for food initiatives and reduced waste – For example, efforts are now made to redistribute leftovers (especially perishable fruits and vegetables) to low income communities.

In the facilitation of the multi-stakeholder process to formulate the strategic goals, VECO has also been involved in the implementation, including a 'healthy and sustainable food at school' program in Belgium.

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[6] The Pact has been signed by more than 130 cities so far and has gotten an outreach potential to over 450 million citizens, per "Food Smart Cities for Development Recommendations and Good Practices," EU Commission, 2015.

(…Box 4.4 continued)

Tegucigalpa, Honduras. VECO has focused on strengthening horticultural value chains and their distribution through supermarkets in the city. By strengthening farmer organizations, VECO has helped to demonstrate that smallholders can be consistent suppliers to supermarket chains, such as Walmart and La Colonia. As these farmers' incomes rose, they were able to diversify product lines and become more resilient to market changes and economic shocks.

Quito, Ecuador. This new project aims to address the lack of reasonably cost nutritious foods for people in Quito and looks closely at the distribution of food in the city. In this instance, VECO contributes to the design of a sustainable food strategy and helps bring private sector players into a multi-stakeholder dialogue platform. VECO's work has focused on strengthening the coffee value chain, improving the quality and business environment for farmers near Quito. One side benefit noted has been that as incomes in Quito rise, more Ecuadorans are drinking high quality coffee, which previously only went for export.

Lesson 17: Not all urban settings are created equally.

As the world becomes more urbanized, many changes are happening in food supply chains. Foremost, these chains are lengthening considerably. Additionally, there is an increased demand for vegetables and processed foods. Production of these are labor intensive, and create a number of opportunities for smallholders globally.

However, urban areas can vary widely in their ability to engage with rural producers and vice versa. As can be seen in Box 4.5, Mercy Corps found through its work in Uganda, Indonesia and China that very different approaches were required to meet the needs of each area. Various regions have different levels of access to technology, which projects can leverage to support a value chain. The sophistication of the supply can also be a factor in determining the right interventions. Nevertheless, in each respective area, Mercy Corps came across these three important considerations for leveraging support in the value chain:

1. **Information exchange**. Understanding the wants and needs of urban consumers can help greatly in allowing producers to adapt to the changing demands. On the other side, consumers should also be able to understand what smallholders can offer. Technologies facilitating this exchange can vary widely, depending on infrastructure and intermediaries.
2. **Market organization**. Meeting urban demand requires finding more and different food, which implies an increase in the length of supply chains, a more diversified food basket, and more attention to quality.
3. **Private sector engagement.** To incorporate aspects of sustainability, scale and leverage, it is important to include the private sector in developing rural-to-urban linkages.

Box 4.5: How Mercy Corps Adjusts its Approach to Match the Urban Setting

Mercy Corps works in a variety of settings worldwide, targeting marketing systems to make them more inclusive and effective.

In Uganda, Mercy Corps works in a community that is off the electronic grid, has no paved roads, and hosts some transient agro-pastoral groups. These factors all work to influence the access to market of the community, and thus inform Mercy Corp's targeted approach. The main focus was on connecting local producers to markets, especially for quality inputs. Here, Mercy Corps has tapped into existing structures, often sharing knowledge through radio segments, as well as through lead farmers and demo plots. Mercy Corps facilitated input supply by working with rural agents identified by agro-dealers, and worked to increase the demand for quality inputs through education.

In Indonesia, where unmet urban demand was the biggest driving force, Mercy Corps focused on increasing the yield of smallholder farmers. Mobile platforms, including group "SMS" chats connected farmers to each other, as well as to government extension workers, input supplier agronomists and financial institution field officers. They could ask technical questions as well as receive advice on good agriculture practices and financial literacy. Mercy Corps largely relied on building on existing community structure, such as farmers already working together. This also helped when looking to the private sector for investment; the links were already well-established lines of trust, in which other actors in the value chain could invest with confidence.

A long supply chain and heavy reliance on the middle man plagues many of China's producers in the area where Mercy Corps works. This can mean that producers have low profitability, even while consumers demand more high-quality products. Through a smartphone platform, Mercy Corps worked with local partners to create an e-commerce app. This connects producers and consumers to build trust and exchange information. Furthermore, it allows producers to cut out the middle man and connect directly with consumers, streamlining the supply chain and facilitating the ease of private sector engagement.

Lesson 18: Women farmers need secure land tenure and access to information, productive resources, and market opportunities to be able to increase production, income and food security.

Sometimes called the “forgotten farmers,” women farmers play an essential role in agricultural production, yet the majority lack secure land tenure[7] as well as access to productive land, extension services, technology and financial services. This poses a large challenge for the sustainability of future livelihoods and food security in Africa and around the world as women produce over half of the world’s food. Without secure rights to land, many women are disinclined and discouraged to make investments to improve their land, production, and incomes. Providing women farmers with secure land access is critical to their empowerment (Box 4.6).

[7] Secure land tenure is defined as the ability to own, use, control, sell, inherit, and make decisions about land. www.landesa.org.

Box 4.6: Land Access as a First Step to Empowering Women Farmers

In Soumatogo, Mali, a collective of women farmers went before the village chief, Amadou Plea, and the local mayor, Sedou Diarra, to ask for a piece of land to collectively farm. The women wanted to test new agricultural techniques on the land but the caveat to the request was that the women wanted an official deed to accompany the allocation of land. The village chief said it was the first time in his village that women had asked for land – and insisted on an official deed. In front of the assembled community, the chief approved the provision of one hectare to the group and a deed was granted for a three-year period. Confident in their official status as landowners, the women's group was able to test new agricultural techniques, such as a compost pit, which resulted in lower input costs and increased yields per hectare.

The women's collective worked with the Nyeleni project, part of CARE's Pathways to Empowerment program which works to secure land for women farmers, improve agricultural practices, develop market skills and build gender awareness and nutrition knowledge. The project has found that access to land is one of the first and most challenging issues and that community dialogues have proven to be critically important in raising awareness among men to assure them that women's land access is not a threat, but benefits the entire community. Already, the Nyeleni project has secured 214 hectares of land for women and aims to facilitate even more long-term or permanent land agreements so that as the women famers expand their businesses, they can construct infrastructure (storage sheds, processing mills, etc.) that are needed.[1]

In addition to facing challenges of land rights, men often possess the most fertile land, leaving women with degraded and inferior pieces. Men are also prioritized to receive extension services and new technologies because they have more acreage. Since men are often involved in the sales transactions, they frequently have better access to the household income. In northern Ghana, MEDA's Greater Rural Opportunities for Women (GROW) program employs a market-driven approach to address these challenges and to integrate women into the soybean value chain (see Box 4.7). If provided with the right information and access to quality inputs, technology and finance, women can not only increase their production and income, but household food security and nutrition can be improved as well. When economically empowered, women gain confidence to participate more actively in household and community decisions.

Box 4.7: MEDA Builds Food Security through Market Linkages for Rural Women Farmers

Established in 2012, MEDA's GROW program works with 20,000 women farmers and their families in northern Ghana to increase food security and improve nutrition in the region through agriculture. Women farmers were chosen because they are marginalized and working with them has a multiplier effect: women share information and best practices with their spouses and children and teaching women about good nutrition leads to improved nutrition of the whole household since women are responsible for nourishment and often control the diets of the family.

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Following a market assessment, the soybean value chain was chosen due to the demand for soybeans in the market, its nutritious benefits, the positive effects it has on soil fertility and the fact that women were already planting the crop. The program uses a community mobilization model in which MEDA works with key facilitating partners to train women lead farmers who work with 20-25 members providing extension services, training, and monitoring. Women receive training on agricultural best practices, nutrition (including how to incorporate soybean into the diet), financial literacy, and conservation practices. MEDA puts special emphasis on conservation because it is an important way for women farmers to adjust increasingly unpredictable rainfall patterns.

While the project faced initial challenges of low participation of women, MEDA is preparing for expanded participation in the upcoming season by a) strengthening women's use of village savings and loan associations so that they have the money they need to purchase inputs and services for soybean production and b) sharing with community leaders and other women, information about the sales women farmers have been able to make from their first harvest. During the initial season, participating farmers produced an average of 8 bags or 800 kilos of soybeans per acre. MEDA facilitated purchases by several soybean processing companies who are eager to include GROW participants in their supply chain. These companies are paying USD 43-50 per 100 kg bag of soybeans and cover the cost of transporting the beans to the processing plants. This initial success is encouraging other farmers to participate in the project. MEDA anticipates the number of participants to triple or more in the upcoming season.

V. Moving Forward

Across the themes, the cases highlighted the fact that certain populations are more vulnerable than others, whether young agri-preneurs or female producers. These realities require us to think of how we must adapt approaches to meet their specific needs, or we risk leaving some people even more disadvantaged as a result of our efforts. Here are a few cross-sectoral take-aways and debunked myths that should help to guide our work going forward.

Lesson 19: We can attract more youth to agriculture, including off-farm agribusiness, through technology and market orientation.

Kipp Sutton, Agricultural Team Lead of USAID's Regional Development Mission to Asia (RDMA) opened the plenary panel on "Engaging Youth in Agriculture" by highlighting the fact that 60% of the world's youth are in Asia and that many youth are leaving rural agricultural areas for cities to find paid employment. He cited Nepal as an example, where 75% of youth migrate from rural to urban areas, including outside of the country, causing a significantly decreased supply of agricultural labor, driving up food costs and placing stresses on urban areas. Kipp engaged his four panelists in a discussion on the barriers and opportunities for youth to engage in modern agriculture and food systems. Box 5.1 summarizes the perspectives of two young agri-preneurs and two youth development practitioners. Collectively, they agreed that traditional agricultural production is viewed as drudgery and as Rashmi Ekka explained, "Youth don't want to work in farming" and "farmers don't want their children to stay in farming." Instead, we need to use networks and media to show different types of farming (more technology-enabled, and urban approaches) and to entice youth to work in agribusinesses where there is clear market demand, including in the "hidden middle" where value is added through processing, packaging and transporting food. Kipp Sutton concluded that we need to remember that "youth is a huge and diverse group" and that we need to understand various youth cohorts and build support networks for problem sharing and problem solving.

Box 5.1 Perspectives on Barriers and Opportunities for Youth Engaging in Agriculture

Youth Agri-preneur Perspectives	Youth Practitioner Perspectives
Gibran Huzaifah, CEO and Founder of eFishery experienced hunger as a young college student, which drove his interest in hunger issues. Learning of a new technology for fish farming, he started eFishery in year? eFishery currently employs 48 people, 94% of which are youth (under age 30). His business maximizes smart feeding of fish and shrimp using a cloud-based sensing technology that allows remote monitoring and control of farm feeding via cell phones and laptops, reducing the cost of feeding by up to 21%. Gibran believes that "access to finance is a significant barrier" as there is "no clear path to success until a business is profitable and growing" and yet agribusinesses require time and investment before returns become clear. He also believes that there is a lack of role models to guide young entrepreneurs through those early stages.	**Dr. David Hall, COP USAID STRIDE project for RTI International** cited multiple barriers to youth employment. In Liberia, for example, he explained that "no one wanted to invest in anything long-term for fear it could be taken away (e.g., working the land)." Also, the enabling environment encouraged students to attend university, but neglected the technical/vocational education for agriculture, required when many youth would return to farms and rural areas after college. He believes in a holistic approach and suggests that we question whether we are doing enough to understand the various constraints to youth in agriculture in each specific environment where we work. In addition to becoming stronger in diagnosing barriers to youth agribusiness, Dr. Hall feels that a combination of innovative support structures and access to finance are often needed.

Rashmi Ekka, Co-Founder Queen Sheba Winery, an Indian national and international development practitioner, said the business "was inspired by her Ethiopian husband" who identified the market opportunity as middle income Ethiopians were no longer interested or skilled in making traditional honey wine. They currently produce and sell honey wine to Ethiopian restaurants and high end stores in the US, with 30% of their sales online. As an Indian woman, Rashmi grew up seeing many subsistence-level farmers, but believes that "we need to build pride in the agricultural sector" and that we can do so by demonstrating that agribusiness can be profitable. As she and her husband are now considering moving their operations to Ethiopia, she thinks that diaspora networks could be important sources of funding and information to young entrepreneurs in developing countries.	**Shaun Ferris, Director of Agriculture and Livelihoods, Catholic Relief Services (CRS)** posited that there are many good opportunities in agriculture if you have access to land, capital, finance, and technology, but youth rarely have access to these assets. Shaun believes that youth today are better educated, more mobile and open to using technology, all of which are advantages to supporting young agri-preneurs. He believes we need to find creative ways to incubate youth ideas, provide basic business skills and facilitate knowledge and investment in agribusinesses. On EDC's USAID/Rwanda Huguka Dukore project, for example, CRS and Connexus are working together to organize small groups (with up to 5 youth) to start horticultural businesses with technical assistance from the private sector and access to local finance with a minimum investment.

Lesson 20: Bottom-up approaches to agricultural value chain development can be effective in addressing the specific needs of women.

Two common approaches to agricultural value chain development can be characterized as follows:

> ***Lead firm-down approach:*** focuses on medium and large producers or processors requiring new market development and emphasizes sales to urban markets. Although its activities are aimed at improved linkages and increased acceptance of products in international markets, they hope to benefit small and medium sized actors by engaging them into extended business models through a "trickle down" effect.
>
> ***Farmer-up approach****:* focuses on small producers and processors with existing markets and emphasizes sales to local markets. These projects emphasize agricultural products, which are essential consumables and therefore have pre-existing market demand.

While the lead firm-down approach can be highly effective for improving a nation's competitive positioning in international markets, this more top-down approach can be effective in addressing poverty reduction, especially for vulnerable and disadvantaged populations, such as women. For example, USAID/Pakistan's Agricultural Innovation Program (led by CIMMYT) found that it was important to have female facilitators to encourage women's participation and benefits from new agricultural technologies and farming practices.

Conclusion. In addition to the adjustments needed to serve especially vulnerable and disadvantaged populations, we need to make sure that we are not designing programs based on unfounded assumptions. The conference helped to debunk a number of myths that have previously limited our impacts, a few of which are described below.

Myth #1: Digital financial services are a panacea for access to finance. While ICT applications are widespread nowadays and more people have cell phones, a recent CGAP article shows that digital financial services can cause greater exclusion of the poor and ultra poor; yes, cell phones are giving more people access to finance across the board, but DFS is also increasing the gap between rural and urban populations and excluding the ultra poor. We need to go beyond thinking of ICT as only reducing transaction costs but

also see how it can reduce risks for agriculture and facilitate efficiency in a value chain through increased spread of information up and down the value chain.

Myth #2**: **There exists a strict rural/urban dichotomy. Rural is not a homogenous category and the growing importance that medium-sized towns play in food chains, in terms of facilitating input supplies, aggregation and processing, shows how all urban areas are not alike. There are different levels of urbanization and this affects decisions in the supply chain and project implementation. One presentation demonstrated the differences between a food security project in urban Uganda, which relies on radio advertising to one in China, which relies on digital communication and an e-commerce website.

Myth #3**: **It is always better to cut out the middle men in value chains. Recently the focus has been on cutting out middle men or shortening the value chain to allow producers to capture more value. Many believed that middle men and traders often hold the farmers hostage through trader credit arrangements and price setting. Dr. Reardon's research shows that this is no longer true as information is becoming more available up and down the food chain, helping to empower farmers to negotiate prices and terms. Increasingly we are seeing that the middle man can play a positive role in facilitating the flow of information and resources to farmers, helping to add value to the food chain as a whole. In the case of Malee, for example, they are acting more as an extension of the company and assisting in traceability and other issues.

To conclude, things are constantly changing and some of the thinking from the past needs to be questioned as we move forward. With urbanization levels expected to reach 67% by 2050, we need to continue to seek innovative, scalable and sustainable approaches to reinforcing food systems to meet urban demand and to improve food security for rural and urban populations. As a global community, we must resist the temptation to close borders to trade and embrace global cooperation, as our lives and livelihoods are inextricably linked to the well-being of others and our planet.