



## TechnoServe Initiative for Inclusive Agricultural Business Models

Syngenta: Addressing Barriers to Adoption of High-quality  
Agricultural Inputs Among African Smallholder Farmers



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# EXECUTIVE SUMMARY

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**Multinational companies have made bold sustainability commitments with potential to effect substantial poverty reduction.** Through a grant from the Ford Foundation and matching company investment, TechnoServe supported four multinational companies in designing win-win approaches to meeting their sustainability commitments related to smallholder farmers. This involved developing inclusive and sustainable business models that could both improve farmer livelihoods and reduce their vulnerability while creating commercial value for the company. This case study documents the experience of one of these four companies, Syngenta, including the company's specific opportunity, the model designed to capture this opportunity and take-aways for consideration by other industry actors.

**Syngenta aims to build a \$1 billion business in Africa and empower 20 million smallholder farmers to sustainably increase productivity.** Meeting these growth targets and commitments would require Syngenta to adapt its business model in order to successfully reach African smallholder farmers, which manage 80 percent of the continent's farmland and produce the majority of its food supply.<sup>1</sup> This would also provide a channel for Syngenta to support the continent's agricultural transformation, as high-quality inputs used in conjunction with good agricultural practices can enable smallholder farmers in sub-Saharan Africa to narrow the region's estimated yield gap of 76 percent<sup>2</sup> while raising quality levels. These changes would lead to higher incomes as well as greater food security and livelihood resilience. Last but not least, high-quality inputs can help smallholder farmers to better withstand climate-related issues, such as drought, flooding, and increased incidence of pest and disease outbreak.

**Using Kenya as a platform, Syngenta partnered with TechnoServe to address the unique risks and barriers that African smallholder farmers face in adopting high-quality agricultural inputs.** In addition to addressing smallholder farmers' distrust of improved inputs and the financial barriers to their access, Syngenta asked TechnoServe to help train farmers on good agricultural practices and to strengthen their access to markets, where they could sell their crops at better prices. By establishing a market access component, Syngenta sought to improve and sustain farmers' incomes in the face of productivity-driven increases in market supply. Specifically, TechnoServe assisted farmer business organizations (FBOs) in the management of aggregation stores, including potato cold storage facilities – which help farmers avoid selling when market supply is at its peak – allowing them to secure direct contracts with large volume commercial buyers.

**The model has reached over 25,500 Kenyan tomato and potato smallholder farmers to date, resulting in significant yield and income improvements for farmers alongside increased uptake of high-quality inputs.** Across the four crop seasons in which this model has been applied to date, participating tomato farmers averaged a 185 percent increase in yield and 181 percent increase in income (106 and 138 percentage points, respectively, above average control group changes). Participating potato farmers averaged a 38 percent increase in yield and a 48 percent increase in income (48 and 39 percentage points, respectively, above average control group changes). Annual investment in high-quality agricultural inputs – inclusive of fertilizer, as well as both Syngenta and non-Syngenta seed and crop protection products – across the four seasons to date increased between 40 and 300 percent among potato farmers and between 60 and 180 percent among tomato farmers.<sup>3</sup> The share of potato growers in the program specifically using Syngenta crop pro-

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1. "Smallholders and Family Farmers." UN FAO fact sheet, 2012.

2. "Estimated difference between actual yields and their practical potential for major crops." *The State of Food and Agriculture: Innovation in Family Farming*. UN FAO, 2014.

3. The large ranges in proportional spending increases reflect regional variations in farmers' initial spending on inputs.

tection has also increased significantly. Finally, 100 percent of tomato growers in the program tried Syngenta's Kilele tomato seed and many have adopted this high yielding hybrid variety in lieu of the low yielding seeds they historically used.

**Business models designed to reach smallholder farmers can eventually transition to lower cost, ongoing delivery models; however, enabling the initial customer transformation required for this transition is prohibitively expensive for any single market actor to bear at scale.** Getting smallholders to a point at which they are sustainably reaching their productivity potential requires significant initial investment in farmer training, strengthening market access and improving the broader enabling environment. As more multinational companies seek to reach low income, rural populations in sub-Saharan Africa (SSA) with high impact products and services, there is an increasingly clear need and opportunity to reduce investment costs in the initial customer transformation stage through innovative partnerships with a broad array of organizations, including other companies as well as donors and government actors. Syngenta has begun to test this approach through its current partnership with ICL Fertilizer Limited and Sanergy in Kenya. Co-investing with crop buyers is another way in which model delivery costs can be reduced, particularly when considering the strong business case for buyers in SSA to invest in improving the consistency and quality of high-value cash crops grown by smallholders.



*Joshua Kibet, a TechnoServe farmer trainer, gives a training session at a demonstration plot in Kapyego, Kenya.*

# BACKGROUND

**In recent years, an increasing number of multinational companies have made bold sustainability commitments with the potential to effect substantial poverty reduction.** In recognition of this great potential, the Ford Foundation and TechnoServe have partnered to support multinational companies in achieving their sustainability commitments related to smallholder farmers. Through a grant from the Ford Foundation and matching company investment, TechnoServe supported four multinational companies in developing inclusive and sustainable business models that could improve farmer livelihoods and reduce their vulnerability while creating commercial value for the company.

**Syngenta is a leading agriculture company operating in over 90 countries; it seeks to improve global food security by enabling millions of farmers to make better use of available resources through innovative crop solutions.**<sup>4</sup> This case study documents Syngenta's partnership with TechnoServe to address the unique risks that smallholder farmers face in adopting high-quality agricultural inputs – including suboptimal production practices and lack of access to reliable markets – under the Mavuno Zaidi project in Kenya. Syngenta piloted the model in partnership with TechnoServe with roughly 2,400 smallholder potato and tomato farmers from 2014 to 2015, and by 2016 had rolled it out to over 25,500 farmers. ICL Fertilizers Ltd., Sanergy and the Ford Foundation provided co-funding to support Mavuno Zaidi's expansion in 2016 through individual grants to TechnoServe for its work training farmers and strengthening their access to markets. This report considers the project's evolution over several seasons, focusing on Syngenta's specific opportunity in Africa, the model designed to capture this opportunity in Kenya and takeaways for consideration by other industry actors.

**Under its Good Growth Plan, Syngenta aims to empower 20 million smallholder farmers to sustainably increase productivity by 50 percent as part of its broader commitment of supporting farmers to meet the challenge of feeding a rising population.**

Syngenta recognizes the critical nature of catalyzing productivity improvements among smallholder farmers, given that they represent the majority of the world's farmers – an estimated 2.5 billion people managing 500 million households that rely on agriculture for their livelihoods.<sup>5</sup> The company therefore aims to provide tools and training that enable smallholders to improve their productivity and incomes.<sup>6</sup> In 2014, Syngenta estimated that it had indirectly reached 13.8 million smallholders through its product sales, and by 2015 it had extended this reach to 17.2 million.<sup>7</sup>



*The use of high-quality inputs in conjunction with best agronomic practices led to a 48 percent increase in income for participating potato farmers.*

4. <http://www4.syngenta.com>

5. IFAD

6. <http://www4.syngenta.com/what-we-do/the-good-growth-plan>

7. Syngenta: The Good Growth Plan 2015 Progress Report.

# OPPORTUNITY

## GROW AFRICAN MARKET DEMAND WHILE IMPROVING SMALLHOLDER LIVELIHOODS

**In 2012, Syngenta announced its goal of building a \$1 billion business in Africa over the subsequent 10 years.** As a company focused on seeds and crop protection solutions for eight crops<sup>8</sup> comprising the majority of global food production, Syngenta views Africa as a strategic region for the company's future growth. Through expansion of its Africa business, Syngenta aims to support the continent's agricultural transformation by helping to sustainably increase productivity, thereby improving food security and reducing poverty.<sup>9</sup> Over this 10-year period, the company has set out to reach more than 5 million farmers across the continent, enabling them to achieve a minimum 50 percent increase in productivity without relying on additional land and inputs, such as water or chemicals. The company has committed to investing \$500 million in Africa – in collaboration with local partners – to support this goal.<sup>10</sup>

**Syngenta recognized that building a \$1 billion business in Africa and securing long-term, sustainable demand for its products would require outreach to smallholder farmers through a new business model.**

Syngenta's Africa business had historically targeted larger-scale, commercial farmers. However, meeting its new growth targets and commitments required adapting this African business model to reach smallholder farmers, who manage 80 percent of farmland in sub-Saharan Africa and produce the majority of the continent's food supply.<sup>11</sup> Smallholder farmers typically cultivate multiple crops on fewer than 2 hectares of land, often facing high financial risks with low returns.<sup>12</sup> Unlike large commercial farmers, smallholder farmers lack access to external financing and means of risk mitigation, such as crop insurance, irrigation, storage, mechanization and direct contracts with large volume buyers.

**Access to and use of improved agricultural inputs has tremendous potential to improve the viability of smallholder livelihoods.** The Food and Agriculture Organization (FAO) estimates that the productivity levels of major crops across sub-Saharan Africa are 76 percent below their practical potential.<sup>13</sup> Optimization of inputs and management – including improved seed and crop protection – can enable farmers to close this yield gap and raise quality levels, leading to higher incomes and greater livelihood resilience. Improved seed and crop protection can also help smallholder farmers withstand climate-related issues, such as drought, flooding, and increased incidence of pest and disease outbreak.

**However, smallholder farmers in many parts of Africa are reluctant to adopt high-quality inputs.**

Smallholder farmers face physical, financial and psychological barriers to accessing improved inputs, as well as risks to recouping their investment driven by factors often outside of their control. A summary of these barriers and risks is included in *Exhibit 1*.



*Gladys, a TechnoServe farmer trainer, demonstrates best agronomic practices.*

8. Syngenta focuses on improved seeds and crop protection solutions for eight major crops: cereals, corn, diverse field crops, rice, soybean, specialty crops, sugar cane and vegetables.

9. "Syngenta to expand presence in Africa: contributing to the transformation of agriculture." PR Newswire, May 18, 2012.

10. Syngenta 2014 Annual Report.

11. "Smallholders and Family Farmers." UN FAO fact sheet, 2012.

12. <http://www4.syngenta.com/what-we-do/the-good-growth-plan/empower-smallholders>

13. *The State of Food and Agriculture: Innovation in Family Farming*. UN FAO, 2014.

Exhibit 1: Barriers and risks to smallholder adoption of high-quality inputs

	Factor	Description
<b>BARRIERS</b> Various factors create physical, psychological and financial barriers to smallholder access to high-quality inputs.	Lack of trust	The prevalence of poor-quality and counterfeit agricultural inputs in markets like Kenya has caused skepticism of improved inputs among many smallholder farmers.
	Low perceived value	Smallholders often lack an understanding or full appreciation of the benefits of high-quality inputs, which is reinforced by the common practice of using (free) seeds from a previous harvest despite their significantly lower productivity.
	Lack of access to cash or financing	Smallholders often lack cash at the beginning of the season when most inputs are purchased, particularly when there are competing household investment needs – for example, crop planting and school fees may be due at the same time of year – and have difficulty accessing affordable means of financing inputs in the face of cash flow constraints and risk perceptions.
	Poor rural infrastructure	Poor roads, electricity and communications infrastructure in many rural areas across Africa limit smallholders' physical access to high-quality inputs from established brands, as well as their access to markets to sell any crop surpluses beyond household consumption requirements.
<b>RISKS</b> Various factors put smallholders at risk of failing on their investment in high-quality inputs.	Crop price volatility	Like most farmers, smallholders operate at the whim of market demand and supply forces, which can create dramatic price volatility. Smallholders also lack the means to mitigate price volatility risks, such as facilities to store crops during peak supply, or forward contracts with buyers guaranteeing a minimum price.
	Climate variability	Increasingly volatile rainfall and temperature patterns, unusual pest and disease outbreaks, and shifting crop suitability – combined with lack of access to irrigation or crop insurance and limited knowledge of how to address these challenges – puts smallholders at a growing risk of losing part or all of their harvest along with any corresponding investment they may have made in high-quality inputs.
	Limited knowledge of best practices	Lack of knowledge around the proper and effective use of high-quality inputs limits smallholders' ability to realize their full potential for yield and quality improvement.
	Soil and land degradation	Smallholder farmers often work on land suffering from erosion or poor soil quality, limiting potential yield and quality improvements from improved seed or crop protection without complimentary processes to replenish soil quality.

# CAPTURING THE OPPORTUNITY

## IMPROVING ACCESS WHILE MITIGATING FARMER RISK

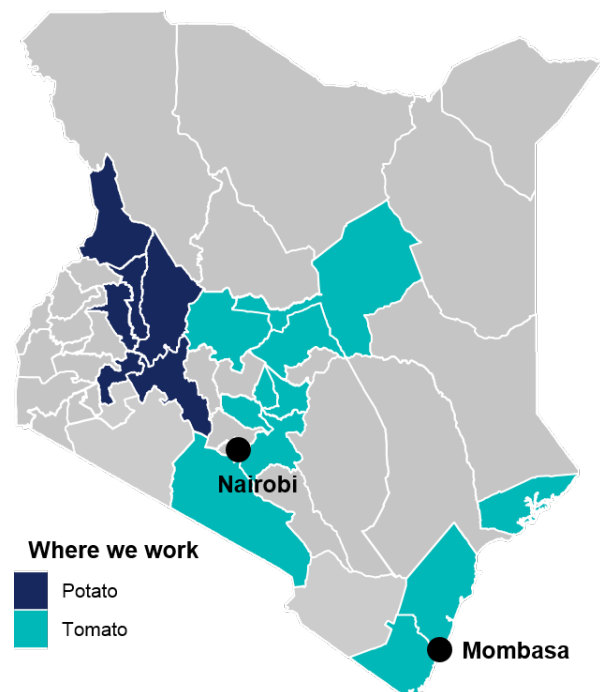
**Syngenta sought to address the unique risks and barriers that African smallholder farmers face in adopting high-quality agricultural inputs.** Syngenta decided to develop and pilot a model for overcoming these challenges in Kenya, where it already had a sizeable sales operation. It also opted to focus on high-quality inputs for tomato and potato, two crops with strong local demand that was projected to grow due to several factors, including: increasing incomes, rapid urbanization, rise of tourism and subsequent growth of processing industries.<sup>14</sup> Syngenta commissioned TechnoServe to conduct an initial market assessment highlighting that smallholder yields and incomes can be improved through a model that:

1. Proves the value of high-quality inputs and overcomes smallholder farmer mistrust;
2. Equips smallholder farmers to realize a compelling return on their investment (ROI) in high-quality inputs, including the mitigation of farmer income risks;
3. Addresses financial barriers to smallholder farmers' access to high-quality inputs.

**Syngenta needed to physically demonstrate the business case for smallholder investment in order to build farmer trust, showcasing how high-quality inputs could help farmers optimize their yields and incomes.** To prove the value proposition of high-quality inputs to smallholder farmers, Syngenta worked with TechnoServe to set up over 30 tomato and 30 potato demonstration plots throughout several regions in Kenya (see *Exhibit 2*), on which Lead Farmers apply high-quality seed, fertilizer and crop protection, and carry out best agronomic practices. These plots produce visibly greater volumes of each crop, as well as desirable quality traits, such as size and color. The results provide a visually compelling case for surrounding smallholder

farmers who are considering investing in improved inputs and implementing best agronomic practices. Syngenta also hosts regular field days across these regions, showcasing its products and inviting farmers who have invested in and used Syngenta and other high-quality inputs to speak to their peers about the benefits they have experienced.

**Exhibit 2: Counties in Kenya where the model has been rolled out**



Tomato	Potato
Embu	Baringo
Isiolo	Bomet
Kajiado	Elgeyo-Marakwet
Kilifi	Kericho
Kirinyaga	Nakuru
Kwale	Pokot
Lamu	Uasin Gishu
Laikipia	
Machakos	
Meru	
Murang'a	
Tharaka Nithi	

14. TechnoServe Kenya Tomato and Potato Market Assessment, 2014.

**Syngenta also needed to equip farmers with an understanding of best agronomic practices to help them secure a strong return on investment in improved inputs.** Syngenta worked with TechnoServe to design and deploy a training curriculum for over 25,500 farmers – more than 30 percent of which are women – in key tomato and potato cultivation areas to promote best agronomic practices for improving yields and quality levels. Farmers in the program receive seven to eight hands-on training modules during the first season. These modules are deployed by trainers living and working in the farmers’ communities. Training topics include: land preparation and planting; crop nutrition; pest and disease identification; crop protection and agrochemical use; sorting; grading; harvest and post-harvest handling; and other topics specific to the crop, such as nursery establishment for tomatoes. Community trainers then reinforce messages through visits to individual farms. During group training sessions and individual farm visits, trainers spend significant time explaining the benefits of high-quality inputs and how to use them correctly. After the first season, farmer adoption is assessed and refresher sessions are provided on the weakest areas with the highest potential for impact on farmer yields and incomes. Syngenta and TechnoServe are also assessing opportunities to integrate e-learning and SMS reminders into the model, particularly in order to aid farmers in responding to emergencies such as pest and disease outbreaks.

**Farmer ROI needed to be further secured by supporting smallholders’ improved access to output markets, thus mitigating risks to farmer income.** Smallholder tomato and potato productivity was expected to rise significantly as a result of the adoption of high-quality inputs in conjunction with improved agronomic practices. Syngenta therefore sought to ensure the viability of smallholder incomes in the face of increased market supply. Syngenta and TechnoServe collaborated to design and implement a two-fold approach to improving market access for smallholders in the program:

Supporting farmer business organizations (FBOs) to set up and manage aggregation stores, including potato cold storage facilities;

Facilitating direct contracts between FBOs and commercial buyers.

Aggregation stores enable FBOs to purchase from farmers at a guaranteed price and increase the efficiency of the value chain. Where collection volumes are high, aggregation stores are permanent physical buildings that house and collect crops on a daily basis. High-volume potato aggregation stores are also equipped with low-cost cold storage technology built with locally available materials: a hut with a basic drip water system that passes through charcoal lined walls, requiring only access to a water source and diesel pump. In lower volume areas, aggregation stores are pop-up collection centers established in central locations with minimal infrastructure and specified weekly pickup times. TechnoServe facilitates direct contracts between FBOs and anchor buyers by holding buyer forums. During these forums, high-volume tomato and potato buyers – for example large fresh market traders, hospitality and government institutions, supermarkets, and large processor – learn about FBO production expectations and make volume purchase commitments. To date, six major processors and numerous large volume fresh market traders have been engaged. While processors require specific varieties and sizes that can be difficult for aggregation stores to fulfill, large volume fresh market traders have been more willing and able to contract with FBOs.



*Cold storage facilities, such as this one in Kapyego, Kenya allow farmer business organizations to purchase from smallholder farmers at a guaranteed price.*

**Finally, Syngenta needed to overcome farmer capital constraints by facilitating access to finance for inputs.** Syngenta worked with TechnoServe to develop a network of 13 financial partners in Kenya, including Equity Bank, Umati Capital, Chase Bank and Cooperative Bank. To date, 500 farmers have accessed an average of \$37,500 in aggregate credit in each of the four seasons. This represents a small fraction of total farmers in the program, as the financial institutions' high interest rates and stringent collateral requirements – stemming from limited familiarity and experience serving smallholder farmers – have deterred additional farmers from taking on credit, even when provided with the opportunity.

Strengthening the access to finance component of the model is a top priority for Syngenta, which is exploring the potential of less traditional options, such as commitment-based mobile savings products, as alternatives to credit.

**Rollout of the model has resulted in significant farmer yield and income improvements.** Across the four seasons to date, participating potato farmers averaged a 38 percent increase in yield and a 48 percent increase in income (48 and 39 percentage points higher than control group averages). Participating tomato farmers averaged a 185 percent increase in yield and 181 percent increase in income

Exhibit 3: Change in crop yields and incomes for participating farmers versus control groups



Source: TechnoServe analysis of Syngenta project data

(106 and 138 percentage points above control group averages).<sup>15</sup> Exhibit 3 shows specific season-by-season changes in crop yield and income from baseline to season's end for participating and control group farmers.

**The model has also driven increased use of high-quality agricultural inputs among participating smallholder farmers.** Annual investment in high-quality agricultural inputs – inclusive of fertilizer as well as both Syngenta and non-Syngenta seed and crop protection products – across the four seasons to date increased between 40 and 300 percent among potato farmers, and between 60 and 180 percent among tomato farmers.<sup>16</sup> The share of potato growers in the program specifically using Syngenta crop protection also increased significant-

ly. Finally, 100 percent of tomato growers in the program tried Syngenta's Kilele tomato seed, and many have adopted this high-yielding hybrid variety in lieu of the low-yielding seeds they historically used.

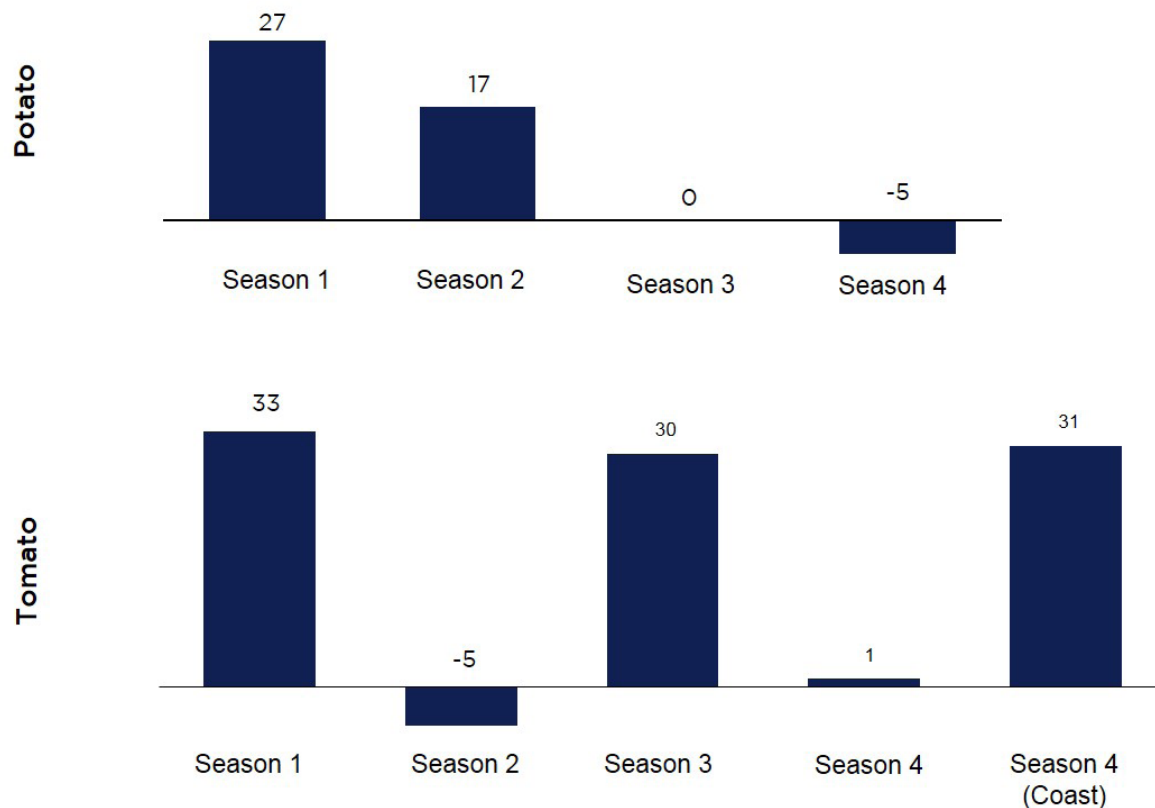
**Treatment farmers have also secured higher prices than control farmers in some seasons.** Crop sales data shows participating potato and tomato farmers securing prices as high as 27 and 33 percent higher than control group farmers, respectively. However, higher crop price is not a consistent outcome across all seasons, as shown in Exhibit 4. This reflects the complex and challenging nature of market access dynamics in smallholder agriculture. Even when farmers are supported to aggregate their product and sell directly to large buyers, it is difficult to fully protect them from price volatility.

Exhibit 4: Difference in price secured by treatment versus control farmers at end of season

### Crop Price Premium for Treatment Group Farmers

(Kenyan shillings/kilogram)

*% difference in season end crop sales price, treatment group over control group*



Source: TechnoServe analysis of Syngenta project data

# KEY TAKEAWAYS

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**Effectively reaching vulnerable populations such as smallholder farmers necessitates business models that address the challenges of the broader eco-system and the unique risks faced by that target population.** Syngenta set out to reach smallholder farmers with improved seed and crop protection as part of its plan to build a \$1 billion business in Africa. However, the company recognized that its traditional sales model would have to be adapted to effectively reach smallholder farmers in Africa. Specifically, they had to address smallholders' lack of trust, barriers to access, limited understanding of high-quality inputs and the resulting inability to realize high-quality inputs' value proposition. For Syngenta, this meant physically proving the value of high-quality inputs through demonstration plots across its rural sales areas; actively facilitating the reduction of smallholders' investment risk by working with TechnoServe to provide them with agronomic training and support in securing markets for their crop (including accessing appropriate storage facilities to avoid selling when market supply is at its peak); and reducing financial barriers to accessing inputs by facilitating farmer access to credit.

**Business models designed to reach smallholder farmers can eventually transition to lower cost, ongoing delivery models. However, enabling the necessary initial customer transformation for this transition is prohibitively expensive for any single market actor to bear at scale.** Getting smallholders to a point at which they are sustainably reaching their productivity potential requires significant initial investment in farmer training, strengthening farmer access to markets, and improving the broader enabling environment. As more multinational com-

panies seek to reach low-income, rural populations in sub-Saharan Africa with high-impact products and services, there are increasingly clear needs and opportunities to reduce the investment cost of the initial customer transformation stage. This can be accomplished through innovative partnerships with a broad array of organizations, including other companies as well as donors and government actors. In Kenya, Syngenta has begun to test this approach through its current partnerships with ICL and Sanergy, two organizations focused on fertilizer that invested in the model to increase their own product reach. This has reduced the model cost for each partner while enabling farmers to access a more complete package of inputs. Co-investing with crop buyers is another way in which model delivery costs can be reduced during the initial transformation stage, particularly given the strong business case for buyers in sub-Saharan Africa to invest in improving the consistency and quality of smallholder crops. While Syngenta has made a costly initial, multi-year investment, scaling the model ultimately requires additional donor and private sector partners.

**Access to finance is difficult to solve in high-value cash crops such as tomato and potato, but it is often critical to enabling smallholder farmers to maximize productivity.** In the next phase of model evolution, Syngenta is focusing on solving the access to finance component by developing best practice models for enabling input finance in open market value chains. Syngenta is seeking banks, investors and donors to join the company as it works to develop and implement models that will enable many smallholder farmers to access finance for the first time.