



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Partnering for Innovation

Commercializing Seed Technologies: A Decade of Lessons Learned



USAID
FROM THE AMERICAN PEOPLE



December 2021

This publication was produced for review by the United States Agency for International Development (USAID). It was prepared by Kate Granger with The Development Practice for Feed the Future Partnering for Innovation, a USAID-funded program managed by Fintrac Inc.

Cover Photo: Fintrac Inc.

About Feed the Future Partnering for Innovation

Feed the Future Partnering for Innovation is a USAID-funded program that builds partnerships with agribusinesses to help them sell new products and services to smallholder farmers, who represent a potential market of more than 500 million customers worldwide. Businesses are provided with the investment assistance, expert guidance, and technical support they need to expand in emerging markets and create a growing and lasting customer base for their agricultural innovations.

www.PartneringforInnovation.org

DISCLAIMER

This publication was made possible with the support of the American people through the United States Agency for International Development, under the terms of Cooperative Agreement No. OAA-A-12-0051, and managed by Fintrac Inc. The opinions expressed herein are those of the authors and do not necessarily reflect the view of the United States government.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
INTRODUCTION	5
BACKGROUND	6
Overview of Smallholder Seed Systems	6
Seed Commercialization Analysis Framework	7
PARTNER CASE STUDIES.....	8
Case Study I: Biofortified Seed in Central America.....	9
Case Study II: Improved Input Distribution in Southern Africa	11
Case Study III: Bundled Seed and Crop Insurance in Southern Africa.....	14
Case Study IV: Maize Aggregation and Milling in Southern Africa	16
KEY RECOMMENDATIONS	20
CONCLUSION.....	22
ANNEX I: RELEVANT BACKGROUND REFERENCES	23

EXECUTIVE SUMMARY

Since its inception in 2012, Feed the Future Partnering for Innovation (Partnering for Innovation), a United States Agency for International Development (USAID)-funded program, has built partnerships with 75 agribusinesses in emerging markets to help them sell transformational new products and services to smallholder farmers. In 2016, Partnering for Innovation published the report, [Bringing Seeds to Market](#), to analyze the program's portfolio of seed commercialization investments. The study identified critical gaps in the seed value chain that heightened market entry risk and prevented private sector companies from meeting the needs of smallholder customers. The report outlined recommendations for donor investment in public-private partnerships aimed at developing and initially replicating new seed varieties; supporting private sector seed companies in increasing and smoothing seed supply; incorporating other value chain actors in expanding rural distribution; and building a more enabling environment for seed commercialization through quality assurance policies and more nuanced seed subsidy programs.

This report builds on these findings to examine four partnerships from the program's more recent investment portfolio. Detailed case studies of these partnerships show that public funding can indeed help decrease corporate risk, support private sector investment in developing smallholder markets, and provide a critical bridge to private sector companies interested in bringing new seed products to market. The report also finds that public funding must be applied strategically over time and across a variety of actors through different points in the seed value chain, including research institutions, seed companies, infrastructure investors, logistics providers, and grain processors. The literature review, partner case studies, and interviews with sector-wide experts conducted as part of this report contributed to the following recommendations, which are intended to assist donors in undertaking strategic investments that ensure smallholder farmers have ongoing access to improved seed varieties:

Ensure public-private partnerships are in place before the research and development process starts. Consumer preferences tend to take a back seat to improved traits for pest resistance, drought tolerance, or nutritional content. Production and marketing needs must be taken in to account before the development process begins, and the best way to achieve this is by building formal private sector partnerships at the outset.

Support seed companies by investing in other actors throughout the value chain to build a sustainable market ecosystem. Last-mile distribution, logistics, and marketing are often too expensive for individual seed companies to cover profitably. Donors should therefore give equal consideration to distribution companies, logistics providers, and other input suppliers in accelerating the growth of last-mile distribution and market networks in reaching sustainable scale.

Identify funding opportunities to support more sophisticated approaches to marketing for smallholder seed products. Seed companies tend to struggle in executing innovative sales strategies to clearly defined smallholder customer segments. Donors can have a major impact on private sector sales capacity by leveraging a variety of pathways and partnerships to drive seed sales to smallholder farmers.

Cultivate more strategic funding portfolios that support different value chain actors along a longer time horizon. Establishing a sustainable seed market requires strategic investment, smallholder behavior change, and enabling environment improvements. By strategically investing over a longer period of time as the seed market matures, donors can have a more systemic and sustainable impact on smallholder access to new seed technologies.

INTRODUCTION

In the 2021 USAID report, [Introducing the Seven Building Blocks of Mature Seed Systems](#), one of the key lessons learned concerning the role of public-private partnerships in effective seed commercialization focused on the fact that there is always a role for the public sector to bring improved seed varieties to market. Public sector investments that open access to improved seed varieties are crucial for improving the resilience of seed systems and their ability to withstand changing climate conditions, perform in volatile markets, and help ensure food security around the world. Partnering for Innovation plays a critical role in this effort as it is one of USAID's mechanisms for funding private sector products and services for smallholder farmers, particularly regarding investment of public funds in seed commercialization.

Since its inception in 2012, Partnering for Innovation has built partnerships with 75 agribusinesses in emerging markets, helping them sell transformative new products and services to smallholder farmers. These agribusinesses, which invest equal funds in partnership activities, are provided with targeted investment assistance, expert guidance, and technical support to expand and create a sustainable smallholder farmer customer base. Using these innovative products and services, smallholder farmer customers gain the opportunity to boost farm production, access new markets, raise incomes, reinvest in their land, and increase food security. Launching and scaling seed technologies has long been an important focus area of Partnering for Innovation. In 2016, the program published the report [Bringing Seeds to Market](#) to analyze its investments into seed companies to date.

Commercializing Seed Technologies: A Decade of Lessons Learned builds on the findings of the 2016 report by examining more recent program investments in seed commercialization to understand where public-private partnerships can best be leveraged to maximize both development outcomes and private sector profitability. As Partnering for Innovation will end as a program in March 2022, the findings in this report provide USAID and its partners with valuable market-tested insights that will help ensure smallholders have ongoing access to improved seed varieties, even after donor funding has ended.

Using desk research and stakeholder interviews, this report compares the findings from the 2016 study with findings from case studies of four program partnerships undertaken between 2016 and 2020. By analyzing Partnering for Innovation's investments in companies involved in seed production, distribution, and marketing, this report identifies key factors impacting the success or failure of seed technology commercialization, provides lessons learned on seed system resilience (particularly in light of the global COVID-19 pandemic), and offers recommendations for future public investment.

The recommendations in this report complement the lessons learned outlined in Partnering for Innovation's 2016 seed study, providing fresh perspectives on areas where donor intervention can strengthen the resilience of seed systems in emerging markets. Partnering for Innovation's initial investments in seed commercialization focused on its partners' ability to profitably replicate, package, and distribute high-quality seed to smallholder farmer customers, and the recommendations in the 2016 seed study reflect that focus. As the capacity of both the program and the companies it partners with have grown, recent partnerships have broadened to include investments in more sophisticated marketing, distribution, and sales strategies. Taken together, the findings of the two reports offer insights applicable across companies, countries, and contexts for donors investing at any point in the seed value chain.

BACKGROUND

New crop varieties realized from improved seeds yield larger harvests, produce higher value traits, thrive in changing climates, and increase nutrition through vitamin enrichment. Ensuring smallholder access to these seeds and varieties is paramount to improving their food security and resilience outcomes. Complex market systems produce and deliver seeds to these farmers, and funders need to understand these systems in order to drive private sector engagement with smallholder farmers and ensure consistent access to seed products tailored for small-scale production. A framework for evaluating public sector investment opportunities that maximize seed systems impact (Figure 1) was developed from a comprehensive literature review of academic and grey literature on seed systems in emerging markets.

Overview of Smallholder Seed Systems

Smallholder farmers source seed from both formal and informal seed systems. Formal seed systems follow a process of research, plant breeding, seed certification, marketing, and distribution through recognized outlets. Well-functioning formal systems are governed by a regulatory environment intended to ensure high-quality phytosanitary standards and maintain varietal identity (Norway, 2012). Alternatively, informal seed systems are locally organized such that farmers produce, disseminate, and procure seed themselves whether by reusing their own harvest, bartering within social networks, or through local grain traders (Norway, 2012). Globally, the formal seed market is estimated at USD 45 billion annually, while the informal seed market is estimated between USD 6-15 billion annually. Despite the dominance of the formal seed sector, smallholder farmers tend to access seed primarily through informal markets; for example, smallholder farmers in sub-Saharan Africa currently access up to 90 percent of their seed from informal local markets or farmers' own stocks (McGuire, S. et al, 2016).

Smallholder reliance on the informal seed market does not indicate a lack of interest in improved varieties, seed quality, or reliable access. In fact, many smallholder farmers make important and relatively large investments in improved seed through informal seed markets (Boettiger et al, 2013). This latent yet growing demand can create an incentive for the private sector, both globally and through local agribusinesses, to invest in developing, producing, and distributing improved seed. However, private sector seed companies face significant barriers to entering the smallholder seed market, including limited national infrastructure, unfavorable government seed policies, unaffordable commercial credit, long product development timelines, and underdeveloped seed markets (Boettiger, 2013). Additionally, companies must drive a fundamental behavior change in smallholders to draw them away from informal seed markets, build trust for their products, and convince them to invest in improved seed varieties (Boettiger, 2014). Strategic public investment can help private sector seed companies and other key value chain actors mitigate these risks, and incentivize them to build sustainable markets for smallholder products and services (Partnering for Innovation, 2018).

Currently, the private seed sector is largely dominated by local and regional seed companies; for example, in sub-Saharan Africa, local private seed companies account for at least 75 percent of companies actively producing and marketing certified seeds for cereal and legume crops (TASAI, 2020). For maize in particular, which comprises the largest share of the formal seed market in sub-Saharan Africa, large-scale multinational companies have a significant presence in the market, but locally-owned and largely newly established companies control 60 to 80 percent of the market depending on the country (TASAI, 2020). However, these newer local companies tend to lack the capacity and infrastructure for developed breeding programs, and as a result, release less than half the number of new varieties that multinational companies launch. Local and regional seed companies tend to rely on public research institutions or licensing

agreements with larger companies for their parent seed material (Access to Seeds Foundation, 2019). Therefore, with their strong local presence in specialized markets but limited access to genetic resources, local and regional seed companies tend to be acquired by or merged with larger multinational competitors, and even the smallest players see global partners as a key strategy for growth (Mujaju, 2018).

Seed Commercialization Analysis Framework

Successful private sector seed commercialization requires profitable sales of seed products with high demand. In order to increase smallholder farmer access to and demand for improved seeds, it is critical for funders to identify and address the correct barriers to profitability that are preventing businesses from entering the smallholder seed market on their own. This is challenging as seed markets systems are inherently complex, and smallholder seed systems compound that complexity with additional challenges including informal seed markets, last-mile distribution networks, and overall scale of the target market. In addition, every seed business, value chain, market environment, and country context present unique bottlenecks and challenges, and often require different commercialization strategies to overcome obstacles and realize opportunities. This variability makes it especially difficult to identify catalytic public investment opportunities that can spark successful private sector commercialization of improved seeds targeted to small-scale producers.

❖ The “Bringing Seeds to Market” (2016) report highlighted the importance of understanding the market context. Seed market dynamics vary across countries, and even *within* countries. A clear understanding - from diverse agro-ecological conditions to end-market demand - is therefore critical.

Figure I provides a seed commercialization analysis framework to help funders assess specific seed systems and diagnose critical bottlenecks in any context as they consider public investment opportunities in seed commercialization. The framework outlines the seed value chain, from research and development to enabling environments, and identifies common barriers to profitability and potentially catalytic investment opportunities that can accelerate impact across the commercialization process. The framework is used in this report to evaluate and draw lessons from previous public seed sector investments made through Partnering for Innovation, and to provide a guide for identifying targeted funding opportunities that maximize impact within the local market context.

Figure I: Seed Commercialization Analysis Framework

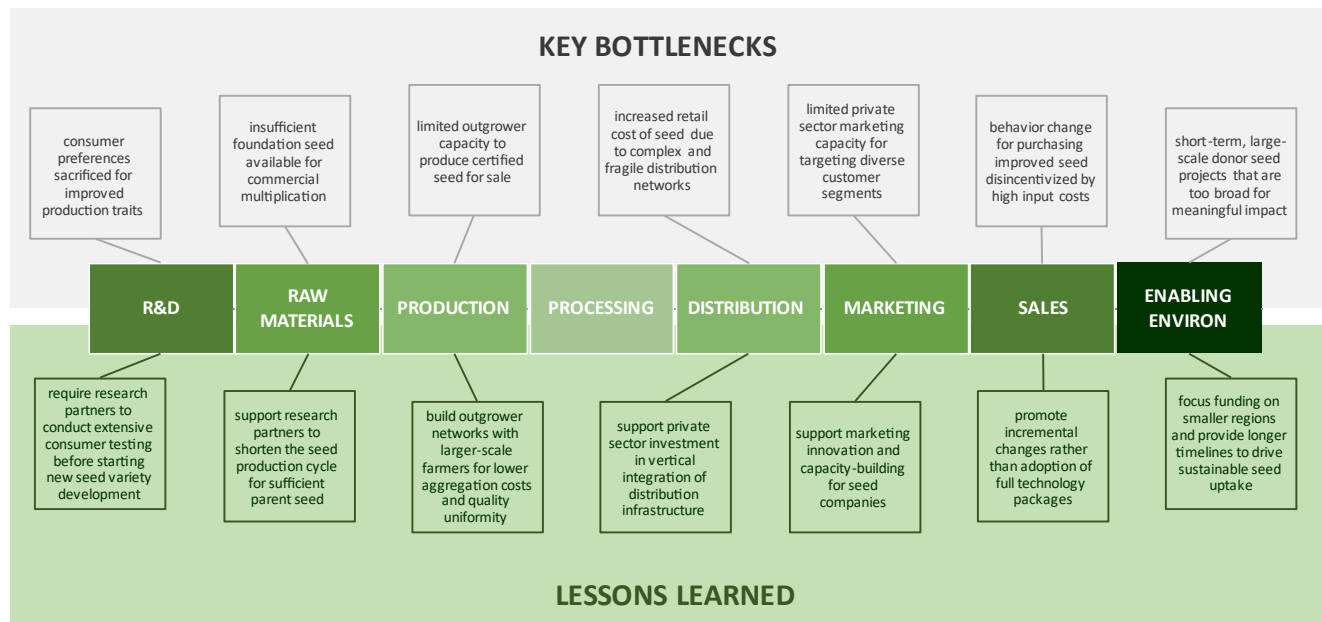


PARTNER CASE STUDIES

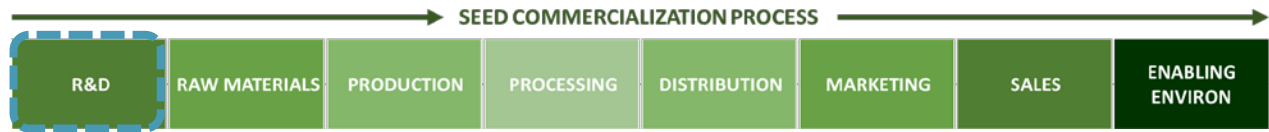
Using the Seed Commercialization Analysis Framework (Figure 1), Partnering for Innovation examined eight of its program investments in companies commercializing new seed technologies, improved inputs, extension services, and commodity off-taking in Africa and Central America. This framework has been updated since the previous report was written in 2016 to include a greater focus on private sector participation in the seed commercialization process – especially the marketing, distribution and sales of new seed products. Key informant interview with these companies were conducted to identify critical bottlenecks and lessons learned. Interviews were also held with program staff, value chain stakeholders, and sector experts to provide additional context.

Four of the eight program investments were selected for further discussion as case studies in this report. As outlined in Figure 2, the case studies focus on common seed commercialization process bottlenecks and contribute to a better understanding on how to maximize the impact of public investments in smallholder seed production, market access, income opportunities, and overall food security.

Figure 2: Seed Commercialization Process Bottlenecks and Lessons Learned



Case Study I: Biofortified Seed in Central America



Partnership Background

Partnering for Innovation funded a non-profit biofortified seed enterprise in 2019 to address low maize yields and malnutrition in Central America through the commercialization of Fortaleza F3 seed, an improved and biofortified maize variety that was developed by an international research institution to contain higher protein and zinc content than traditional maize varieties. The enterprise focuses on establishing proof-of-concept for seed products with long time-horizons for market establishment and then licensing the seed to private sector seed companies for scale-up. During the partnership, the funded seed enterprise sold more than 4,000 bags of biofortified Fortaleza F3 seed to more than 4,000 farmers in eleven regions of the target country. However, the company found that grain buyers offered lower market prices for the seed due to its color and smaller kernel size, which disincentivized farmers from continuing to purchase the seed. To address this challenge, the seed enterprise worked with a consulting firm, through support from Partnering for Innovation, to develop a new marketing strategy focused on changing buyers' biases against Fortaleza F3 seed. The seed enterprise is now piloting a new marketing effort to reposition the seed for home consumption – instead of commercial production – in regions where market price penalization was found to be highest.

Key Market Challenge

New seed variety developers tend to sacrifice consumer preference and processor needs for drought tolerance, pest resistance, or nutritional gains.

The research institution's failure to test varieties with end-consumers or intermediate buyers about their desired traits was a critical mistake. The Fortaleza F3 maize variety was developed in partnership with the research institution specifically to biofortify its protein and zinc content, and to improve consumer nutrition. However, by prioritizing its nutritional value over its other characteristics, the maize variety resulted in smaller kernels that were darker in color than traditional maize varieties.

As a result, the seed enterprise struggled to attract end-consumers who prefer large white kernels, and farmers producing Fortaleza F3 maize struggled to sell their crop to intermediate buyers and received lower market prices when they did. Most smallholder growers therefore tended not to buy the Fortaleza F3 seed for a second season, returning instead to their traditional varieties that were more viable commercially. The research institution did not fully account for the needed maize characteristics in the current market, so the seed enterprise launched the Fortaleza F3 seed product without fully understanding what consumers were and were not willing to pay for. As a non-profit, the seed enterprise was only able to keep Fortaleza F3 in the market through donor funding as the product struggled to find a sustainable consumer base.

Lesson Learned

Ensure public-partnerships are in place before starting the research and development process.

Both production and marketing must be accounted for before the development process begins, and the best way to do that is to build formal private sector partnerships from the outset. This creates two-way communication between public and private actors, and provides a clear pathway to commercialization from the start.

❖ The “Bringing Seeds to Market” (2016) report emphasized the importance of aligning development objectives and commercial objectives up-front to help maximize new product adoption.

The seed enterprise’s current strategy is to market Fortaleza F3 seed for home consumption rather than as a cash crop for intermediate buyers or aggregators. In addition, both the research institution and the seed enterprise are working on developing and trialing new varieties of biofortified maize that provide desired consumer characteristics, rather than focusing on the highest biofortification values.

For these new varieties under development, both the research institution and the seed enterprise should work together before undertaking the lengthy plant breeding process to clarify their target market, determine consumer preferences, and prioritize key traits for market sustainability. This will help both organizations avoid critical market barriers and ensure their improved seed products reach the hands of farmers and consumers.

Commercial Outlook

Once Fortaleza F3 has demonstrated its market viability, the seed enterprise will license production and sales to government agencies or for-profit seed companies, and then take on new seed technologies to test and market for the benefit of smallholder farmers.

However, with little consumer value for higher nutritional value, the seed enterprise still faces an uphill battle marketing its Fortaleza F3 maize variety. Even with addressing customer needs for improved

consumer traits, the seed enterprise might need additional seed subsidies, government mandates, or policy changes to drive biofortified seed adoption. In the meantime, the seed enterprise continues to market Fortaleza F3 in the target country, although the organization now primarily targets the eastern region of the country where the variety produces greater yields.

“For variety development, the big research institutions are the only game in town, but they have way too big of a mandate and far too little funding – there needs to be a lot more support to help them provide better services to private sector partners.”

- Seed Enterprise

Recommendations

Donors should leverage their networks to ensure public-private partnerships are in place before starting the research and development process to support successful commercialization.

Organizational relationships between public seed developers and private sector seed companies can be difficult to identify, negotiate, and manage. Donors often have a broader network of relationships in both the public and private sectors, and can make critical connections between stakeholders at the outset of the research and development process. In addition, donors may have the financial leverage to require commercial partnerships and consumer preference testing before the development of new varieties begins. Donors can highlight the incentives for these kinds of public-private partnerships such as leveraging the partnering seed company's knowledge of their customer priorities; allowing researchers to focus on improving best-selling seed varieties already in the market to ensure customer preferences are met; limiting the amount of publicly-funded customer research needed; and, providing new varieties with a clear path to commercialization. In addition, research institutions could consider the development of new seed varieties as a potential income generator through their successful licensing to private sector commercialization partners. Research institutions require more support to provide better breeding services to seed companies, and accountability through licensing income from seed sales could drive smarter investment of public resources.

Case Study II: Improved Input Distribution in Southern Africa



Partnership Background

Partnering for Innovation funded a certified legume seed company in 2016 to contract smallholder seed producers in Southern Africa to produce improved legume seed varieties. The company provided extension services and inputs on credit, which increased farmer production volumes substantially. The produced seed was sorted, treated, and packaged by the legume seed company at its factory, and then sold under its proprietary label to more than 60,000 smallholder farmers. The outbreak of COVID-19, however, exposed key weaknesses in the company's value chain, including difficulty accessing customers and inputs, and restrictions on carrying out its typical marketing and sales activities. As a result, Partnering for Innovation supported the legume seed company again in 2020 to launch a new business model by establishing 20 new distribution centers in rural areas. These "one-stop" shops enabled the company to reach untapped markets and add new customers, particularly farmers located far from market centers with few options to source quality seeds and inputs.

Key Market Challenge

Selling small seed quantities to a high number of dispersed agrodealers requires a complex distribution network that adds costs to seed products for smallholder farmers.

The legume seed company's value chain broke down most critically in moving seed products to its core customer base: local agrodealers. The company found that agrodealers lacked sufficient liquid capital to stock their shops at the start of the season, and the company did not have the financial resources to risk providing credit for a high volume of upfront bulk purchases.

❖ The “Bringing Seeds to Market” (2016) report identified logistical and financial constraints, such as limited rural points of sale and weak access to supplier credit, as a major challenge to establishing efficient distribution networks.

The legume seed company did not perceive the situation as an issue of simply providing customer credit, but rather as a more fundamental issue involving distribution. Due to limited distribution networks, agrodealers need to purchase all their stock for the season upfront in one bulk purchase in order to save on delivery fees and ensure affordable prices for their customers. The challenges of product distribution can be addressed by seed companies targeting smallholders by either requiring these customers to travel to centralized retail stores located in more easily accessed urban centers (the farmer still bears a transportation burden) or by building better rural distribution networks to reach their customers where they are, which requires significant upfront capital investment.

Lesson Learned

Support private sector investment in logistics infrastructure to ensure the necessary volume and quality of seed can be delivered profitably to customers.

The legume seed company identified that a successful sales strategy would ensure that its products were available in agrodealer shops in advance of the planting season. As a result, the company explored expanding their rural distribution network. In order to create profitable distribution routes, it developed a network of rural distribution centers made up of low-cost warehouses in rural areas with higher sales density. The centers brought products closer to their wholesale customers, allowing them to purchase stock for cash throughout the agricultural season rather than having to purchase one bulk delivery at the start.

To ensure the success of this business model, the legume seed company made strategic infrastructure and technological investments to better manage their own inventory across multiple distribution sites. The company also added new products and services, such as crop protection products and weather-indexed crop insurance, to bolster sales volumes and build more resilience into their value chain to help their end-customers weather losses and still buy replacement products. These improvements were long-term investments that required public support and partnership. For smaller companies lacking the resources to invest in distribution infrastructure, public investments in dedicated logistics and distribution companies

can help maximize sales volumes and increase distribution efficiency that stand to benefit smallholder farmers even after public funding ends.

Commercial Outlook

As a result of the new business model, the legume seed company established 11 rural distribution centers based on farmer productivity, brand awareness, and key relationships with local area leaders and community members, and increased sales to 30,000 new farmer customers. However, the rural distribution centers did not perform equally well, and the company plans to close two of the lowest-performing sites. Based on this experience, the company will double the size of its rural distribution network and will ensure profitably by establishing site selection guidelines based on where their active sales were highest – in densely populated areas where brand awareness was already supported by influencer farmers, extension agents, and local authorities.

“This is such a huge country, but we only have consistent rural distribution of two products: Coca-Cola and beer. Investment in introducing new technologies needs to be done simultaneously with investment in a reliable distribution network, and you need a big company to distribute the kind of volumes that result in profitability.”

- African Logistics Firm

Additionally, the company’s inventory management system requires digital access, necessitating mobile connectivity and the adoption of digital technology as key factors in influencing future distribution centers and seed access.

Recommendations

Donors should support seed companies by investing in other actors in the value chain, such as distribution and logistics providers, to build a sustainable market ecosystem.

Seed companies are critical actors in the seed value chain and their sales to smallholder farmers rely on an equally important ecosystem of service providers. Last-mile distribution, logistics, and marketing are especially expensive given the rural location of smallholders, and these costs can easily become prohibitive without operating at a sufficient scale and volume. In light of this, donors should, along with investing in new seed technologies, give equal consideration to scaling-up seed companies and other private sector actors, such as distribution companies, logistics providers, and other input suppliers.

Accelerating the growth of last-mile distribution and market networks will enable them to reach sustainable scale and ultimately increase the diversity of business services available to all actors across the seed value chain. Investments in stronger business services encourage seed companies to focus operations on their areas of expertise and competitive advantage. Such investments would engage other actors in the value chain to supply services that would otherwise impact the affordability of companies’ seed products for smallholder customers.

Case Study III: Bundled Seed and Crop Insurance in Southern Africa



Partnership Background

Partnering for Innovation funded in 2020 an economic development non-governmental organization (NGO) and its partners – a private seed company and regional insurance provider – to pilot a new seed product that automatically bundles weather-based index insurance with seed sold to smallholder farmers in Southern Africa. Through this effort, insured seed for maize, sesame, and several bean varieties was sold at no additional cost through agrodealers and other rural retail outlets to more than 5,000 smallholder farmers, specifically targeting those who were heavily impacted by Cyclone Idai in 2019. The pilot project allowed the seed company to test its operational model and key systems, as well as to assess the extent to which bundled insurance acts as a selling point for clients. Following the pilot, the NGO continued to support the seed company in selling the bundle directly to smallholder farmers, and has included training of distribution agents and raising awareness of the new product through social media marketing.

Key Market Challenge

Many seed companies lack the marketing capacity for nuanced approaches to targeting different customer segments across different markets, regions, or eco-zones.

The private seed company partner invested significantly in marketing strategies to promote the bundled seed product. This included covering the total cost of the insurance premiums for smallholder farmer customers and hiring a dedicated manager to coordinate the insurance program. However, the seed company overestimated smallholders’ demand for insured seed and their willingness to pay for the bundled product.

For example, in order to reap the benefits of the insured seed, smallholder farmers were required to enter a simple registration code through their mobile device. However, the mobile system was difficult to navigate, especially on commonly used older-model cell phones and the nominal SMS fee (USD \$0.08) proved to be a barrier.

As a result, only 10 percent of eligible seed was actively insured and the seed company still had to absorb the full insurance premium of 4 percent of the total seed sales whether the insurance was activated or not. Furthermore, by marketing the bundled seed product to all its customers universally, the seed company ultimately increased

“I think the marketing capacity of these seed companies is always neglected; very few of them seem to have a sophisticated understanding of how to effectively market their products to different segments of the smallholder market. Smallholder farmers have major buying power, and seed companies should treat their products like any other essential product, such as sugar or flour.”

- Economic Development NGO

the cost of the insurance premium for a premium product that customers did not value. Overall, the company approached all smallholder customers as a uniform purchasing block with no nuanced factors driving sales, rather than segmenting customers and targeting each segment aggressively with tailored marketing strategies. As a result, the company lost the market advantage to sell the bundled seed product.

Lesson Learned

Support marketing innovation and capacity building for seed companies to the same extent as funding for seed research and production practices.

Marketing strategies were just as important as production practices for the seed company to reach smallholder farmers with its new seed technology. Rather than developing clearly differentiated approaches to marketing its seed products to distinct market segments, the seed company invested in marketing its bundled seed product uniformly to all customers. Since the company would have made seed sales regardless of the insurance bundle, a more strategic approach would have seen the company identify customers who highly valued crop insurance or were early adopters in order to target the bundled seed product to them so that they, in turn, might influence other customers. Such an approach would have allowed the seed company to leverage marketing staff and resources more strategically, ensuring that the company only had to pay the insurance premium for those customers who valued the bundled product. While there are companies that market products successfully to smallholder farmer customers through persistent marketing, promotion, and relationship-building with small retail sellers, the seed company – as a medium-sized family-owned business – needed expert support in enhancing its marketing staff members’ skills as well as in developing creative and nuanced marketing approaches, materials, and messaging.

Commercial Outlook

Automatic inclusion of weather-index insurance is slowly gaining appeal among smallholder farmers and larger commercial clients. Smallholders and larger commercial clients, such as agribusinesses, development organizations, and commercial outgrower programs, are attracted by the reduced risk in experimenting with new seed technologies. To date, the seed company has sold 850 metric tons (MT) of insured seed to smallholder farmers both directly and through aggregator schemes.

While other seed companies replicate this model, the company intends to secure its market-leader position over the next five years by expanding the bundle to include new products and markets. New marketing strategies, such as video and audio advertisements on social media, community radio, and other promotional outlets, are in development as are efforts to introduce the bundled product through large-scale partnerships with NGOs serving smallholder farmers. Finally, the NGO will continue to work with the seed company on the implementation of the bundle and related logistical challenges, especially as the insurance index is triggered and payouts begin.

❖ The “Bringing Seeds to Market” (2016) report highlighted the importance of building farmer awareness of new seed products through farmer field days and local demonstrations. *Commercializing Seed Technologies: A Decade of Lessons Learned* expands on this by examining more nuanced strategies that engage farmers and build sustainable demand for new seed products.

Recommendations

Donors should look for funding opportunities to support more innovative and sophisticated approaches to marketing and sales for smallholder seed products.

Seed companies tend to have strong expertise in core business functions around producing, replicating, and packaging seed, and there are key opportunities for them to partner with public research institutions to improve profitability in the seed multiplication process. Where seed companies – and even large-scale companies – tend to struggle is in executing innovative sales strategies to clearly defined smallholder customer segments. Donors can have a major impact on private sector sales capacity through a variety of pathways, such as providing funding for expert marketing consultants at entrepreneurial seed companies to drive sales innovation sector-wide; forge partnerships with government agencies and research institutions for broader behavior-change campaigns around the benefits of improved seed varieties; and, facilitate knowledge transfer on successful consumer-goods marketing tactics and strategies through high-level relationships with global companies like Coca-Cola, Unilever, and Mars.

Case Study IV: Maize Aggregation and Milling in Southern Africa



Partnership Background

Partnering for Innovation partnered in 2020 with a private sector maize aggregator and miller in Southern Africa that sources maize from more than 12,000 smallholder farmers, providing them with extension services, inputs on credit, transport to and from the mill, and a guaranteed market at an above-market rate. Through the partnership, the maize processor responded to growing market demand by expanding its operations and adding new farmers to its network. The company built new small-scale warehouses to aggregate maize and train farmers; purchased a new, durable silo to accommodate increased maize volumes; raised its milling capacity by installing a maize dryer; and, contracted new farmers.

These investments aimed to build the resilience of the maize processor and its farmers to shocks and stresses, such as those resulting from Cyclone Idai in 2019, which resulted in significant losses for smallholder farmers and lower maize availability at higher cost for procurement by the maize processor.

Key Market Challenge

Private sector seed value chain actors need public support to reach smallholder customers on a longer commercialization timeline than most donor funding cycles provide.

When the maize processor began operations, it became clear to company leadership that farmers lacked the necessary resources to produce maize of a quality and volume required for the company's milling needs, specifically for its own line of maize meal products and to ensure its maize grits contained sufficient starch content to attract breweries to buy for their malting operations.

As a result, the maize processor worked with farmers to enhance their production volume and quality to ensure receipt of sufficient levels of maize to develop the milling and processing side of the business. While the extension services were welcomed, farmers in remote, rural areas lacked reliable and consistent access to improved seed and therefore saved and replicated their own rather than purchase unreliable packaged seed.

The maize processor did need farmers to adopt improved seed to increase both their consistency and quality; however, it was a struggle to drive the required behavior change, and it took the company almost ten years to convince farmers to invest in any improved maize seed product rather than replicating their own seed. This longer timeline put the maize processor at odds with Partnering for Innovations funding cycles which only give private sector partners two to three years to achieve results and scale technologies. In this case, much of the behavior change work had been done prior to Partnering for Innovation's involvement, allowing for quicker technology uptake and returns on investment; however, many other program partners also report that it can take from five years to a decade to develop both the supply and demand for improved seed products in a new market. If donor funding is the start of the behavior change process, many program timelines will be insufficient to see true impact and results.

"If you look at the percent of improved seed adoption, it's stayed the same for years. There have been so many development projects, but they've only impacted the system at the margins – the seed system hasn't fundamentally changed."

.....
- Seed Enterprise

Lesson Learned

Encourage donors to provide longer timelines to support a diverse network of seed value chain stakeholders to drive seed uptake.

The maize processor addressed smallholder barriers to higher quality over time by requiring the use of improved seed in order to access the company's guaranteed end-market, and by providing farmers with agricultural training and ongoing extension to maximize returns on their investment in improved seed.

The company also provided incentives to farmers through access to a credit facility, guaranteed markets, and preferential pricing for high quality maize production. However, building demand for improved seed products while also striving for corporate profitability in an undeveloped market proved difficult, leading the maize processor to secure short-term public funding from various donors to invest in a long-term behavior change campaign, ongoing extension support, and infrastructure investment to ensure a viable end-market for network farmers. With multiple donors each having their own application, management, and reporting requirements, the company found themselves dedicating almost as much time to grant management as to business operations. Longer-term funding cycles that targeted multiple actors in the seed value chain at different points in the seed market's development would have provided greater financial efficacy for the public fund investments.

❖ The “Bringing Seeds to Market” (2016) report recognized the vital role private sector partners play in seed commercialization efforts. However, businesses often face unfamiliar and time-consuming donor requirements for reporting and monitoring and evaluation. Partnering for Innovation's approach to “speak the language of business” with its private sector partners has succeeded in overcoming many of these challenges.

Commercial Outlook

The maize processor plans to almost double its maize milling volumes by significantly increasing the number of smallholder farmers it supports and sources. By 2025, the company expects to source maize from nearly 18,000 smallholder farmers (30 percent of whom are anticipated to be women farmers) with an annual purchased volume of 25,000 MT. As its maize business grows, the company will also start moving into new crops, both to encourage farmers to diversify and rotate crops as a good agricultural practice, but also to enter new markets for processed foods and animal feed. With more products reaching the market, the maize processor will also increase its milling capacity and revamp its marketing strategy. At present, the maize processor is supplying two breweries with grits products and is not able fully satisfy the demand for its own processed maize meal. Currently, demand still outpaces supply and additional milling capacity will allow the company to reach new provinces.

Recommendations

Donors should cultivate more strategic, holistic funding portfolios that support different points in the market's development along a longer time horizon.

The maize processor was able to develop different donor funding streams to achieve successful scale-up and a positive commercial outlook. However, a more strategic donor strategy would have likely allowed it to achieve this earlier and more efficiently. Large-scale, short-term funding priorities promote a generic approach to seed system development that results in only marginal impact on smallholder farmer access to improved seed varieties. Donors have the financial power to set funding terms that encourage deeper, longer-term system development and the convening power to bring together diverse stakeholders to identify the specific bottlenecks for more targeted seed markets.

With this approach, funders can coordinate a phased sequence of funding initiatives over a 10- to 20-year funding period that focuses support over time where it is needed most at different points in the market's

development. For example, a phased funding approach could initially support the production of new varieties, then move on in phases to seed registration policy, distribution services, and finally, mobile and road infrastructure. Such an approach would gradually build the supply and demand of new seed products for smallholder farmers and support a variety of value chain actors through different market development phases, all of which helps to drive sustainable impact long after funding ends.

KEY RECOMMENDATIONS

Drawing from these four case studies as well as from a comprehensive literature review and sector-wide expert interviews, the key recommendations discussed below are intended to provide donors with market-tested insights for making strategic investments that ensure smallholder farmers have ongoing access to improved seed varieties.

-
- ❖ *Donors should ensure public-private partnerships are in place before starting the research and development process.*
-

Research institutions often undertake the lengthy plant breeding process in support of new crop variety development; however, consumer preferences tend to take a back seat to an overwhelming focus on improved traits for pest resistance, drought tolerance, or nutritional content. Both production and marketing needs must be taken in to account before the development process even begins, and the best way to do that is to build formal private sector partnerships from the outset. This creates two-way communication between public and private actors, and provides a clear pathway to commercialization from the start. Donors have the convening power to bring all parties to the table, and can play a crucial role in building lasting public-private relationships. (see *Case Study I: Biofortified Seeds in Central America*).

-
- ❖ *Donors should support seed companies by investing in other actors throughout the value chain to build a sustainable market ecosystem.*
-

Seed companies are obviously critical actors in the seed value chain, but they rely on an equally important ecosystem of service providers to support their sales to smallholders. Last-mile distribution, logistics, and marketing are especially expensive given smallholders' rural location, and these costs can easily become too expensive for individual companies to cover profitably without operating at sufficient scale and volume. Therefore, in addition to investing in new seed technologies, donors should give equal consideration to other private sector actors, such as distribution companies, logistics providers, and other input suppliers, to accelerate the growth of last-mile distribution and enable market networks to reach sustainable scale to ultimately increase the diversity of business services available to all value chain actors. These investments in stronger business services encourage seed companies to focus their operations on their areas of expertise and lean into their competitive advantage by engaging other actors in the value chain to supply services that would otherwise impact the affordability of their seed products for smallholder customers. (see *Case Study II: Improved Input Distribution in Southern Africa*).

-
- ❖ *Donors should explore funding opportunities that support more innovative and sophisticated approaches to marketing and sales for smallholder seed products.*
-

Seed companies tend to have strong expertise in core business functions around producing, replicating, and packaging seed, and there are key opportunities for them to partner with public research institutions to improve profitability in the seed multiplication process. Where seed companies universally struggle – as do large-scale companies as well – is in executing innovative sales strategies to clearly defined smallholder customer segments. Donors can have a major impact on private sector sales capacity through a variety of pathways: funding for expert marketing consultants for more entrepreneurial seed companies to drive sales innovation sector-wide; partnerships with government agencies and research institutions for broader behavior-change campaigns around the benefits of improved seed varieties; and, facilitation of knowledge transfer through high-level relationships with companies, such as Coca-Cola, Unilever, and Mars, that are global experts in marketing consumer goods. (see *Case Study III: Bundled Seed and Crop Insurance in Southern Africa*).

-
- ❖ *Donors should cultivate more strategic, holistic funding portfolios that support different value chain actors, at different points, and over a longer time horizon.*
-

Local production conditions, regional seed markets, and national policy contexts vary widely around the world, but large-scale, short-term funding priorities promote a generic approach to seed system development that result in only marginal impact on smallholder access to improved seed varieties. Donors have the financial power to set funding terms that encourage deeper, longer-term system development and the convening power to bring together diverse stakeholders to identify the specific bottlenecks for more targeted seed markets. With this approach, funders can coordinate a phased sequence of funding initiatives over a 10 to 20-year funding period to focus support over time where it is needed most at different points in the market's development. For instance, phased funding could support new variety production followed by seed registration policy, seed distribution services, and finally, mobile and road infrastructure. This phased funding approach would gradually build the supply and demand of new seed products for smallholder farmers and support a variety of value chain actors through different phases of the market's development, as well as help drive sustainable impact long after funding ends. (see *Case Study IV: Maize Aggregation and Milling in Southern Africa*).

CONCLUSION

There are critical gaps in the seed value chain that increase the risk of market entry and prevent private sector companies around the world from meeting the needs of smallholder farmer customers. Public funding can help decrease this risk and provide a critical bridge to private sector companies that want to bring new seed products to market, but lack the liquid capital or shareholder willingness to invest in licensing new technologies, ensuring high quality seed multiplication, developing distribution infrastructure, driving customer behavior change, or competing in a limited enabling environment.

For these companies, donor funds are critical to moving improved seeds and other high-quality inputs into the hands of smallholder farmers. Funding, however, must be applied strategically over time throughout different points in the seed value chain to a variety of actors, including research institutions, seed companies, infrastructure investors, logistics providers, grain processors. Donors can achieve a more systemic and sustainable impact on smallholder access to new seed technologies by intentionally mapping out investments over a longer period time that both focus on the development and production of new improved seed varieties as well as the deployment of more strategic and innovation distribution and marketing approaches.

ANNEX I: RELEVANT BACKGROUND REFERENCES

- Access to Seeds Foundation. "Access to Seeds Index 2019." 2019.
- Banziger, M. et al. "Accelerating the Delivery of Quality Seed from Breeding Investments Made by the Crops to End Hunger Initiative Through Economically Sustainable Seed Systems." Syngenta Foundation for Sustainable Agriculture, 2021.
- BMGF, USAID, Monitor Deloitte. "Early Generation Seed Study." 2015.
- Boettiger, S. "Scaling Up Technology Adoption Among Poor Farmers: The Case of Seed." 2014.
- Boettiger, S. "Crowd-Sourced Lessons About Scaling Seed Systems." Syngenta Foundation for Sustainable Agriculture, 2013.
- Boettiger, S. et al. "Integrating Seed Systems: Planning for Scale Brief #3." FTF Partnering for Innovation, 2013.
- Fletcher, A. et al. "Ten Simple Rules to Commercialize Scientific Research." 2012.
- Feed the Future Partnering for Innovation. "Bringing Seeds to Market." 2016.
- Feed the Future Partnering for Innovation. "Success Factors for Commercializing Agricultural Research: Lessons from Feed the Future Partnering for Innovation." 2017.
- Feed the Future Partnering for Innovation. "Designing Agricultural Research that Leads to Commercialization: Recommendations for USAID." 2018.
- Feed the Future Partnering for Innovation. "Success Factors for Commercializing Agricultural Research: Lessons from Feed the Future Partnering for Innovation - A Companion Guide for the Private Sector." 2018.
- GAIN. "Supply Chain Analysis for Nutrition (SCAN)." 2020.
- Granger, K. et al. "Commercialization of Agricultural Public Goods: GAIN & HarvestPlus Review." GAIN, 2018.
- Hansen, A. et al. "Nutritious Food Foresight: Twelve Ways to Invest in Good Food for Emerging Markets." GAIN, 2019.
- INGENAES. "Integrating Gender and Nutrition Within Agricultural Extension Services: PICS Bags in Zambia." 2016.
- Jaleta, M. et al. "Smallholder Commercialization: Processes, Determinants, and Impact." ILRI, 2009.
- Kirsten, J. "Managing Agricultural Commercialization for Inclusive Growth in Sub-Saharan Africa." Global Development Network, 2013.
- Manfre, C. et al. "Assessing How Agricultural Technologies can Change Gender Dynamics and Food Security Outcomes: Part One." USAID, 2017.
- McGuire, S. et al. "Seed Systems Smallholder Farmers Use." 2016.

Mujaju, C. "Identifying Leading Seed Companies in Eastern and Southern Africa." Access to Seeds Foundation, 2018.

Nickerson, J. "Introducing the Seven Building Blocks of Mature Seed Systems." USAID Agrilinks, 2021.

Norway, C. "Understanding Seed Systems Used by Small Farmers in Africa: Focus on Markets." USAID, 2016.

Ochieng, J. et al. "Commercialisation of Food Crops and Farm Productivity: Evidence from Smallholders in Central Africa." 2016.

Pingali, P. et al. "Agricultural Commercialization and Diversification: Processes and Policies." IFPRI, 1995.

Spears, J. et al. "Scaling Agricultural Technologies Through Public-Private Partnerships." USAID, 2013.

The African Seed Access Index (TASAI). "Towards a Vibrant, Private Sector Led Seed Industry in Africa." 2020.

USAID EAT. "Agricultural Technology Commercialization Assessment Tajikistan." 2014.

USAID EAT. "Seed Commercial, Legal, & Institutional Reform Tanzania." 2013.

Winter, S. et al. "Multi-Stakeholder Initiatives: Lessons from Agriculture." Technoserve, 2017