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# SCALING IMPACT: ZAMBIA PROFIT CASE STUDY

**LEO**

Leveraging Economic  
Opportunities

REPORT NO. 24



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## **DISCLAIMER**

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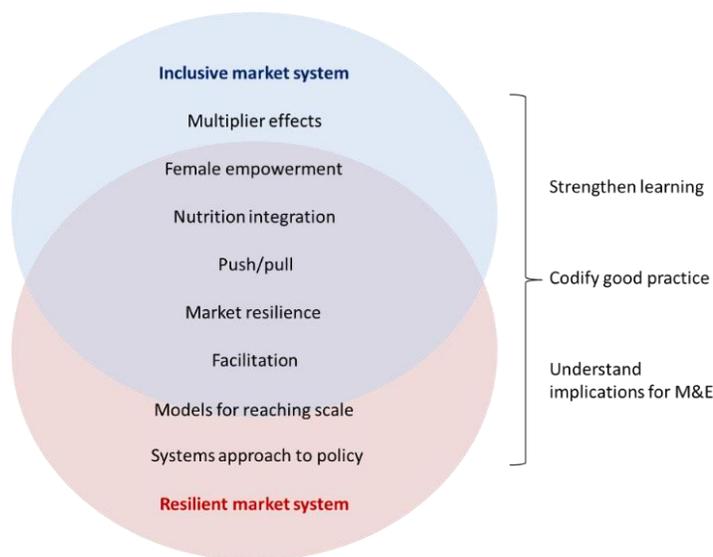
# ACRONYMS

CFU	Conservation Farming Unit
CLUSA	Cooperative League of the USA
EMG	Emerging Markets Group
FISP	Farmer Income Support Program
FSP	Fertilizer Support Program
iDE	International Development Enterprises
LEO	Leveraging Economic Opportunities
PROFIT	Production, Finance, and Improved Technology
SME	Small and Medium Enterprises
USAID	United States Agency for International Development
ZMW	Zambian Kwacha

# I. INTRODUCTION

The goal of the Leveraging Economic Opportunities (LEO) activity<sup>1</sup> is to increase the capacity of USAID staff and its development partners to use evidence-based good practices to: (i) design new projects and activities that promote inclusive market development, (ii) effectively manage their implementation, and (iii) evaluate their results. LEO pursues an ambitious learning agenda that explores a number of interrelated research topics, as shown in figure 1. One of these research streams focuses on models for reaching scale. Many smallholder farmers face multiple barriers to accessing input and output markets, including isolated location, small farm size, inadequate financial assets and services, and limited market and agricultural skills. LEO is researching a diversity of models that implementing agencies are using to solve the issue of linking smallholders, including the very poor, to input and output markets. The research focuses on the principles and conditions that made these models effective.

Figure 1. LEO Research Topics



Since 2013, LEO has conducted research into projects<sup>2</sup> that have addressed these issues through a market systems facilitation approach (see textbox 1). In Phase 1 of this research, LEO conducted two desk-based reviews of 50 projects, with a more detailed study of 9 past and current projects. The results were summarized in two papers (Fowler & White, 2015a and b). Phase II of this research includes field-based case studies focused on expanding the learning of two priority cases from Phase I. This is the final report from the first of those research projects, assessing the legacy of the input supply sector development activities of the USAID/Zambia Production, Finance, and Improved Technology (PROFIT) project.

## TEXTBOX 1: KEY DEFINITIONS

**Market system:** A dynamic space—incorporating resources, roles, relationships, rules and results—in which private and public actors collaborate, coordinate and compete for the production, distribution and consumption of goods and services.

**Market systems development:** An approach that uses the facilitation of private and public actors to support the emergence of competitive, inclusive and resilient market systems.

For more information on market systems development, see Campbell (2014).

The objective of PROFIT’s agro-input activities, outlined in further detail in the next section, was to improve smallholder livelihoods through increasing input supplier focus on and competition for them as viable customers. This case study analyzes the extent to which dynamics between input suppliers and smallholders have

<sup>1</sup> For more on the LEO program, see <http://acdivoca.org/leo>

<sup>2</sup> Throughout this document, “project” is used in a generic sense, rather than USAID’s specific definition of the word.

changed, including: the extent to which input suppliers' focus on smallholders as a viable market has persisted, reversed, or evolved, and what this means for smallholders; what external economic and policy factors supported or hindered smallholder input market growth; and what lessons policymakers and practitioners can draw from the evolution of the Zambian input supply sector over the past ten years.

The study found that smallholders are a continued and growing target market for interviewed input suppliers. A majority of input suppliers attributed their original investment and focus on smallholders to the enduring lessons, mentalities, and models learned through PROFIT. Input suppliers across the board are competing aggressively for a share of the smallholder market, and continue innovating ways to expand their geographic reach. PROFIT's facilitation approach (see textbox 2) allowed for significant flexibility in adapting implementation approaches over time, and ensured that all increases in smallholder market access were sustainably embedded in the value chain itself. While there is evidence that the market has expanded to include relatively poorer farmers over time, the extent to which these expansions have benefited women, youth, and extremely poor farmers is less clear.

#### **TEXT BOX 2: FACILITATION APPROACH**

A facilitation approach to project implementation aims to intervene in such a way that stimulates changes in value chains or market systems, while avoiding taking a direct role in the system. For example, facilitators may encourage private sector companies to supply inputs to target beneficiaries, rather than providing those inputs directly. Facilitation projects build the capacity of existing actors and institutions, and the relationships among them, to strengthen their ability to respond and adapt to changes in market trends or in the enabling environment without project support—thus enabling sustainable growth in the value chain.

For more information on facilitation, see ACIDI/VOCA (2012).

Section two of this document summarizes the PROFIT project's objectives, theory of change, and causal model for the retail input supply sector. Section three presents the field research methodology, including limitations. Section four presents the broader economic and social context in which the project operated, including longer-term trends to which the project was responding and/or from which it was benefiting. Section five presents the major findings from the field research. Finally, section six presents overarching conclusions.

## II. PROFIT BACKGROUND AND THEORY OF CHANGE

The USAID/Zambia-funded PROFIT project was a \$15 million, five-year (2005–2010) project implemented by Cooperative League of the USA (CLUSA), International Development Enterprises (iDE), and Emerging Markets Group (EMG). The project had three goals (Snodgrass & Woller, 2006):

- Improve the competitiveness of selected industries in which large numbers of small and medium enterprises (SMEs) participate and might benefit.
- Foster the sustainability of competitiveness to enable firms and industries to respond to market demands, both in the short and long run.
- Increase the breadth and depth of benefits at the industry, SME, and household levels.

The project's target value chains evolved over time, but the project ultimately focused most efforts on three value chains: cotton, livestock, and retail agro-input supply. Limited access to high-quality agro-inputs at competitive prices was an overarching constraint for all value chains (PROFIT Project, 2005). Over the first several months of the project, PROFIT began work in target communities in Southern Province, and reached out to the wholesale and retail input supply sector. The project identified two primary systemic drivers of low levels of smallholder agro-input adoption: first, smallholders were averse to engaging commercially with companies and individuals outside of their social network, and second, the agro-input supply sector mostly did not view smallholders as a viable market. Their focus instead was on larger-scale commercial growers.<sup>3</sup>

Both barriers were significant because they were primarily social, not economic, in nature: the input suppliers' marketing strategy was based on personal relationships with a handful of larger growers, with most buyers carrying in-store accounts on credit. Shifting into the smallholder market segment would require developing a "mass market" approach to retail sales with which most input suppliers were unfamiliar.<sup>4</sup> Similarly, even where farmers understood the agronomic and economic advantages of using improved inputs, they were highly distrustful that products sold to them would be genuine, unless they bought from someone they knew and trusted (Krivoshlykova & Sebstad, 2009).

In this context the PROFIT project envisioned systemic change from two attitudinal shifts: on the part of input suppliers, encouraging them to see smallholders as a viable mass market worthy of increased quality assurance and customer orientation; and on the part of smallholders, encouraging them to see input suppliers as vendors of legitimate goods who could be trusted to deliver on quality (ibid). Thus PROFIT attempted to leverage relatively strong social capital at the village level to overcome distrust through deploying several models focused on tying retail input suppliers to individuals with social capital and trust within the existing community. The project worked with several agrodealers on a variety of models focused on this objective, including buyer clubs, agrodealer franchises, and most prominently village-level sales agents. The sales agents model focused on developing agents, nominated by the communities themselves, as input suppliers at the village level who promoted improved seed and other inputs to their neighbors, bulked orders, and coordinated logistics for delivery. These sales agents were primarily paid on commission.

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<sup>3</sup> Skype interview with Michael Field, April 23, 2015.

<sup>4</sup> Ibid.

The project's causal model for retail input distribution is below in table 1.

**Table 1. Causal Model for Retail Input Distribution**

<b>PROFIT PROJECT CAUSAL CHAIN: RETAIL INPUT DISTRIBUTION<sup>5</sup></b>			
<b>ACTIVITIES (Facilitation)</b>	<b>OUTPUTS (Service Delivery)</b>	<b>OUTCOMES</b>	<b>IMPACTS</b>
<p>Expansion model development using:</p> <ul style="list-style-type: none"> <li>• Wholly owned stores</li> <li>• Agent network</li> <li>• Modified franchises (corner of store)</li> <li>• Buyer clubs</li> </ul> <p>Create incentives to market inputs (according to model)</p> <p>Work with agents &amp; retailers on market research</p> <p>Work with larger retailers to ensure right input packaging and combinations are being distributed and right inventories kept</p> <p>Facilitate transparent contracts between wholesalers and retailers/ franchises (clear responsibilities regarding payments &amp; dispute resolution)</p> <p>Work with Farmers' Union on dispute resolution</p> <p>Work on marketing programs of retailers &amp; agents</p> <p>Facilitate agents' access to training (or provide directly in some cases)</p> <p>Promote dealer networking (horizontal linkage); may help dealers access financial services</p> <p>Work with seed, chemical, etc. producers &amp; pushing them into the distribution network</p> <p>Facilitate outgrower schemes for seeds</p> <p>Add layers of services into input supply chains (e.g., sprayers linked to input providers)</p> <p>Promote outgrower schemes for non-traditional crops</p>	<p># of retailers signing Memorandum of Understanding</p> <p># of agents, franchise stores, wholly owned new stores &amp; buyer clubs</p> <p>Incentive scheme in place</p> <p>Agreements signed between retailers &amp; agents</p> <p>Marketing/inventory plans completed</p> <p>Market research conducted</p> <p>New dispute resolution mechanism in place</p> <p># of dealers in networks</p> <p>Linkages to wholesalers/ large producers established</p> <p># of outgrowers</p>	<p>Increased sales at wholesale &amp; retail levels:</p> <ul style="list-style-type: none"> <li>• Among clients</li> <li>• In the sector</li> </ul> <p># of farmers accessing retail services</p> <p>Marketing activity launched by retailers</p> <p># of retail outlets</p> <p>Decreased cost/unit of inventory</p> <p>Increased access to finance from seed companies &amp;/or banks</p> <p>Smooth functioning of dispute resolution process</p> <p>Increased knowledge about business &amp; markets</p> <p>Increased used of inputs on farms</p> <p>Increased production of inputs (seed, chemicals)</p> <p>Reduced cost of inputs</p> <p>Reduced transportation cost for farmers</p>	<p>Market/regional level</p> <ul style="list-style-type: none"> <li>• Increased farm productivity (multiple crops)</li> <li>• Increased farm income</li> </ul> <p>Firm level</p> <ul style="list-style-type: none"> <li>• Increased farm yields &amp; production</li> </ul> <p>Increased farmer income</p> <p>Household level</p> <ul style="list-style-type: none"> <li>• Improved household welfare</li> </ul>

<sup>5</sup> Adapted from Snodgrass & Woller (2006).

# III. RESEARCH METHODOLOGY

The research team began key informant interviews in late April, 2015, and conducted field research in Lusaka and Southern Province, Zambia from May 1-31, 2015.

The available contacts who had previously worked on the project provided the research team with the list of all 14 companies that had implemented the sales agent model. Each of the companies employed a cadre of sales agents (at the time of the impact assessment in August 2010, there were 600 agents total employed by all 14 firms). Each of these sales agents maintained a customer base (100,000 farmers total according to the impact assessment), bulking purchase orders and coordinating pickup or delivery from a retail location.

Research focused on interviewing actors within the value chain at each of these three levels: the input supply firm, the former and current sales agents, and the end customer.

The farmer survey utilized a modified snowball sampling methodology that followed transactions to capture the experience of the model at all three levels. The 14 input supplier firms interviewed were asked for a list of and contact information for (where still available) their past or current sales agents. In turn, these agents were asked for a list of their current or past customers. The final round of interviews was with a non-random volunteer sample of these customers. The initial targets for informants, and actual numbers achieved, are listed below in table 2.

**Table 2. Targets for Informants and Actual Achieved**

VALUE CHAIN POINT	TARGET	ACTUAL	NOTE
Input Supplier Firm	14	7	Three have gone out of business; two have merged; and an additional three did not respond to requests for interview or declined to participate in the study.
Agents	28	16	The target was based on interviewing at least two agents for each input supply firm interviewed.
End-customers	56	50	

## LIMITATIONS

**Non-representative sampling:** Due to budget and time constraints, field research could not include a large-scale randomized sample of end beneficiary farmers in target communities. The snowball method captured the characteristics of smallholders purchasing inputs through the channel, what inputs they are purchasing, and whether they are purchasing through marketing channels originating in the PROFIT models. Additionally, this did provide a sample to compare to other, representative data sets on smallholders to see how farmers utilizing village-based input supply channels may differ from the population as a whole.

**Unable to prove causality:** This methodology also did not enable definitive causal attribution to the PROFIT project of any current input supplier activities, beyond what companies self-reported. As the next two sections explain, several long-term trends seem to also be driving factors in the growth of the smallholder input market, which began before the PROFIT project and continued after it ended.

**Staff changes/company closures:** In the five years since the impact evaluation was conducted, several of the input suppliers identified as implementers of the PROFIT model have closed, and staff who had worked with PROFIT at other suppliers had left. This has skewed, undoubtedly, the perception of the PROFIT models sustainability since only companies still successful were available for interview.

# IV. PROJECT CONTEXT AND ITS EVOLUTION

Zambian smallholder adoption of improved maize seed varieties (the primary food security crop) and associated inputs, has gone through three directional trend shifts over the past 50 years. First, adoption of improved maize seed varieties began in the 1960s, and climbed steadily through the mid-1980s, propelled by a state-led production subsidy and marketing scheme common to the regional food production regime at the time. Second, after the state-led subsidy scheme was dismantled during structural-adjustment in the early 1990s, smallholder adoption rates began a nearly-decade long decline. Third, beginning in 2002, adoption rates began climbing again, largely under the framework of the Zambian government’s Farmer Income Support Program (FISP).<sup>6</sup> As of 2011, nation-wide adoption rates for F1 hybrid maize stood at 68 percent, and adoption rates for all improved varieties stood at over 88 percent (Smale et al, 2013).

Below is a series of snapshots from project and secondary sources, which shows a consistent trend towards increased smallholder adoption of improved inputs nationwide over the past ten years.

**Table 3. Smallholder adoption of improved inputs nationwide over the past ten years**

SECTOR	2005	2010	2015
Smallholder	<p>PROFIT baseline showed annual outlays of 667,000 ZMW on fertilizer by active project members; non-active members have annual outlays of 836,000 ZMW. (DAI, 2010)</p> <p>25% of smallholders nationwide are using synthetic fertilizer. (Sitko, et al, 2011)</p>	<p>Seed adoption: “68% of interviewed smallholders were growing F1 hybrid maize seed that they could name” (Smale &amp; Birol, 2013); less than 60% of smallholders nationwide have adopted hybrid seed, though the number is growing. (Sitko, et al, 2011)</p> <p>Active project members have annual outlays of 1,242,000 ZMW (86.4% increase), compared to 1,519,000zmw annually</p>	<p>Majorities of input suppliers (86%), agents (80%), and farmers (68%) indicate that smallholders are purchasing more inputs than they had five years ago.</p>

<sup>6</sup> FISP is the Ministry of Agriculture and Livestock's fertilizer subsidy scheme. Its objective is to increase smallholder adoption of synthetic fertilizer. The program began in the 2002/2003 season, and as of 2013 involved the distribution of 183,000MT of fertilizer, nearly half of the total fertilizer market that year. For further analysis of the FISP's policy efficacy and challenges, see Mofya-Mukuka et al, 2013, and Mason et al, 2013.

		<p>in non-active members (a 77.4% increase). (DAI, 2010)</p> <p>40% of smallholders nationwide are using synthetic fertilizer. (Sitko, et al, 2011)</p>	
Commercial (see Key Findings section below)	Commercial farming sector growth begins to slow after years of realignment after liberalization.	Commercial sector stabilizes its input supply chain, and input sale growth abates in the face of volatile international prices for commercial commodities.	Commercial sector remains flat.
Government/NGO	Government expands Cotton Outgrower Credit Fund aimed at smallholders.	65% of interviewed farmers received a maize and/or fertilizer subsidy through the Farmer Income Support Program.	New iteration of FISP (2012/13—onwards): distributes inputs through agrodealers instead of centralized distribution, strengthening agrodealer/farmer linkages instead of displacing them.

# V. KEY FINDINGS

## ENDURANCE OF PROFIT'S MODEL AND OUTCOMES

In the most basic sense, the smallholder-focused agent model piloted and scaled by the PROFIT project has proven durable. Seventy percent<sup>7</sup> of interviewed input suppliers are still implementing some version of rural agents, though the lines between rural agents and stockists/agrodealers have become blurred in many cases, with some agents graduating to independent businesses. More importantly, though, input suppliers are very clearly targeting smallholder farmers as a viable market—the key attitudinal shift that PROFIT wished to trigger. As explained by Mike Field, one of the key technical architects of the PROFIT approach, the agent model was itself only one of many mechanisms through which the project attempted to jumpstart more organic innovation on the part of input suppliers in terms of expanding outreach and marketing to smallholders.

All firms interviewed stated they are targeting the smallholder market, and 57 percent of firms interviewed stated that smallholders have grown as a percentage of their overall input supply market. Smallholder share of their total market ranged from 30 to 85 percent. The case study identified five drivers of this expansion in focus on smallholders. Three were/are driven by phenomena external to the PROFIT project, and two are directly attributable to the project's activities, as explained below

## DRIVERS EXTERNAL TO THE PROFIT PROJECT

### 1. Slowdown in large-scale commercial sector growth

Several input supply firms noted that large-scale commercial farming sector growth has slowed over the past 10 years. Interviewees offered the following explanation:<sup>8</sup> the large-scale commercial sector is more heavily linked to export markets, in which prices are determined by international commodity markets. According to respondents, over the past several years, global market volatility and price fluctuations have adversely affected the domestic large commercial farm sector. As one respondent put it, “[the large-scale commercial farm] market is totally dependent on commodity prices, but [smallholders] need to eat.” Additionally, other suppliers noted that there was a large disruption and expansion in the commercial farming sector after liberalization in the 1990s, and then again under the Fertilizer Support Program (FSP) framework in the early 2000s, which translated into new sourcing agreements and space for input suppliers to supply this growing market. From 2007/8 onwards, large-scale, estate commercial growers have largely stabilized and settled into proven sourcing relationships for inputs, shrinking the pool of potential ‘new’ customers at the commercial level for any single supplier. In this context, the best area for input suppliers to grow their markets was at the ‘emergent’

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<sup>7</sup> This was of the firms interviewed—if we include the four firms that closed in the total, only 45% of the PROFIT partner firms are still implementing. There was no real pattern to reasons why firms closed—one closed because the owner decided to go into politics, and stopped investing in the business; in another case, the owner died; in a third, one former employee cited general mismanagement.

<sup>8</sup> It should be noted however that very little data is publicly available on the large-scale commercial farming sector in Zambia: most research is focused at the smallholder level. Thus these explanations of stagnation in commercial farming sales could not be corroborated with other data sources.

subset of smallholder farmers—farmers who have fully commercialized, producing on at least 5 Ha of land but less than 10 Ha, and rely on hired labor for at least some tasks during the production season.

## **2. Regional market created economies of scale**

Regional market changes, in particular the decline in the Zimbabwean agricultural sector have increased demand for seed regionally. Most of the international companies interviewed were using Zambia, because of its diversity in production climates, as a major seed breeding location, and even as a source for seed to hybridize in regional markets, including Tanzania, Zimbabwe, Malawi, and Mozambique. Thus regional economic incentives have led to a strong seed sector to the benefit of local farmers. This has created economies of scale in seed production in Zambia, driving down the price point for suppliers.

## **3. Growth in smallholder adoption of improved seed and fertilizer through the government subsidy program**

57 percent of the agro-input companies interviewed argued that these subsidy programs were key gateways to demonstrating to farmers the potential of improved inputs, and were critical stepping stones to incentivizing further smallholder purchases. It should be noted however that several agro-input companies are direct beneficiaries of these subsidy programs, as they sell directly to FSP, so have a commercial interest in continuing the subsidy program. Independent research has questioned how equitable these programs really are, citing that there is a positive correlation at the village level between household wealth and receipt of input subsidies, suggesting that the program tends to benefit relatively better off farmers for non-food security reasons, including political patronage (Mason & Ricker-Gilbert, 2012) (Burke, Jayne, & Sitko, 2012).

# **DRIVERS THAT PROFIT AFFECTED**

## **4. Feelings that peer competitors are chasing the space**

Half of the input suppliers noted that they felt pressure to chase smallholders because they knew their competitors were doing so as well. One supplier said, “It is getting very difficult out there to compete because the number of input suppliers interested in smallholders has grown, but the pie is still the same size.” While all companies stated they had an interest in the smallholder market, all of them also concurred that this was driven primarily by a recognition that the commercial market was not growing (see above), some implying that if that market were still growing they most likely would have continued to ignore the smallholder market. While one input supplier was using the agent model prior to engaging with PROFIT, the project accelerated crowding in, leading to the current feeling of pressure to invest in smallholder marketing—86 percent of interviewed firms stated that PROFIT helped them recognize the value of the smallholder market.

## **5. Growth in smallholder adoption of herbicides**

Several firms argued that the first entry-point for many smallholders to agro-input purchases was herbicides, in particular glyphosate. This was due in part to the growth of glyphosate-dependent conservation farming as promoted by the Conservation Farming Unit (CFU), and in part because chemical herbicides freed up significant labor demands otherwise needed for weeding. The PROFIT project partnered with CFU to conduct conservation agriculture training and field days through the agent network. The smallholder market for glyphosate has expanded rapidly over the past 10 years. Smallholders implementing minimum tillage land preparation requiring glyphosate rose to 51,538 smallholder farmers in 2012 from 24,186 in 2008 (Ngoma,

Mulenga, & Jayne, 2014).<sup>9</sup> As one input supplier stated, most of their customers learned the benefits of agrochemicals, how to apply them effectively, and safe use, through the CFU, and have since come back to agents and nearby stockists for additional selective agrochemicals to solve pest and disease problems.

The input supplier models have evolved over time, though always with a focus on increasing market share of smallholders. Some companies are taking a strategic approach focused on continuing expansion into increasingly rural/disconnected areas to capture ‘greenfield’ market share. Other companies are focusing on consolidating their market share with smallholders in a smaller catchment area, but through outperforming competitors in terms of the services and support they offer.

Several input suppliers had adapted the agent model over time, notably in the graduation of agents to stockists. Several original agents developed their own shops, and, with financing and technical support from input suppliers, have shifted from a commission-based relationship, to holding and trading their own stock on margins. This is evidence of the growth in business acumen on the part of agents.

## ‘SMALLHOLDER’ ACCESS

The evidence on smallholder access was mixed. One issue that complicates the findings on smallholders is the growing mismatch between the government and input supply sector’s perception that the market is simply bisected into ‘smallholders’ and ‘commercial’ farmers, and the far more complex reality on the ground. As has been observed in other contexts (Wiggins, Argwings-Kodek, Leavy, & Poulton, 2011), increases in smallholder adoption of improved inputs and other forms of market integration often lead to increased class and economic differentiation amongst smallholders. ‘Emergent’ farmers, who are classified generally as transitioning out of small-scale production into increasing land sizes, increased utilization of commercial inputs, and emerge as an increasingly productive, profitable, and differentiated market-base relative to other smallholders. Comparing the profiles of the farmers identified and interviewed through the market channel snowball survey, and national average profiles, provides a useful comparison. The average landholding size under production of smallholders purchasing through agents is 4.7 Ha, compared to a Southern Province average of 3.8 Ha (Tembo & Sitko, 2013).

At the same time, the case study found three indicators that access to input markets for a broader demographic of smallholders has increased since 2005. First, 57 percent of firms responded that they have expanded geographically into more rural areas since 2005. This geographic expansion, while clearly ‘targeting’ those smallholders within the ‘emergent’ subset, nevertheless increases access for all producers within that catchment. And particularly given the disproportionately negative effects of distance on women farmer uptake of improved inputs, these geographic expansions can have acutely positive effects on women.

Second, the growth in smallholders as a percentage of the market has led to the proliferation of new product sizing and packaging targeted towards them. Several agrochemical companies have specifically scaled down herbicides and pesticides to 10 liter sprayer pack sizes, in order to cater to smallholders with less than 2 Ha in production, and to significantly reduce chemical storage risk to the farmer and her family.

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<sup>9</sup> It should be stated however that Ngoma et al raise questions about how durable this growth is. The 51,538 farmers in 2012 only represented 3.88 percent of the total smallholder population. The authors theorized that many farmers will adopt the no-till/low-till plus herbicide land preparation protocol when the inputs are provided freely or subsidized through CFU, and then discontinue adoption after input and service subsidies are withdrawn (2014).

Third, evidence suggests that there has been a virtuous cycle of increasing smallholder adoption of inputs driving an increasing focus on smallholders as a viable business segment. When the market was dominated by commercial producers, input suppliers had no incentive to reduce margins on small-scale sales. Annual revenue was largely determined by the margins resulting from one-on-one wholesale negotiations with commercial producers. At the point that input suppliers began competing for smallholders, pricing on small volume purchases became a key differentiator and marketing tool. This has resulted in lower prices for farmers. One agent for a major input supplier noted that “every year we have to be more and more proactive...offering discounts and promotions.” Additionally, several input suppliers and agents noted that smallholders are becoming more discerning customers, demanding seed varieties tailored to their agro-ecological zone, and more targeted fertilizer offerings. Several agents interviewed attributed this increasing discernment to greater exposure to sophisticated production practices through company marketing materials and extension services. Suppliers and agents are offering a wider range of smallholder-focused size and type of products than 10 years ago, including smaller packs for chemicals scaled to backpack sprayer size and increasingly differentiated marketing of early and late maturity seed varieties based on local agro-climatic conditions.

In terms of incomes, 73 percent of farmers interviewed responded that their incomes from farming activities have increased over the past 10 years, and 68 percent responded that their household incomes have increased over the same period overall. Farmer-level data showed no significant correlations between changes in income, source of income, or changes in input use. However, it does show a correlation between awareness of input benefits and increases in income. Additionally, two agents interviewed stated that they have seen the biggest income increases among smallholder customers arise through greater investment in improved inputs, and more precision in how to apply them.

## **FARMER-LEVEL RESILIENCE**

Aside from the general resilience effects of increased input adoption at the smallholder level, the only additional indicator of resilience measured was the extent to which smallholder crop production and income sources are diversifying (or not) over time. 70 percent of farmers interviewed stated that they are growing a wider range of crops now than five years ago, compared with 22 percent growing the same diversity, and only 8 percent growing a narrower range of crops. While farm production diversity can enable households to better withstand output market price shocks, it is equally important smallholders diversify income sources away from farming to provide better resilience to environmental shocks, as Irwin and Campbell (2015) have noted. On this metric, 73 percent of farmers interviewed noted that the number of different household income sources has increased, 22 percent stated it has stayed the same, and only 2 percent stated that it has decreased.

## **GENDER**

Female farmers are consistently underrepresented as smallholder clients. Women as a percentage of agent customers ranged from 1.5 percent to a high of 30 percent, with an average female customer representation of 16 percent. No input suppliers had a strategy to reach women specifically. Nonetheless, 44 percent of agents said the proportion of women has increased over time, 50 percent said the number has remained the same, and only one agent (6 percent) said that the number of women has decreased over time. One agent theorized that the increase is primarily due to male urban outmigration, leaving village and farming populations, and his customer base, as increasingly female.

The farmer level surveys showed no significant difference in improved input adoption rates between men and women, except for herbicides: 31 percent of female farmers surveyed stated they purchase and use herbicides,

compared to 56 percent of male farmers, with a P value of 0.017. Crop diversity was consistent between male and female farmers, except for tomato, which was much more likely to be grown by women. Female farmers were much more likely to obtain knowledge on where to purchase inputs from a friend or family member in the village than male farmers, and female farmers were more likely to state that the prices they paid for inputs from their sources were most likely higher than other sources nearby than male farmers, possibly reflecting the effects of relatively limited mobility for female farmers, precluding them from traveling farther for better prices.

Thirty-six percent of agents noted that their female customers tended to come to the shop or deal with them on transactions with another family member—either female or male. The perceived reasons for this were varied, from assuming that women did not have the autonomy to make the purchase without their husband present, to assuming that the presence of another person was meant to pressure the agent to give the woman a fair price. This was true for traditionally ‘men’s’ crops like maize and traditionally ‘women’s’ crops like vegetables. Twenty-five percent of agents stated that they preferred dealing with female customers, as they were more trustworthy and more likely to pay back credit at the end of the season than men. 13 percent of agents preferred dealing with men, and 62 percent stated they had no preference. Input suppliers and agents state that they deploy different marketing strategies targeting men and women. For men, most marketing strategies were based on yield, and they were given t-shirts or hats. For women, emphasis was on crop health and disease resistance, and they were given branded *chitenges* (screen-printed textiles).

# VI. CONCLUSIONS

The Zambia PROFIT project was implemented from 2005 to 2010. Favorable systemic changes happening prior and concurrently to the project were clearly driving factors in smallholder awareness and demand for improved inputs, and a shift in industry-focus to the smallholder sector. Nonetheless, the majority of input suppliers (86 percent) did state that the PROFIT project was key in facilitating their entry into the smallholder input market. PROFIT provided key information on reliable partners at the local level who would eventually become agents, leaders of buyer clubs, or full franchisees. 86 percent of input supply companies also mentioned continued support from Musika, an NGO that formed out of the PROFIT project to continue supporting innovations in input supply to smallholders, including facilitating transportation (see below), as essential to continued growth in smallholder outreach and marketing. What is clear, five years after the end of the project, is that PROFIT project's interventions were instrumental in encouraging innovation and buying down risk to test the smallholder market at a time when broader trends in agriculture and government policy were creating market opportunities at that market segment. In this context, the case study found six conclusions relevant to policymakers and implementers looking to replicate the PROFIT project's scale and sustainability of outcomes, detailed below.

## **1. Multidisciplinary analysis of overlapping systems is key to design**

PROFIT methodically implemented a multi-disciplinary assessment of the economic and socio-cultural constraints and opportunities during the design phase. This comprehensive, market systems-level approach allowed them to see how these systems interacted with one another to generate market failures. The original assessment went beyond a simple economic deconstruction of the supply chain into 'value capture' points at each level, to ask farmers and input suppliers why they were or were not buying/selling inputs. This led to an assessment that merely facilitating transactions would not be sufficient if it did not also entail an attitudinal shift grounded in social dynamics: input suppliers needed a socially familiar conduit, like agents, to encourage farmers to take a risk on an initial transaction from a company they otherwise were unfamiliar with and did not trust. For input suppliers, this involved understanding that the market transactions in the commercial farming sector were embedded in a larger social context of familiarity and personal relationships between input supply companies and commercial farmers. Reaching out to smallholders meant expanding beyond the existing social network to more culturally, economically, and politically diverse customer bases. If the project had focused solely on the business case of supplying inputs and utilizing inputs on farm, it may have identified a market opportunity for suppliers and farmers without addressing the social constraints precluding it from being successful.

## **2. Be clear on project objectives, but flexible enough to pilot, jettison, and adapt before finding something worth scaling**

While many of the interviewed input suppliers were still implementing the sales agent model, two had jettisoned that model because it did not work for them<sup>10</sup>, but still recognized the potential of the smallholder market if the social and other transaction costs could be overcome. So they have continued innovating and tweaking different approaches to targeting smallholders. While the agent model may have been a core initiator

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<sup>10</sup> One of the two companies admitted that it was most likely implementation errors on their end, including extending credit to agents too readily, which adversely affected the pilot and led to discontinuation.

of this focus, the specific model was unimportant once input suppliers saw the value of smallholders as customers. Once the PROFIT project had completed its market systems analysis and developed clear objectives, it was able to implement several different approaches to achieving those objectives, and had a clear reference point to compare the performance of different models. This allowed PROFIT to shift partners and pilots easily, ensuring promising approaches were identified quickly and with enough resources available to take them to scale. Evidence-based adaptive management can only occur when there are clear objectives that activities are continuously measured against.

### **3. Using a facilitation approach was critical to this flexibility**

PROFIT engaged the input suppliers, and never took on any of the transactional or logistical functions of the value chain. This meant that when the model shifted at the input supplier level, it did not require a substantial restructuring of the project (including staff profiles, size, location, etc.), and did not leave an essential function in the chain without an existing value chain actor to perform it. Instead, PROFIT focused its resources on supporting input suppliers' capacity to think critically about their own marketing strategies, and test and revise those strategies based on results.

### **4. If PROFIT had taken on logistics and marketing directly, input suppliers would not have actively engaged smallholders to the same extent**

Several input suppliers stated that, prior to engaging with the PROFIT project, they were less willing to invest the resources needed to figure out the smallholder market. One supplier mentioned that initially they were less interested in engaging with PROFIT because the project was not willing to take on distribution and marketing directly for the company, but that in the long run it was better for them to have to figure out their own strategy, with PROFIT aiding through buying down the risk of new models (i.e., cost-sharing the piloting of new models) along the way.

### **5. Smallholders are still the most expensive customers for input suppliers, meaning any increase in larger firm demand can derail investment in the smallholder market, at least in the short-term**

Even though input suppliers are now actively competing for smallholders, this focus can very rapidly be derailed if the large-scale commercial sector were to revitalize or the NGO sector were to take on an active buyer/distributor role again. There is a time lag intrinsic to seed multiplication and supply—seed suppliers have to multiply next season's seed this season. Thus, by the time the marketing window for this season hits, suppliers tend to have a finite supply of seed. Since the basic production costs are already sunk at this point, a seed supplier's profitability becomes a function of the marketing and sales cost per bag sold.

This means that in any given season, a supplier is always going to prefer to sell more volume to fewer buyers, because it will be more profitable. If a larger institutional buyer, whether public or private, enters the market unexpectedly, the seed intended for smallholder sales will be diverted to supply the lower transaction-cost buyer. It is critical for continued smallholder growth that future programs respect this dynamic and avoid direct transactions with input suppliers, or taking on their logistical or marketing functions focused on smallholders.

### **6. Subsidizing improved transportation and communication logistics can have catalytic and enduring effects**

All input suppliers and several agents noted that projects that supported them through improving transportation and communication capacity, including motorbikes, vehicles, and cellphones, have had the biggest effect

on their ability to reach the most marginalized communities. While many of these forms of support are considered restricted goods, and subjected to greater procurement scrutiny under most donor frameworks, field research suggests that these forms of support can be catalytic. Despite their prohibitive upfront costs for small- and medium-sized companies, such assets yield substantial systemic results if their disbursement is structured correctly. One model that could be effective is an incentive-based purchase loan agreement, where ‘repayment’ for the vehicle is fully or partially achieved through market-based metrics at the farmer level.

On the whole, PROFIT’s interventions seem to have sustainably altered the systemic dynamics of the input supply sector in Southern Province and at scale for all of Zambia. This has led to an increase in smallholder adoption of improved inputs, an increase in the availability of inputs sized and targeted towards smallholders, and healthy competition in the sector for smallholder market share. It is less clear how equitably these benefits are accruing to women, youth, or extremely poor farmers.

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**U.S. Agency for International Development**

1300 Pennsylvania Avenue, NW

Washington, DC 20523

Tel: (202) 712-0000

Fax: (202) 216-3524

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