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# PROFIT ZAMBIA IMPACT ASSESSMENT

**FINAL REPORT**

**AUGUST 2010**

This publication was produced for review by the United States Agency for International Development. It was prepared by DAI.



# PROFIT ZAMBIA IMPACT ASSESSMENT

## FINAL REPORT

**Program Title:** Zambia Production, Finance and Improved Technology  
(PROFIT)

**Sponsoring USAID Office:** Office of Microenterprise Development

**Contract Number:** GEG-I-00-02-00014-00, Task Order No. 01

**Contractor:** DAI

**Date of Publication:** August 2010

**Author:** DAI



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# EXECUTIVE SUMMARY

Over the past decade, a new generation of private sector development programs has evolved. These programs emphasize sustainable and pro-poor economic growth while working through markets and private sector agents, reducing and eventually eliminating assistance provided to participating businesses. These projects often involve promoting the competitiveness of selected industries or value chains in global and domestic markets while increasing the participation of, and benefits to, farmers and other micro and small enterprises (MSEs). Activities aim to strengthen inter-firm cooperation, improve access to product markets, promote firm upgrading and bolster supporting markets for inputs, finance and business services – all in a sustainable and market-friendly manner.

The Private Sector Development Impact Assessment Initiative (PSD-IAI), funded by USAID under the Accelerated Microenterprise Advancement Project (AMAP), selected the Zambia Production, Finance and Improved Technology (PROFIT) project for a detailed impact assessment, because it exemplifies this new generation of economic growth projects and because it has the potential to generate information that could be used to inform decisions about the design of future projects.

## ZAMBIAN CONTEXT

At independence in 1964, Zambia's per capita income was among the highest in Sub-Saharan Africa, owing largely to the development of copper mining. During the first three decades of independence, however, per capita income declined steadily as a result of falling copper prices, misguided public policies, poor resource management, periodic drought and heavy involvement in the freedom struggles of neighboring countries. According to World Bank figures, GDP per capita fell nearly 50% between 1965 and 1995, declining from \$613 to \$318 (expressed in 2000 USD).

In recent years, significant debt forgiveness, higher international copper prices and more favorable agricultural conditions have contributed to strong economic growth in Zambia. A poverty reduction and growth facility (PRGF) from the IMF in 2004-2007 and improved management of public finances helped to bring about this reversal. Zambia signed a follow-on agreement with the IMF in June 2008 to continue the PRGF, the primary objectives of which are to maintain macroeconomic stability and diversify the economy to reduce dependence on mining.

Privatization of the copper mines and high international copper prices also helped drive growth. Yet approximately half the population still lives in extreme poverty and wealth remains concentrated in a small segment of the population. HIV has had a devastating effect on Zambia, cutting population growth from 3.1% in the 1990s to 1.9% between 2002 and 2006. Youth is the fastest growing population segment; 45% of the population is under 15 years old.

Most Zambians work in agriculture, which is characterized by very low productivity and subsistence-oriented production. Less than half the potentially arable land is cultivated. Agriculture is dominated by maize, but in recent years production of cash crops such as cotton, tobacco, soya, vegetables and fresh flowers has increased. Transport costs are high because Zambia is landlocked and there are many structural weaknesses and inefficiencies in the transport network.

## THE PROFIT PROJECT

PROFIT began in 2005 with an initial funding level of \$15 million, including \$5 million for local grants. The Cooperative League of the USA (CLUSA) implements the project on behalf of the United States Agency for International Development (USAID). International Development Enterprises (IDE) and the Emerging Markets Group (EMG) participated as sub-contractors.

The overarching goal of PROFIT is to increase multi-sector growth to ensure poverty reduction at the household level. PROFIT's activities aim to strengthen connections within selected value chains to increase the provision of inputs and services to farmers with the objective of improving productive output and quality, thereby increasing enterprise and household incomes. PROFIT works with lead firms and communities to develop agent networks to reach rural areas lacking sufficient supplies of inputs and services. This entails demonstrating the value of these inputs and services to rural consumers and helping lead firms shift from a high-margin, low-volume orientation to a structure that also supports low-margin, high-volume smallholder clients.

PROFIT uses an industry-based strategy. All facilitation activities that target individual enterprises are done with the aim of improving the overall functioning of the industry and aim to foster the development of commercial mechanisms to address critical production constraints. PROFIT uses minimal interventions and clear exit strategies to limit potential distortions, maximize leverage and increase the likelihood of sustainable impacts.

PROFIT sees itself as a facilitator of market system change—that is, an agent that stimulates change but does not become part of it. Economic pressures and cultural norms often result in conflicting economic and social incentives. It is the job of the market facilitator to help overcome these conflicting incentives by fostering new relationships, on-going innovation and enhanced benefits so that market actors behave in a way that makes the industry more competitive.

PROFIT aims to achieve changes in three systemic characteristics that are interrelated and crucial to an industry's ability to compete over time.

- **Benefits** accrue in terms of increased incomes, reduced risks and improved social status. Benefits must be sufficient enough to provide incentives to change behaviors so that actors take on new risks, develop new relationships, change the nature of their commercial relationships and embrace learning and innovation as the basis for competition.
- **Relationships** that are transparent, long-term and focused on industry-level goals are critical to an industry's ability to respond and adapt to changing demand. Incentives that foster win-win relationships enable industries to expand knowledge and skills.
- **Learning and innovation** happen only when appropriate incentives are in place. When learning and innovation are an integral part of an industry's norms, that industry is more likely to be competitive over time.

An evaluability assessment of PROFIT was conducted in November 2005. The evaluation team met with various stakeholders, and together with project staff, selected the three areas of program activity to include in the impact assessment: retail inputs and services, beef and cotton. Input and service distribution at the retail level was seen as a novel activity with opportunities for learning that could be applied elsewhere. The livestock and cotton sectors were chosen for inclusion in the study because they are activities that involve large numbers of smallholders (200-300 thousand in each case).

Smallholders occupy an important place (in terms of numbers if not in terms of productivity or purchasing power) in all three of the selected sectors. They tend to be marginal producers working small plots of land or managing small herds with low levels of productivity (and in the case of cattle farmers, high rates of cattle morbidity and mortality). They have limited resources and lack access to formal financial services. They have few incentives to invest in commercial upgrading and use limited technology. They possess little market power and often sell outputs and purchased inputs under adverse market conditions and with limited market information.

## **RESEARCH DESIGN AND PROCESS**

The impact assessment attempted to measure the results of project interventions using a mixed-method (quantitative plus qualitative) approach. The quantitative part of the impact assessment included a baseline survey of 919 program clients and 620 non-clients conducted in August-September 2006 and a follow-up survey of the same clients and non-clients in November 2008. It also utilized a field assessment of farmer involvement with PROFIT undertaken in 2010 and related to the 2007-2008 growing season. The quantitative data gathering and analysis was complemented by qualitative research that consisted of in-depth key informant interviews and focus group discussions with selected value chain actors as part of both the baseline and the follow-up research. The analysis sought to test a number of specific hypotheses about the outcomes and impacts of project activities. These hypotheses were derived from causal models formulated together with project personnel at an early stage of the study.

## **FINDINGS**

Shifts in approach, emphasis and location during the course of program complicated or invalidated parts of the research plan. Between the two survey rounds cotton activities moved out of the South, where the survey was undertaken, to the East, where there was no baseline survey. As a result, only qualitative evidence was generated on PROFIT's impact in the cotton sector. Beef sector activities also moved away from the areas surveyed to some extent, but a field inquiry undertaken in 2010 indicated that many survey respondents (but not necessarily those in the original treatment area) were active participants in PROFIT in the 2007/2008 season. This permitted some quantitative analysis to be carried out for beef on an active/inactive (as opposed to a treatment/control) basis. The best coverage was achieved for the retail inputs and services sector, where the treatment/control and active/inactive groups largely coincided.

A project's impact can only be proven when quantitative analysis can be performed on data from treatment and control groups, with the latter serving as a counterfactual representation of what would have happened in the absence of the project. Even then, failure to account fully for selection bias may invalidate the findings. Because of the specific limitations of this study and general shortcomings of quasi-experimental approaches, most of the findings cited in this report should be regarded as suggestive rather than definitively proven. Nonetheless, the combination of quantitative and qualitative evidence suggests positive outcomes and impacts for smallholder participants in the project's beef and retail activities. Moreover, these results, measured after only two years of project facilitation, may well continue to improve over time. Moreover, these results, measured after only two years of project facilitation, may well continue to improve over time; recent discussions with project personnel suggest that substantial increases in outcomes have occurred since the period of the endline survey.

## **RETAIL INPUTS AND SERVICES**

Long distances, geographically dispersed rural communities and a poor road network have limited the provision of agricultural inputs in rural areas. The cost of farming inputs is high and the availability of

quality inputs and related technical services has been low. Retailers have been hesitant to supply inventory to rural areas unless it is sold in advance and are generally unwilling to provide credit to smallholder farmers for input purchases.

PROFIT uses an agent network model to mobilize representatives at the community level who take prepaid orders from farmers for inputs (chemicals and seeds). Agents consolidate these orders and place them with input supplier representatives in towns. Agents are usually farmers themselves who come from a particular community and serve as intermediaries between farmers and a particular input supplier.

By 2009, 14 firms selling chemicals, fertilizer and veterinary drugs were cooperating with PROFIT to build the network for agricultural inputs and services. About 600 agents were active, serving more than 100,000 farmers and making a rapidly rising total of agent-mediated sales.

Increased access to commercial agricultural products and services has encouraged the evolution of smallholder practices from subsistence to emerging commercial agriculture. Both treatment and control group farmers increased their production and sales of primary crops. Production of maize, the most important crop for farmers in the survey, increased on average by 82% for farmers who were active in PROFIT compared to 68% for those who were inactive. Perhaps more importantly, the average amount of maize sales increased by 161% for farmers who were active in PROFIT, compared to 56 percent for those who were inactive. The production and sales of active farmers both increased faster than average total land planted, indicating that productivity improved.<sup>1</sup>

“Agents bring products to the village in bulk and there are no transport costs to the farmers. Agents are demand-driven—they bring what farmers want and give them money for. Agents also bring product knowledge—they teach us how to use the product. If you buy in the shop, they don’t teach you. Agents that sell chemicals live in the village and know the problems that we face. We know them. Agents also help in terms of sales of our crops; they bring information on prices. Agents are fair because we know them. If you are short on cash, they will give you a discount, or allow you to pay a few days later.”

—Male and female maize and groundnut farmers, Focus Groups Discussion (FGD), Chikupili area, Mkushi

**TABLE 1: AVERAGE AMOUNT OF MAIZE HARVESTED (KGS) AND SOLD (000 KWACHA)**

	Baseline			Endline			% change		
	Active Group Mean	Inactive Group Mean	Total Mean	Active Group Mean	Inactive Group Mean	Total Mean	Active Group Mean	Inactive Group Mean	Total Mean
Average production (kg)	3,421	4,549	3,804	5,886	7,653	6,652	81.6	68.2	74.9
Average sales (000 kwacha)	1,347	2,224	1,729	3,510	3,469	3,492	160.6	56.0	102.0

The agent network model provides incentives for smallholder farmers to upgrade by improving access to quality inputs and providing knowledge on how to use them properly. Farmers and agents participating in

<sup>1</sup> According to project personnel, there was little change in the price farmers received for maize sales between the two survey periods, nor did the price differ significantly between active and inactive farmers. The finding that sales in kwacha by members of the active group increased faster than their production thus appears to be attributable to a rise in the portion of their output that was marketed. Conversely, members of the inactive group appear to have marketed a decreasing share of their output.

the qualitative study have adopted new seed varieties and are using herbicides and chemicals to treat crop diseases. The agents, drawing on the training they receive from the input suppliers, have furnished farmers with accurate information on new products, technologies and practices. For example, farmers have learned more about crop diseases and how to treat them with the proper application of specific chemicals and herbicides at the right time. They have improved knowledge on which seeds to plant when. They have also learned the value of planning ahead—in preparing their land, buying seeds earlier, projecting their yields and anticipating their cash flow needs over the course of a year. They are aware of the high risks of using fake chemicals that destroy their crops and of the importance of using certified products. They have increased awareness of the risks of using uncertified seeds and have increased their purchases of certified seeds. With this knowledge, combined with improved access to quality inputs, farmers have gained confidence to upgrade their crops. The upgrading, in turn, has resulted in higher quality crops and higher yields.

Input suppliers interviewed indicated that the agent model brings them closer to farmers. In particular, seed companies said that it allowed them to identify and diagnose problems early and to get better information on farmer demand. According to one input supplier, this closer relationship helps them to understand the mentality of farmers and their needs. This information serves as a driver for them in innovating new products to meet farmer needs better, such as new seed varieties.

Both men and women farmers are engaged in farming and in decisions around the purchase and use of inputs and upgrading. Both genders interact with agents in purchasing inputs and receiving advice, and both have a favorable view of the agent network model. Men and women alike said they had good relationships with the agents and trusted them with the money they give them in advance for their input purchases.

Research found that while progress is evident, women continue to face constraints in terms of mobility, access to information, control over income and, in some cases, gender-biased attitudes. The number of women agents is still limited—one input supplier said two out of 24 agents were women and five sub-agents were women; another said that out of 139 hubs<sup>2</sup>, 4-5 are women. Although there are only a few women agents, and few or no women input suppliers or representatives in the large input supply companies, actors all along the value chain had a very positive view of women agents, which suggests good potential to expand their involvement.

The input supplier approach is evolving from merely selling products toward a more solutions-driven marketing strategy, in which information, knowledge and solutions become integral parts of the product distribution strategy. Firms are realizing that labor and equipment shortages in rural communities provide an opportunity to deliver services to smallholders, which in turn results in the sale of even more of their products.

The success of the agent network model is reflected in its self-replication: agents are starting their own sub-agent networks. Through a cascade effect, the sub-agents are able to cover a larger geographic area and reach into more remote areas.

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<sup>2</sup> One input supplier that PROFIT worked with uses a two-tier agent system in which a managing agent, called a “hub,” coordinates the work of several agents directly engaged with farmers.

## BEEF

The beef sector in Zambia is disjointed, with weak and ineffective linkages. As a result, the sector has limited ability to respond to industry threats such as low productivity, drought, disease and competition from imports. High rates of cattle morbidity and mortality are especially challenging constraints to upgrading the sector. Despite the danger of frequent disease outbreaks, few smallholders vaccinate their cattle or test regularly for infection. When cows fall sick, they usually die – medical assistance is rarely available and even when it is, farmers often do not trust it to work.

In this sector, PROFIT tried to improve animal health by encouraging the development of private services and the creation of herd health plans (HHP), which provided one-year of preventive care for a fixed fee. It also hoped to improve the marketing of smallholder beef. With regard to the latter objective, however, the study found that relatively few smallholders (11-16%) sold cattle in a given year and most of those cattle were sold on a one-time basis to meet a specific financial need, rather than as a continuing commercial enterprise. The importance of cattle as a source of prestige and a vehicle for savings continues to outweigh herding as a regular source of income.

The herd health plan did promote the formation of commercially viable relationships in some communities. Some veterinarians became more entrepreneurial and the use of community agents to expand the reach of veterinary services into rural areas was introduced, but scaling up this success was impeded by a shortage of private vets. Although most agents reported satisfaction with their relationship with the vets, the level of trust on the side of vets toward agents was not as strong as expected. A private vet in Chongwe explained that in order to ensure quality control, he trained his agents, but also limited most service provision to qualified vets. The research indicated that farmers have a high level of trust in agents and that this trust is strengthened by the fact that agents come from the same community and were selected by the community.

Before farmers had a perception that vet services should be provided for free. PROFIT helped change this mindset. Now people are starting to realize the value of HHP. Farmers value this service so much that if they are not in the scheme they feel left out. Now they understand the concept of prevention.

—Public vet, Mazabuka

Over the study period, surveyed farmers reported a very large increase in the use of private veterinary services. Only 5% of the sample (just 19 farmers) used them at the time of the baseline survey, but 43% (167 farmers) did so at the time of the endline survey. Accordingly, morbidity and mortality declined over the course of the evaluation period. The average number of cattle deaths in the year preceding the endline survey dropped by 81 percent for active farmers, versus a drop of 29 percent for inactive farmers.<sup>3</sup> The number of sick cattle dropped by 69 percent for active farmers, versus a drop of 16 percent for inactive farmers.

Male and female farmers interviewed during the qualitative study report that access to information between men and women is the same because information is shared during meetings attended by both men and women. Men are still making most of the decisions in cattle rearing, especially where and how much to sell, but a few men do discuss these issues with their wives. Although men are at the forefront of

Under the vet [program], cattle are no longer dying and they are having calves. This means that the number of cattle per farmer has drastically increased—the herd has grown in size. The use of new vet services and technologies has led to this increase in the number of cattle per farmer.

—Livestock farmers, FGD, Chongwe

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<sup>3</sup> Although both declines are strikingly greater for active than for inactive farmers, the differences are not statistically significant because of large variations within both samples.

cattle-raising activities, some interviewees said women play an active role in the adoption of veterinary services and in some cases are more adaptive to change than men. Male and female veterinarians reported working well with all farmers regardless of their gender. Although there are female vets, the vet agents are mostly men because it is difficult for women to take on such public roles with regard to cattle, which is traditionally a male business.

PROFIT's endeavors in the beef cattle industry show that improvements in animal health were registered, but neither cattle sales nor herd size increased, leaving traditional patterns of livestock rearing pretty much intact. It seems likely that more time is needed for the demonstrated improvements in herd health - which can only be regarded as a strongly positive outcome - to become reflected in larger herd sizes and, eventually, increased commercial sales of cattle.

## COTTON

The cotton industry in Zambia operates on a contract basis. Cotton farmers are locked into supplying product to a particular cotton firm through the provision of inputs on credit. Farmers receive input packs (that contain seeds and chemicals) from cotton firms, the cost of which is deducted when the crop is sold. This practice draws farmers in Zambia to growing cotton because it is the only commercial crop for which inputs are available and the end-market is secure. However, since the transaction costs of switching from cotton to other crops such as maize are very low, when the price of cotton goes down, farmers switch to other crops on a seasonal basis. This tendency reduces sector productivity and the wide availability of inputs on credit to all those planting cotton means that there are no incentives to attract high-performing farmers or to improve productivity. PROFIT planned activities to alter this market structure in a way that would be beneficial for both farmers and lead firms.

The cotton industry was deemed promising at the time the study was conceived but had a very difficult experience during the study period. The appreciation of the kwacha in the era of high copper prices greatly undermined the industry's international competitiveness. The industry did particularly badly in the South, where the baseline study was conducted, because the ill effects of kwacha over-valuation were compounded by problems with weather, predatory competition and weaknesses of the lead firm. Project activity therefore shifted to the East, where most of Zambia's cotton is now grown.

Despite the challenges of observing and attributing impact of PROFIT's activities in the cotton sector, two important shifts that are taking place in the industry thanks to PROFIT's facilitation can be noted.

First, there has been a move away from using credit to "lock-in" farmers to increasing loyalty through incentives and building relationships. In anticipation of a price increase and industry rebound, Dunavant, a lead firm, is investing in better-performing farmers through its Preferred Supplier Program (PSP). The PSP enables Dunavant to manage its farmers better and select high performing farmers for input packs. This approach suggests an important shift in the lead firm management model. Although it is too early to tell what the impact will be, an important indication of potential change in value chain relationships is the lead firm's recognition of the importance of providing training to farmers and building stronger relationships. Second, third-party input providers are integrating into the cotton sector as spray service providers enter the market and linkages are built between cotton firms and input suppliers.

Capacity utilization of our gins has been below breakeven and the only way we can move back into profitability is to increase individual farmer yields and establish more mutually trusting relationships.

—Dunavant representative

## LESSONS LEARNED

- No one model offers a complete solution to complex problems. For example, PROFIT learned that vet services needed to be delivered in multiple ways through multiple mechanisms. This makes the ability to adapt to changing market environments important. Understanding and maintaining a system-wide perspective is critical for the project implementer to see where momentum is happening and when resources shifts have to take place. The herd health plan provided a catalyst to the vet services market but may never become the predominant offering in the marketplace, even though it appears to have created strong improvements in cattle morbidity and mortality among smallholders
- Trust and relationship building takes time but can be strengthened through community involvement in selecting agents and through active input supplier engagement with their agents and their communities. Trust and satisfaction on the farmer and agent side are strongest where suppliers are more involved in promotion and training.
- Understanding farmers as consumers as well as producers can be effective for fostering behavior change. Smallholders have proven to be a viable market. After seeing field demonstrations and the benefits of adopting new products and technologies, farmers were willing to invest in upgrading.
- Focusing on behavior change and not individual transactions has proven effective for understanding why growth is or is not happening and can help broaden a project's understanding of how change can be catalyzed.
- A commercial input industry is a key driver of innovation both on the farmer and input supplier side and critical for longer-term upgrading. Learning about the smallholder market and farmer needs through closer contacts with farmer communities helps drive product innovation on the input supplier side, such as developing new seed varieties or packaging of chemical products in smaller quantities to meet farmer needs.
- The shift to targeting smallholders is not just a process of promoting products to smallholders. It requires changing the business model to a volume-based business model that has systems to manage large numbers of customer relationships. Critical elements of such a management system include managing agents, better order tracking processes, staff training, staff performance compensation systems and better inventory management systems.
- Building the internal management capacity of input suppliers is critical to the effectiveness and expansion of agent networks. Critical factors are a) the input suppliers' capacity to manage their agents and view them as a core part of their business and not as outsiders; b) input suppliers' ability to forecast smallholder demand and manage inventory; and c) input supplier engagement at the community level through promotional activities and training to maintain quality control of agents, learn about farmer needs and build agent credibility within the communities.
- Inputs are a key component of agricultural value chains and should not be treated as public goods. Handouts and government-controlled subsidy programs lower the probability of upgrading by limiting access, increasing longer-term costs and reducing innovation by crowding out private sector investment in the input industry.
- Downturns can open up important opportunities for fostering systemic shifts in an industry and leveraging competitive pressure. This, in turn, can promote industry-wide upgrading. Dunavant's



strategy is an important example of a situation in which a crisis and increased competition can lead to dynamic shifts in the firm's operating model and the industry overall.

- The capacity and management of the lead firm should be understood. It is often more important to assist a lead firm at the initial stages of project implementation, rather than focusing solely on the smallholder. However, understanding the full range of incentives for smallholders to produce (or not) is a critical part of building capacity of the lead firms, as demonstrated by Dunavant's Preferred Supplier Program.
- Systemic shifts in an industry ultimately define the impact on participants in the value chain. These shifts are not time-bound, and do not always fit into the timeframe of donor-supported projects. This poses a challenge to understanding impacts. All industries experience ups and downs, and projects should be assessed in the context of the industry overall.
- Understanding the smallholder perspective and incentives is critical, as demonstrated by the limitations that social capital issues put on commercial relationships in cattle.



# BACKGROUND OF THE STUDY

## NEW GENERATION ECONOMIC GROWTH PROGRAMS

Over the past decade, a new generation of private sector development programs has evolved. These programs emphasize sustainable and pro-poor economic growth while working through markets and private sector agents, reducing and eventually eliminating assistance provided to participating businesses. These projects often involve promoting the competitiveness of selected industries or value chains in global and domestic markets while increasing the participation of, and benefits to, farmers and other micro and small enterprises (MSEs). Activities aim to strengthen inter-firm cooperation, improve access to product markets, promote firm upgrading and bolster supporting markets for inputs, finance and business services – all in a sustainable and market-friendly manner.

Despite the significant investment in these programs, there have been surprisingly few high-quality impact assessments to provide guidance on designing and implementing future projects. The Private Sector Development Impact Assessment Initiative (PSD-IAI), funded by USAID under the Accelerated Microenterprise Advancement Project (AMAP), has the objective of filling this knowledge gap by conducting impact assessments and identifying specific impacts that the projects have on the private sector and poverty reduction.<sup>4</sup>

The PSD-IAI team selected the Zambia Production, Finance and Improved Technology (PROFIT) project because it exemplifies the new generation of economic growth projects that USAID and other donors are currently undertaking and because it has the potential to generate information that could be used by USAID/Zambia, other African USAID missions, USAID generally and other donors to inform decisions about the design of future projects.

## ZAMBIAN CONTEXT

At independence in 1964, Zambia's per capita income was among the highest in Sub-Saharan Africa, owing largely to the development of copper mining. During the first three decades of independence, however, per capita income declined steadily as a result of falling copper prices, misguided public policies, poor resource management, periodic drought and heavy involvement in the freedom struggles of neighboring countries. According to World Bank figures, GDP per capita fell nearly 50% between 1965 and 1995, declining from \$613 to \$318 (expressed in 2000 USD).

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<sup>4</sup> This evaluation of the PROFIT project is one of four major impact assessments that PSD-IAI has undertaken. These assessments have sought both to learn about the effectiveness of private sector development models and to improve understanding of how best to undertake impact assessments of economic growth projects. Publications summarizing lessons learned and providing guidance about future evaluations are available at [microlinks.org](http://microlinks.org).

Privatization of the copper mines and high international copper prices also helped drive growth. Yet approximately half the population still lives in extreme poverty and wealth remains concentrated in a small segment of the population. HIV has had a devastating effect on Zambia, cutting population growth from 3.1% in the 1990s to 1.9% between 2002 and 2006. Youth is the fastest growing population segment; 45% of the population is under 15 years old.

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Smallholders occupy an important place (in terms of numbers if not in terms of productivity or purchasing power) in all three of the sectors selected for this study. They tend to be marginal producers working small plots of land or managing small herds with low levels of productivity (and in the case of cattle farmers, high rates of cattle morbidity and mortality). They have limited resources and lack access to formal financial services. They have few incentives to invest in commercial upgrading and use limited technology. They possess little market power and often sell outputs and purchased inputs under adverse market conditions and with limited market information.

## **ABOUT PROFIT**

PROFIT began in 2005 with an initial funding level of \$15 million, including \$5 million for local grants. The Cooperative League of the USA (CLUSA) implements the project on behalf of the United States Agency for International Development (USAID). International Development Enterprises (IDE) and the Emerging Markets Group (EMG) participate as sub-contractors.

The overarching goal of PROFIT is to increase multi-sector growth to ensure poverty reduction at the household level. PROFIT's activities aim to strengthen connections within selected value chains to increase the provision of inputs and services to farmers with the objective of improving productive output and quality, thereby increasing enterprise and household incomes. PROFIT works with lead firms and communities to develop agent networks to reach rural areas lacking sufficient supplies of inputs and services. This entails demonstrating the value of these inputs and services to rural consumers and helping lead firms shift from a high-margin, low-volume orientation to a structure that supports a low-margin, high-volume business model.

## **APPROACH**

PROFIT uses an industry-based strategy. All facilitation activities that target individual enterprises are done with the aim of improving the overall functioning of the industry and aim to foster the development of commercial mechanisms to address critical production constraints. PROFIT uses minimal interventions and clear exit strategies to limit potential distortions, maximize leverage and increase the likelihood of sustainable impacts.

PROFIT's implementation activities are based on three tactical goals:

- Improve inter-firm cooperation within the selected value chains.
- Develop support markets of critically important services and products for the selected value chains.

- Foster improvements in the non-policy environment that build credibility and confidence in market mechanisms.

PROFIT has taken a systemic approach to promoting pro-poor agricultural competitiveness. Its initial analysis of an industry's constraints to future competitiveness considered a broad range of market functions (core transactions, support functions and rules), market players (private, public, civil society) and the incentives and relationships that drive and sustain an industry upgrading strategy.

PROFIT sees itself as a facilitator of market system change – that is, an agent that stimulates change but does not become part of it. Economic pressures and cultural norms often result in conflicting economic and social incentives. It is the job of the market facilitator to help overcome these conflicting incentives by fostering new relationships, on-going innovation and enhanced benefits so that market actors behave in a way that makes the industry more competitive.

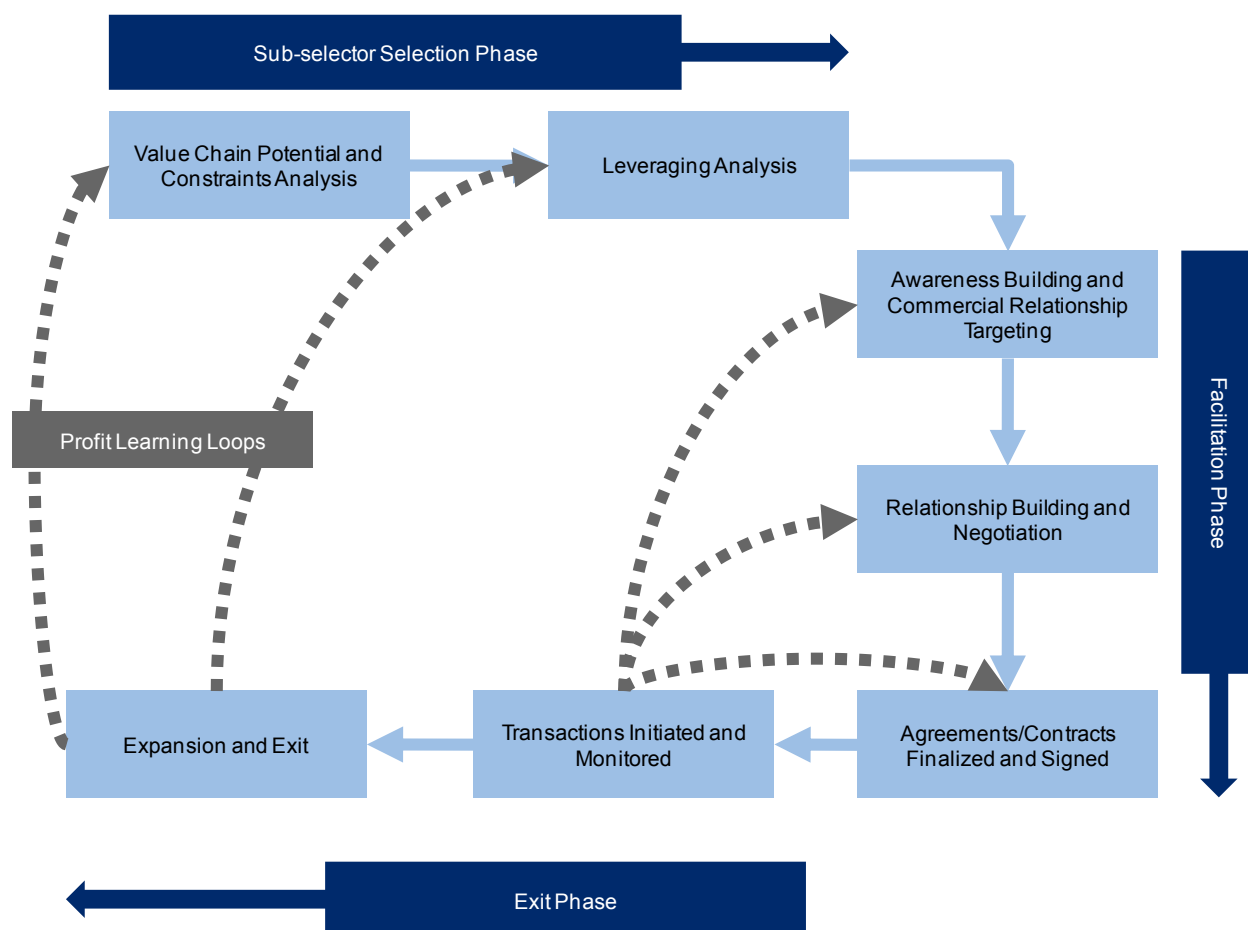
PROFIT aims to achieve changes in three systemic characteristics that are interrelated and crucial to an industry's ability to compete over time.

- **Benefits** accrue in terms of incomes, social status and reduced risks. Benefits must be sufficient enough to provide incentives to change behaviors so that actors take on new risks, develop new relationships, change the nature of their commercial relationships and embrace learning and innovation as the basis for competition.
- **Relationships** that are transparent, long-term and focused on industry-level goals are critical to an industry's ability to respond and adapt to changing demand. Incentives that foster win-win relationships enable industries to expand knowledge and skills.
- **Learning and innovation** happen only when sufficient incentives are in place. When learning and innovation are an integral part of an industry's norms, that industry is more likely to be competitive over time.

## IMPLEMENTATION PROCESS

The PROFIT implementation process focuses on achieving sustainable results. Sustainability requires behavioral change at multiple levels within an industry, including key supporting markets. In order to closely track progress toward these objectives, PROFIT developed a systematic activity cycle as a management tool, which improves their ability to target high-return investments and manage programmatic learning loops. This process has allowed PROFIT to determine where resources are needed to overcome obstacles or increase momentum. Below is a graphic summarizing the process flow, including the major learning loops:

**FIGURE 1: PROFIT APPROACH AND LEARNING LOOPS**



## Implementation Process Details

### Phase I -- Sub-sector Selection

**Stage I - Value Chain Potential and Constraints:** The initial analysis of industry potential was based on assessing three criteria:

- *Growth potential* – the ability to turn competitive advantage into competitiveness in the near, medium, and/or long term
- *Scale of results/impact* –income gains, asset development, and sustainability at both the firm and industry levels
- *Industry leadership* – interested and committed leadership that understands the key role that MSEs play and is willing to work together to address industry-wide constraints

PROFIT also used pilot projects to assess the potential of industries that do not have sufficient on-the-ground operations to effectively determine growth, scale and/or leadership potential.

Based on the initial analysis of potential or pilot, PROFIT determined whether the criteria indicated low, medium or high potential. If an industry showed a high degree of potential, PROFIT performed a more

detailed analysis that examined end market requirements, inter-firm cooperation and support markets to identify the critical industry- and enterprise-level constraints to becoming more competitive. This detailed analysis formed the basis of PROFIT's upgrading strategy for a selected industry.

**Stage II – Analysis of Opportunities for Leverage:** Once the critical systemic and enterprise-level constraints had been identified, PROFIT assessed specific actors, product/service markets and lead firms to identify where industry structure, social incentives and market forces provided an opportunity for project leverage. Lusaka and field staff worked together to appraise potential targets of intervention and to ground-truth initial findings. This analysis included determining the capacity of the MSEs, smallholders and lead firms to benefit from and effectively engage with PROFIT as well as market research to better understand the incentives, needs and commercial viability of key service and product relationships.

### **Phase II – Facilitation**

**Stage I - Awareness Building and Commercial Relationship Targeting:** Following the identification of intervention targets, PROFIT began to engage in awareness building, self-selection mechanisms and initial introductions among key players. Awareness-building activities included meetings and events that allowed PROFIT staff to interact with commercial actors to inform and discuss opportunities and already available mechanisms to address constraints. Self-selection mechanisms included a range of specific actions that assessed interest and commitment to upgrading. PROFIT also facilitated initial meetings and discussions among key commercial players such as farmers, retailers, services providers and lead firms.

**Stage II – Relationship Building and Negotiation:** PROFIT facilitated more direct and intensive interactions among key actors in various relationships such as out-grower relationships, retailer-consumer, retailer-service provider and service provider-consumer. PROFIT assisted in moving these relationships from initial meetings to more formal structures such as agreements, transaction mechanisms and contracts.

**Stage III – Agreements/ Contracts Finalized and Signed:** Once specific actors agreed to move into a formal structure, PROFIT assisted in designing and mediating final negotiations. Formalization included contracts for veterinary services, buying mechanisms and contract farming.

### **Phase III -- Exit Phase**

**Stage I -- Transactions Initiated and Monitored:** During this stage, PROFIT works to facilitate increasing volumes of transactions, effective resolution of disputes, increasing confidence in market mechanisms and new entrants, services and products. Activities include direct mediation, linking to third party mediation, training and upgrading services.

**Stage II -- Expansion and Exit:** As transactions increase in volume, PROFIT facilitates new entrants, organizing out-grower schemes, providing services and offering products. PROFIT exits specific relationships as soon as transactions become stable and re-occur on a regular basis. Broader involvement in a market or industry requires shifting to new relationships and focusing on higher-level constraints such as entry barriers.





# RESEARCH DESIGN AND PROCESS<sup>5</sup>

This impact assessment attempted to measure the results of project interventions in three sectors that involve large numbers of smallholders: retail distribution of agricultural inputs and services, beef and cotton. It used a longitudinal, quasi-experimental design implemented through a mixed-method (quantitative plus qualitative) approach.

The quantitative part of the impact assessment included a baseline survey of 919 program clients and 620 non-clients conducted in August-September 2006 and a follow-up survey of the same clients and non-clients in November 2008. It also utilized a field assessment of farmer involvement with PROFIT undertaken in 2010 and related to the 2007-2008 growing season. The quantitative data gathering and analysis was complemented by qualitative research that consisted of in-depth key informant interviews and focus group discussions with selected value chain actors as part of both the baseline and the follow-up research.

## EVALUABILITY ASSESSMENT

An evaluability assessment of PROFIT was conducted in November 2005. During this process, the evaluation team met with PROFIT staff members, representatives of organizations involved in the implementation of the project, survey research firms and USAID/Zambia staff in order to better understand the PROFIT project and the setting in which it is being implemented. Together with project staff, they selected the three areas of program activity to include in the impact assessment, constructed and verified causal models for each of these three areas and discussed the planning, design and uses of the impact assessment.

Input and service distribution at the retail level was seen as a novel activity with opportunities for learning that could be applied elsewhere. PROFIT planned to work with input dealers to facilitate the expansion and improvement of the input distribution network at the retail level. The project planned to promote the appointment of independent marketing agents and facilitate retailer training to help build their capacity to conduct business profitably with smallholders.

The beef and cotton sectors were chosen for inclusion in the study because they are activities that involve large numbers of smallholders (200-300 thousand in each case) and also because the casual models for PROFIT's interventions were relatively well defined at the time.

Beef production had weak market linkages, was severely hampered by disease and needed substantial upgrading. Most small farmers used cattle more as a store of value than as a commercial product. PROFIT's activity plan emphasized strengthening veterinary services, improving distribution of veterinary drugs and increasing market transparency.

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<sup>5</sup> For more information on the design of the impact assessment and baseline research findings, see DAI, "Assessing the Impact of PROFIT Zambia in the Cotton, Beef Cattle and Retail Input Services Value Chains: Baseline Research Report." May 2007.

At the time of the evaluability assessment, cotton was seen as having good export potential and existing market linkages that could be further strengthened. PROFIT planned to work with lead firms, the Conservation Farming Unit and the Farmers' Union to train farmers in better cultivation methods, improve service delivery and strengthen access to market information.

The evaluation team worked with PROFIT project staff to develop causal models<sup>6</sup> for each of the activities included in the impact assessment. Based on these causal models and the evaluation team's interviews and observation of the project, the team determined that the links between the project activities and the intended impacts on sub-sector growth and competitiveness, firm-level growth and productivity, and income increases and poverty alleviation at the household level were plausible.

## RESEARCH DESIGN

The causal models were used to generate a set of hypotheses about outcomes and impacts to be tested in the impact assessment. For each sector, three hypotheses dealt with improved productivity, increased income and asset accumulation at the industry, firm/farm and household levels. A fourth hypothesis for each sector addressed the outcomes (such as changes in knowledge, skills and behaviors) that would lead to improved sector and firm performance.

As in studies conducted in other countries by PSD-IAI, the PROFIT impact assessment employed a longitudinal, quasi-experimental design implemented through a mixed-method approach. A sample of farmers in an area where the project planned to work (the "treatment group") and comparable sample in an area where it did not intend to work (the "control group") were surveyed twice, once in August-September 2006 and again in April 2009. Data from these surveys were combined with qualitative information collected through interviews and focus group discussions.<sup>7</sup>

Severe problems were encountered in executing the quantitative part of the research design. For reasons discussed below, the project's implementation of planned activities in the cotton and beef sectors in the selected treatment districts did not always go well, prompting the project to shift its emphasis to other parts of the country. Although the project did eventually achieve a number of important successes in these sectors, they took place in other districts. In addition, in later stages of program implementation, activities started up in districts originally designated as control areas. For these reasons, data from the follow-up survey provided relatively little useful information, especially in cotton and beef. Since no baseline data existed for the new districts, this situation forced greater reliance on qualitative methods in assessing the project's impact in these sectors. A special follow-up survey was taken with the help of PROFIT staff to determine which respondents in the beef and retail sectors (including both those originally designated as members of the treatment group and those designated as members of the control group) were actually taking part in PROFIT-sponsored activities. This permitted additional quantitative analysis to be carried out for these two sectors.

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<sup>6</sup> A casual model shows the logical links between program activities and expected outputs, outcomes and impacts.

<sup>7</sup> For more information on the methodology and findings of the qualitative component of the impact assessment, see Jennefer Sebstad and Marina Krivoshlykova, "Zambia PROFIT Impact Assessment: Endline Qualitative Research Findings: Summary Report. June 2009.

## **BASELINE SURVEY**

The baseline survey for PROFIT was conducted in August-September 2006 and included 919 program clients and 620 non-clients.<sup>8</sup> Treatment and control group farmers in all three sectors shared similar demographic and socio-economic profiles. There was some variation across the groups in each sector, but the level of variation was not great enough to raise significant concerns about the similarity and comparability of the treatment and control groups.

The retail input sector was found to be underdeveloped with poor outreach to rural areas where smallholders live and work. A large majority of farmers were unaware of shops selling farming inputs in their community and few farmers had received information on available agricultural products and services. Farmers frequently had to travel long distances to purchase inputs. A perception that input sellers at times engaged in fraudulent practices weakened trust between smallholders and input sellers.

Usage of farming inputs was low across all the farmers surveyed. A large majority of farmers purchased and used fertilizer, but a relatively small minority purchased and used pesticides, herbicides or veterinary drugs. A minority of smallholders purchased farming services, including transport, herding, harvesting, motorized tillage, dipping, labor and spraying. A more significant minority purchased oxygen tillage and weeding services. There was no evidence that input sellers offered embedded services to farmers. Less than one percent of farmers received advice or training from input sellers.

While cotton farming was found to be an important source of household income, raising cattle was not. Neither sector created meaningful employment for family members or others. Horizontal linkages within the cotton and beef cattle sectors were relatively few and generally weak. There was some collaboration among smallholders to pool resources to acquire inputs and services, but this was limited to a small minority. Vertical linkages were also found to be weak, particularly with lead firms and retail input providers, and were characterized by a lack of trust, although farmers did appear to have developed good relationships with agents. Lead firms in the cotton sector had initiated efforts to strengthen their links and were providing more out-grower services to cotton farmers.

Farmers often sought information, advice and training on cotton farming and cattle rearing, which they typically found useful. Information centers, radio and mobile phones were the most important sources of information, whereas government agriculture officers were the most important source of advice and training. In some cases, such as with conservation farming, farmers demonstrated a willingness to adopt new farming practices, but there was generally substantial resistance to change. There was also resistance to adopting new veterinary and other cattle raising practices. Farmers struggled to overcome the collective action problems involved with community-based cattle practices (e.g., dip tanks). Moreover, it was not assured that the private veterinarians could find a viable business model for working with smallholder cattle farmers.

## **ENDLINE SURVEY**

Panel attrition between the baseline and endline surveys was higher than desirable: 30% in the retail inputs and services sector; 23% in the beef sector; and 29% in the cotton sector. Shifts in the location of program activity after the baseline survey was conducted called into question the validity of the originally selected treatment and control groups. PROFIT shifted its cotton activities from the South to the East

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<sup>8</sup> For detailed findings from the baseline survey, see DAI, Assessing the Impact of PROFIT Zambia in the Cotton, Beef Cattle and Retail Input Services Value Chains, May 2007.

during the course of the study and beef activities also put greater emphasis on areas other than the selected treatment sample. Quantitative analysis became impossible for cotton because the data collected in the South were no longer relevant and no baseline survey had been taken in the East. For beef and retail input and service distribution, however, it proved possible to do some quantitative analysis by comparing farmers deemed to be active in PROFIT during the 2007-2008 season with farmers reported to be inactive. Active farmers in the beef sample were actually more likely to be members of the control group than members of the treatment group, so the original distinction was judged to be invalid. For retail inputs and services, by contrast, the treatment and active groups had similar membership, as did the control and inactive groups. Accordingly, quantitative analysis on both bases was possible. The table below summarizes the types of analysis carried out for each sector.

**TABLE 2: TYPES OF ANALYSIS CONDUCTED FOR EACH SECTOR**

Type of analysis	Cotton	Beef	Retail inputs and services
Quantitative:			
Treatment vs. control	No	No	Yes
Active vs. inactive	No	Yes	Yes
Qualitative	Yes	Yes	Yes

## QUALITATIVE RESEARCH

Qualitative research was carried out in Zambia during April 2009. The research team collected information through in-depth interviews and focus group discussions with a sample of actors in the cotton, beef and retail inputs and services value chains. These actors included smallholder producers, input suppliers, agents, veterinarians, lead firms and brokers, all of whom were selected in consultation with PROFIT staff. Because project activities had shifted to new areas during the course of project implementation, the research team expanded the sample to include several new areas in addition to the ones covered during the baseline research to provide broader information on project implementation and lessons learned.

# FINDINGS

## RETAIL INPUTS AND SERVICES

Long distances, geographically dispersed rural communities and a poor road network have limited the provision of agricultural inputs in rural areas. The cost of farming inputs is high (although the government heavily subsidized fertilizer until recently) and the availability of quality inputs and related technical services has been low. Retailers have been hesitant to supply inventory to rural areas unless it is sold in advance and are generally unwilling to provide credit to smallholder farmers for input purchases. Retailers rarely open additional retail outlets, given the expense associated with construction, rent, inventory and security.

PROFIT uses an agent network model to mobilize representatives at the community level who take prepaid orders from farmers for inputs (chemicals and seeds). Agents consolidate these orders and place them with input supplier representatives in towns. In most cases, agents deliver the inputs to the farmers; however, input suppliers may deliver large orders directly to the communities. Agents are usually farmers themselves who come from a particular community and serve as intermediaries between farmers and a particular input supplier. Many agents also serve as spray service providers for farmers. They use their own sprayers and purchase the chemicals from the input supplier.

Community members are actively involved in selecting agents in most places. Input supply firms train agents on the use of chemicals, spraying and the other products and provide agents with uniforms and safety equipment. PROFIT provides training to farmers on the basic requirements of running an agent business, including record keeping and customer service.

By 2009, 14 firms selling chemicals, fertilizer and veterinary drugs were cooperating with PROFIT to build the network for agricultural inputs and services. About 600 agents were active, serving more than 100,000 farmers.

PROFIT used a demand-driven approach in its work, working with firms that were ready to access the smallholder markets and that were willing to invest in the development of an agent network. As these firms internalized the agent network model and positioned themselves strategically to maximize their commercial interests, their regional priorities moved away from the district that was originally chosen as the treatment area for the retail sector baseline study. Despite these shifts in regional emphasis, the 2010 field check by PROFIT staff members determined that 94% of farmers in the survey's treatment sample were in fact active participants in the PROFIT program during the 2007-2008 season, while just 5% of farmers in the control sample were PROFIT program participants (Table 10). Therefore, valid quantitative analysis can be carried out both on a treatment/control basis and on an active/inactive basis.

**TABLE 3: RETAIL INPUTS AND SERVICES: ACTIVE AND INACTIVE FARMERS IN THE TREATMENT AND CONTROL SAMPLES, 2007-2008 SEASON**

Treatment Group		Control Group		Total
Active	Inactive	Active	Inactive	
202	14	8	140	364

To capture a more complete range of impacts and lessons learned, the qualitative research covered the Choma area in the Southern province, where the agent model was especially active and dynamic, in addition to the Mkushi area in the Central Province that was originally selected as the treatment area.

## **HYPOTHESIS 1**

### **Project activities will lead to increased sector productivity and increased on-farm income.**

Between the baseline and endline surveys, the agricultural inputs industry heightened its efforts to reach the smallholder market. As a result, the industry shifted from almost a 100% focus on large commercial farmbuyers to a strategy that included a growing share of smallholder clients.

The input supplier approach is evolving from merely selling products toward a more solutions-driven marketing strategy, in which information, knowledge and solutions become integral parts of the product distribution strategy. Firms are realizing that labor and equipment shortages in rural communities provide an opportunity to deliver services to smallholders, which in turn results in the sale of even more of their products. Through their agent networks, input suppliers are now providing services such as herbicide spraying and actively recruiting and training local sprayers.

The demonstration effects from the use of new products and technologies supplied by input firms through agents helped change farmers' attitudes toward adopting new technologies and investing in upgrading. Input sellers not affiliated with input suppliers are at a disadvantage because they do not bring the technical knowledge to farmers.

The success of the agent network model is reflected in its self-replication: agents are starting their own sub-agent networks. Through a cascade effect, the sub-agents are able to cover a larger geographic area and reach into more remote areas. The input supply companies have not explicitly promoted the growth of sub-agents, but welcome its organic growth.

## **HYPOTHESIS 2**

### **Smallholder farmers will benefit from project activities in the form of increased productivity, sales and profits.**

Increased access to commercial agricultural products and services has encouraged the evolution of smallholder practices from subsistence to emerging commercial agriculture. A shift in value chain governance took place as input firms developed new distribution structures that directly linked them to smallholder communities. As a result, the input firms established a directed governance structure (although some of the firms still manage their networks very loosely) and a shift in the dynamics took place that was empowering to smallholders. Benefits have accrued to smallholders in the form of increased convenience, improved access to information and reduced transaction costs.

Both treatment and control group farmers increased their production and sales of primary crops. Production of maize, the most important crop for farmers in the survey, increased on average by 82% for farmers who were active participants in PROFIT and by 68% for those who were inactive. There was a larger difference between active and inactive farmers with respect to maize sales. Average sales of maize

increased from 1,347,000 kwacha to 3,510,000 kwacha (by 161%) for active farmers and from 2,224,000 kwacha to 3,469,000 kwacha (by 56%) for inactive farmers. Active farmers thus overtook inactive farms in terms of maize sales. The production and sales of active farmers both increased faster than average total land planted, indicating that productivity improved.

**TABLE 4: AVERAGE AMOUNT OF MAIZE HARVESTED (KGS) AND SOLD (000 KWACHA)**

	Baseline			Endline			% change		
	Active Group Mean	Inactive Group Mean	Total Mean	Active Group Mean	Inactive Group Mean	Total Mean	Active Group Mean	Inactive Group Mean	Total Mean
Average production (kg)	3,421	4,549	3,804	5,886	7,653	6,652	81.6	68.2	74.9
Average sales (000 kwacha)	1,347	2,224	1,729	3,510	3,469	3,492	160.6	56.0	102.0

### HYPOTHESIS 3

**If the firm-level impacts are achieved, they will result in improved welfare within smallholder households as indicated by higher household income, asset accumulation and the ability of participating households that are poor to climb above the poverty line.**

Average cash consumption expenditure, a proxy for income, increased to a greater degree for the households of active participants in PROFIT (103%) than for the inactive group (89%). All categories of expenditure increased significantly (Table 4).

**TABLE 5: AVERAGE ANNUAL CONSUMPTION EXPENDITURES ('000 KWACHA)**

	Baseline			Endline			% change		
	Active Group	Inactive Group	Total	Active Group	Inactive Group	Total	Active Group	Inactive Group	Total
Total	1,731	1,861	1,787	3,520	3,521	3,524	103.4	89.2	97.2
Education	319	415	360	639	576	612	100.3	38.8	70.0
Food/Groceries	726	808	761	1,152	1,193	1,170	38.7	47.6	53.8
Housing	7	2	5	276	233	258	*	*	*
Water/Electricity	5	1	3	101	48	79	*	*	*
Paraffin	98	61	82	140	137	139	42.9	124.6	69.5
Clothing	335	368	350	726	767	744	116.4	108.4	112.6
Medicine/Hospital fees	65	69	67	146	114	132	124.6	65.3	97.0
Transportation	176	137	159	341	453	390	93.8	148.9	145.3

\* Averages would not be meaningful because of different treatment of these items in the baseline and endline surveys.

## HYPOTHESIS 4

**Improved sector and firm performance will be preceded by measurable firm-level outcomes, including reduced inventory, input and transportation costs; increased number of retail outlets; increased availability and sales of inputs; increased number of farmers accessing retail services and using farm inputs; increased farmer knowledge about inputs and their use; and increased access to embedded or bank finance.**

The agent network model provides incentives for smallholder farmers to upgrade by improving access to quality inputs and providing knowledge on how to use them properly. Farmers and agents participating in the qualitative study have adopted new seed varieties and are using herbicides and chemicals to treat crop diseases. The agents, drawing on the training they receive from the input suppliers, have furnished farmers with accurate information on new products, technologies and practices. For example, farmers have learned more about crop diseases and how to treat them with the proper application of specific chemicals and herbicides at the right time. They have improved knowledge on which seeds to plant when. They have also learned the value of planning ahead—in preparing their land, buying seeds earlier, projecting their yields and anticipating their cash flow needs over the course of a year. They are aware of the high risks of using fake chemicals that destroy their crops and of the importance of using certified products. They have increased awareness of the risks of using uncertified seeds and have increased their purchases of certified seeds. With this knowledge, combined with improved access to quality inputs, farmers have gained confidence to upgrade their crops. The upgrading, in turn, has resulted in higher quality and higher yields.

With PROFIT's support, the industry adopted a set of industry-wide standards for the safe use of chemicals. It is also undertaking certification and re-training for spray service providers to ensure quality and standards compliance.

Despite somewhat varied data, both treatment and control farmers demonstrate increases in the overall usage of outside production services. The rise was somewhat larger for control group farmers: 13.6% as compared to 1.1% for treatment group members. At the endline, over 80% of all farmers surveyed used one or more type of outside service during the production cycle. Similarly, over the study period, farmers using outside product services have, on average, increased their outlays for such services. Average spending by members of the treatment group increased from 412,000 kwacha to 553,000 kwacha, while average spending by members of the control group increased from 285,000 kwacha to 807,000 kwacha.

Supporting the findings of the qualitative research, the quantitative data demonstrate increases in the purchase of several agricultural inputs. Approximately 85% of treatment and control farmers purchased fertilizer in the past growing season. These numbers are up slightly from the baseline numbers. Perhaps more important is that an increasing percentage of the farmers in both the treatment and the control groups are using pesticides, herbicides and veterinary drugs. Treatment group usage of pesticides rose from 17.5% to 31.2% over the period. The positive increases for both groups suggest program spillover effects.

These trends in input usage are also reflected in the amounts purchased and kwacha outlays. For instance, average fertilizer purchases rose 21.4% for treatment group farmers and 61.1% for those in the control

“Previously we grew maize the way our parents used to grow it—now we do it differently. We use new varieties and get higher yields. Before we didn't know about different diseases for maize - now we know how to handle them, how to use chemicals on maize before planting and before harvesting.”

—Maize and groundnut farmers (male and female), FGD, Chikupili area, Mkushi



group. The significant improvements by the control group might also be attributable to PROFIT cattle or cotton activities in the control region.

Increases in expenditure on fertilizer and veterinary drugs were greater, however, for farmers identified as active in PROFIT than for those who were inactive. The active group increased average spending on fertilizer by 86.4% (from 667,000 kwacha to 1,242,000) while average expenditure in the inactive group rose by 77.4% (from 836,000 kwacha to 1,519,000 kwacha). Spending on veterinary drugs rose sharply (from low initial levels) for both groups: by 180.9% for those active in PROFIT (from 31 kwacha to 86) and by 117.8% for those inactive in PROFIT (from 25,000 kwacha to 55,000).

In the baseline survey, only 9.3% of treatment group farmers and 18.2% of control group farmers indicated that they had received information on available agricultural products and services. By the time of the endline survey, the situation had changed dramatically, with over 90% of the members of both groups acknowledging receipt of such information. In the baseline, the primary sources of information cited were camp and village extension officers. Endline results indicate a more diversified base of information channels. While extension officers still represent the most frequently reported source of information (45.2% of treatment group members and 21.7% of the control group), farmers indicated family and friends as well as community radio to be additional important sources.

Treatment group farmers reported a 14% decrease in advice/training received from period to period while control group numbers remained steady. This drop may reflect a tendency for farmers who have received training once not to pursue further on-going training.

From baseline to endline, price remains the most important factor in deciding from whom to purchase inputs. At the endline, 76.9% of treatment group members and 81.8% of control group farmers indicated that price was an important variable. One interesting evolution is the increasing importance of input quality. At the baseline only 25.5% of treatment group members and 31.8% of control group farmers indicated quality was an important factor. These figures jumped to 75.5% and 79.7% respectively by the end of the program.

## QUALITATIVE STUDY RESULTS

Farmers interviewed in the qualitative study expressed a positive view of the agent network model. Both men and women farmers said they have better access to inputs through the agents and benefit from reduced transport costs associated with accessing inputs. They also benefit from advice on production techniques, planting and the correct selection and use of inputs. In some cases, agents facilitate access to information on new products and services, new buyers and prices. A few agents also help farmers sell their produce. The farmers trust the agents because they come from the same communities, are known and treat them fairly. They appreciate the personal contact and attention they get from the agents.

Research found an evolving sense of trust between value chain actors involved in the agent network, although this has taken time. The benefits received by all actors point to win-win relationships in the value chain—farmers now have access to

“Agents bring products to the village in bulk and there are no transport costs to the farmers. Agents are demand-driven—they bring what farmers want and give them money for. Agents also bring product knowledge—they teach us how to use the product. If you buy in the shop, they don’t teach you. Agents that sell chemicals live in the village and know the problems that we face. We know them. Agents also help in terms of sales of our crops; they bring information on prices. Agents are fair because we know them. If you are short on cash, they will give you a discount, or allow you to pay a few days later.”

—Male and female maize and groundnut farmers, Focus Groups Discussion (FGD), Chikupili area, Mkushi

inputs and the knowledge and skills to upgrade; agents gain through additional income, knowledge and position in the community; input suppliers have expanded their sales and market coverage. The research suggests that the flexibility of the model in adapting to different actors, contexts and products helps to maintain the balance of power, information flow and benefits in the value chain. The trust that is emerging should help to sustain and expand the agent network and reinforce the benefits for farmers, agents and input suppliers in the retail sector.

The agents interviewed in the endline study were all in favor of the agent network model. They are able to make extra income and obtain valuable knowledge and training from the input suppliers on the use of the products and the application of the chemicals. Some agents also received training on how to provide spraying services. They highly value this new knowledge because they also are farmers and can apply it in their own farming businesses. While, overall, agents expressed a high degree of satisfaction with the model, they also faced challenges, such as transporting the goods to the farmers. Another challenge is that the input supply business is seasonal, so it does not provide year-round income. Perhaps the biggest challenge for both farmers and agents is coordinating the timing of orders. Farmers need chemicals at different times and sometimes they have to wait until there are enough orders from other farmers before the order is bulked, submitted and filled. Farmers who do not receive their inputs on a timely basis sometimes lose trust in the agents and the system.

Input suppliers interviewed indicated that the agent model brings them closer to farmers. In particular, seed companies said that it allowed them to identify and diagnose problems early and to get better information on farmer demand. According to one input supplier, this closer relationship helps them to understand the mentality of farmers and their needs. This information serves as a driver for them in innovating new products to meet farmer needs better, such as new seed varieties. They also see that the agent network has helped them to market the products and increase farmer awareness of them.

## **BEEF**

### **BACKGROUND**

The beef sector in Zambia is disjointed, with weak and ineffective linkages. As a result, the sector has limited ability to respond to industry threats such as low productivity, drought, disease and competition from imports. Furthermore, the disconnectedness of the sector limits the flow of information, fosters a lack of transparency that distorts commercial incentives, limits the adoption of better on-farm practices and minimizes the demand for critical support products such as veterinary services, financial products and services and feed services and products. Many small farmers regard cattle more as a source of prestige and store of value than as a commercial product.

High rates of cattle morbidity and mortality are especially challenging constraints to upgrading the sector. Despite the danger of frequent disease outbreaks, few smallholders vaccinate their cattle or test regularly for infection. When cows fall sick, they usually die – medical assistance is rarely available and even when it is, farmers often do not trust it to work. The problem involves both supply and demand. On the supply side, there are too few veterinarians in Zambia and they usually work exclusively with large, commercial cattle owners. Most vets have little interest in serving poor smallholders, who are spread across vast distances in Zambia's thinly populated countryside. On the demand side, smallholders are often unaccustomed to the idea of preventive care and unconvinced of the value of modern medicine. These problems create a vicious cycle in which cattle remain highly susceptible to disease while rural households remain poor and vulnerable.

Working with both private and public veterinarians, PROFIT supported the development and marketing of a Herd Health Plan (HHP), which is a one-year prevention program provided by veterinarians based on an upfront annual payment per animal. PROFIT used a community-based agent model to expand program outreach to rural areas. In this model, the vet, along with members of the community, identifies a representative, a Community Livestock Worker (CLW), to serve as the link between the vet and farmers and help organize farmers as a group, involving them in the HHP to reduce program costs.

Project activities initially focused on Mazabuka District, which also served as the site of the treatment group in the impact study. However, the private vet in the area was interested in working with only one community. In keeping with the demand-driven nature of the project, PROFIT did not pressure the private vet to expand the smallholder program but instead introduced the concept to the public vets. PROFIT continued its work in the baseline area; however, as a result of the above circumstances activities were less dynamic than in other areas. To ensure fuller coverage and learning, the evaluation team extended its qualitative research beyond Mazabuka to include Chongwe, where the private vet was more active and interested in offering services to farmers, which resulted in more beneficial livestock sector activities.

## FINDINGS

When field workers for PROFIT revisited the areas selected as the treatment and controls in the baseline survey in 2010, they found that the patterns of program participation during the 2007-2008 season differed drastically from those anticipated when the quantitative research was designed. As shown in Table 7, the number of farmers who were active in PROFIT (through participation in the herd health plan or by purchasing one-off veterinary services) was actually much larger in the control sample than in the treatment sample. This probably had to do with the limited cooperation of the veterinarian in Mazabuka and the greater spread of the program than had been anticipated when the research was designed.

**TABLE 6: BEEF: ACTIVE AND INACTIVE FARMERS IN THE TREATMENT AND CONTROL SAMPLES, 2007-2008 SEASON**

Treatment Group		Control Group		Total
Active	Inactive	Active	Inactive	
50	193	114	29	386

In view of this finding, quantitative analysis of the survey data for beef focuses on farmers' status in the 2007-2008 season (whether active or inactive in the PROFIT program), rather than on residence in the originally defined treatment and control areas.

## HYPOTHESIS 1

**Project activities will lead to increased sector output by value and volume, increased channeling of production through formal marketing structures, increased smallholder participation, increased access to higher-end markets, a higher producer price relative to the commercial price and improved ability to withstand shocks on the part of the smallholders.**

Relatively few farmers sold cattle during the year prior to either the baseline or the endline survey. At the baseline, only 26 out of 164 active farmers sold cattle, while only 25 out of 222 inactive farmers did so. At the endline, 24 active farmers sold cattle while 46 inactive ones did so. It seems significant that while 102 farmers out of the 386 in the total sample sold cattle in one or the other of the two years surveyed, only twelve (eight active farmers and four inactive ones) sold cattle in both years. This strongly suggests

that the old pattern of holding on to cattle and selling them only when special needs arise—not as a regular, consistent business matter—persisted during the period of the study.

Given the low frequency of cattle sales, especially of regular sales from year to year, some of the issues posed in Hypothesis 1 appear premature. The great majority of farmers who sold cattle reported selling them to local traders, the traditional sales outlet. Only a few reported that they sold cattle to lead firms, processors or brokers.

In its qualitative research, the research team found that the HHP promoted the formation of commercially viable relationships around preventive veterinary services in some communities. In the past, veterinary services were considered a public good that should be provided for free by the government. However, certain farmers are now willing to pay for veterinary services after seeing demonstration effects of the positive impact on animal health. Particularly important is the increased recognition of the value of preventive veterinary services.

## **HYPOTHESIS 2**

### **Smallholder cattle farmers will benefit from higher productivity, increased sales and higher profits for participating smallholders.**

In interviews and FGDs, key informants stated that the new service schemes introduced by PROFIT helped to reduce the cost of accessing veterinary services by bringing the vet closer to the community. Farmers indicated their satisfaction with the HHP because the preventive approach significantly reduced the cost of treating animals (transportation and medicine costs) once they became sick. It has also improved communication by bringing vets into the communities and allowing for direct relationships with farmers.

- Farmers who were selected by the community to become CLWs expressed satisfaction with their relationships with both farmers and vets. They appreciate the knowledge and training they receive from the vet, which they can use in their own cattle-raising businesses. Although the CLWs do not receive monetary compensation from the vet for services performed, all of the agents indicated that access to knowledge was the key motivation in continuing this work.

- As a result of increased marketing and availability of veterinary services through the vets and vet agents, farmers' awareness of the value of veterinary services has increased, especially of preventive services related to disease knowledge and symptom identification. CLWs trained farmers to identify disease symptoms and made them aware of the importance of dipping/spraying and vaccinations.

Before farmers had a perception that vet services should be provided for free. PROFIT helped change this mindset. Now people are starting to realize the value of HHP. Farmers value this service so much that if they are not in the scheme they feel left out. Now they understand the concept of prevention.

—Public vet, Mazabuka

In the past, vaccinations were not done and a farmer would struggle with a sick animal. The vet would need to come from a far place and he was not reliable, as he would sometimes come and other times not.

—Beef farmers, FGD, Chikankata area, Mazabuka

### **HYPOTHESIS 3**

**If the firm-level impacts are achieved, they will result in improved welfare within smallholder households as indicated by higher household income, asset accumulation and the ability of participating households that are poor to climb above the poverty line.**

Despite limited evidence of project impact at the firm level, the survey did show that average reported cash consumption expenditure per household (a proxy for household income) rose significantly between the two surveys. Since expenditure was measured in current kwacha, some of the increase reflects inflation, which apparently ran at about 30% in the inter-survey period. The reported increases were considerably larger than that, however, averaging 178% for active households and 107% for inactive households. Since relatively little change was detected in the patterns of beef cattle production and marketing, it is unlikely that these large increases – if they are genuine and not merely artifacts of data collection processes – can be attributed to this particular economic activity.

### **HYPOTHESIS 4**

**Improved sector and firm performance will be preceded by measurable firm-level outcomes, including increased and improved veterinary services, greater utilization of veterinary services, better herd health, increased stock turnover, higher average stock value, improved margins, a shift to cattle as a business rather than a store of value, increased smallholder access to financial services, increased quality and differential pricing by quality and new entrants into the meatpacking industry.**

Over the study period, surveyed farmers reported a very large increase in the use of private veterinary services. Only 5% of the sample (just 19 farmers) used them at the time of the baseline survey, but 43% (167 farmers) did so at the time of the endline survey. As might be expected, there was significant growth in the use of these services among farmers designated as active in the project by PROFIT field workers, many of whom would have joined herd health plans. Just seven members of this group (4% of the total) had used private vet services at the time of the baseline survey. When the endline survey was conducted, 72 members of the active group (44% of the total) said they were using private veterinary services. Perhaps surprisingly, however, the increase in the use of private vet services by farmers described as inactive in PROFIT was almost equal in magnitude, rising from 12 users (5% of the total) at the baseline to 95 (43%) at the endline. Some of the growth in veterinary services use outside the group of farmers not directly involved in PROFIT activities may be attributable to spread effects of the project.

There were also reported increases in the use of banking services and borrowing from formal sources, although both of these remained at very low levels. Conversely, borrowing from informal sources, traditionally the main source of credit, declined. The use of hired labor for cattle rearing, while still relatively uncommon, increased.

By far the most prevalent cattle rearing inputs/services used by smallholder farmers are dip chemicals and vaccines. On average, over 80% of farmers used both of these services at the endline. Purchases of supplements and feeds increased during the study period, with one-third of reporting farmers using them at the endline. Other services, such as cattle spraying, herding services, cattle transportation services, stud services and artificial insemination, were used infrequently.

Over the study period, both treatment and control group farmers enjoyed reductions in cattle morbidity and mortality rates for all diseases with the exception of anthrax and ‘\_Other’. The diseases most often mentioned in the ‘\_other’ category are black leg, blood in urine, broken leg, poison or weak at birth. The average number of sick cattle fell by 69 percent (from 3.5 to 1.1) for farmers regarded as active in the

PROFIT program, versus a drop of 16 percent (from 2.5 to 2.1) for inactive farmers. Similarly, the average number of cattle deaths in the year preceding the survey dropped by 81 percent (from 2.6 to 0.5) for active farmers, versus a drop of 29 percent (from 1.4 to 1.0) for inactive farmers. Although both declines are strikingly greater for active than for inactive farmers, the differences are not statistically significant because of large variations within both samples.

Despite the challenges of collecting upfront payments and changing the farmer mindset toward a more commercial approach to cattle-raising, PROFIT experience has demonstrated that some farmers will choose to invest in upgrading once they see clear benefits of doing so. Although increases in average herd size and cattle sales were not observed during the period of the study, it is possible that these changes will emerge in time as results of the measured improvements in herd health.

## COTTON

### BACKGROUND

The cotton industry in Zambia operates on a contract basis. Cotton farmers are locked into supplying product to a particular cotton firm through the provision of inputs on credit. Farmers receive input packs (that contain seeds and chemicals) from cotton firms, the cost of which is deducted when the crop is sold. This practice draws farmers in Zambia to growing cotton because it is the only commercial crop for which inputs are available and the end-market is secure. However, since the transaction costs of switching from cotton to other crops such as maize are very low, when the price of cotton goes down, farmers switch to other crops on a seasonal basis. This tendency reduces sector productivity and the wide availability of inputs on credit to all those planting cotton means that there are no incentives to attract high-performing farmers or to improve productivity. PROFIT planned activities to alter this market structure in a way that would be beneficial for both farmers and lead firms.

Unfortunately, a number of unanticipated events during the study period affected cotton sector performance in the country and especially in the South, where PROFIT began its work. Appreciation in the value of the kwacha resulted in lower prices to the farmers.<sup>9</sup> At the same time, a number of Indian and Chinese cotton merchandisers entered the market offering higher prices than the lead firm and tempting farmers to break their contracts. Farmers responded to these events by engaging in side selling, cutting significantly into the value of sales to Great Lakes, the lead firm working with the project. In addition, an unusually wet rainy season led to much lower than anticipated yields, further reducing cotton sales. Eventually the contract farming arrangements established by Great Lakes and facilitated by PROFIT broke down. Subsequently, large numbers of farmers moved out of cotton production. Between 2006 and 2008, the number of cotton farmers and the amount of cotton produced fell by 50%. The loan default rate in the industry increased to 40%. In 2008, Great Lakes Cotton ceased operations in Zambia.

PROFIT's cotton sector activities in the eastern part of the country (not covered by the longitudinal survey) met with greater success than those in the South. In the East PROFIT worked with another lead firm, Dunavant, to identify local cotton farmers who became its agents. Agents select farmers, distribute

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<sup>9</sup> Cotton prices in US dollars *did not* decline in 2006. According to the National Cotton Council of America, the average world price was 55.19 cents per pound in 2005 and 58.56 cents per pound in 2006. The falling price experienced by Zambian farmers was thus entirely attributable to kwacha appreciation. World prices rose further in 2007 and 2008 before declining to 62.75 cents per pound in 2009. Currently, however, a global cotton shortage caused by conditions in China is pushing prices up sharply. The National Cotton Council of America predicts an average price of 85.73 cents per pound in 2010.

inputs on behalf of Dunavant, monitor the growing process, and usually collect cotton at harvest. Their commission is based on loan recovery and the volume collected.

In an effort to build farmer loyalty and create incentives for greater productivity, Dunavant started a Preferred Supplier Program (PSP) with PROFIT's support. High-performing farmers were identified as "gold farmers" and received a 10% discount on input packs. In addition, farmers who reached production targets became eligible to participate in a raffle for prizes, such as oxen, iron sheets, bicycles, planting seed and chemicals. More than 300 farmers received prizes in the 2008 season. Dunavant also started training farmers on land preparation, timely planting, spraying and weeding and crop-handling techniques.

## **FINDINGS**

Areas selected for the baseline study were located in the South because this was where cotton sector activities were concentrated at that time. Because the project cut back and eventually ended activities in this area, opportunities for observing impact there were limited. No conclusions can be drawn from the quantitative data. The qualitative research team interviewed a limited sample of respondents in the baseline areas in the South. To further inform the research and lessons learned, Dunavant representatives were interviewed about firm experiences working with PROFIT in the East. Although activities in the East began too recently to draw conclusions, they do offer some useful lessons for project implementation and demonstrate important shifts occurring in the cotton sector.

First, there has been a shift away from using credit to "lock-in" farmers to increasing loyalty through incentives and building relationship. In anticipation of a price increase and industry rebound, Dunavant is investing in better-performing farmers through its Preferred Supplier Program (PSP). This approach suggests an important shift in the lead firm management model. Second, third-party input providers are integrating into the cotton sector as spray service providers enter the market and linkages are built between cotton firms and input suppliers.

## **LESSONS LEARNED ACROSS THE THREE SECTORS**

PROFIT's experience in the three sectors studied suggests some important general lessons about the design and implementation of new generation economic growth programs.

- No one model offers a complete solution to complex problems. For example, PROFIT learned that vet services needed to be delivered in multiple ways through multiple mechanisms. This makes the ability to adapt to changing market environments important. Understanding and maintaining a system-wide perspective is critical for the project implementer to see where momentum is happening and when resources shifts have to take place. The herd health plan provided a catalyst to the vet services market but was not going to be the predominant offering in the marketplace.
- Trust and relationship building takes time but can be strengthened through community involvement in selecting agents and through active input supplier engagement with their agents and their communities. Trust and satisfaction on the farmer and agent side are strongest where suppliers are more involved in promotion and training.
- Understanding farmers as consumers as well as producers can be effective at fostering behavior change. Smallholders have proven to be a viable market. After seeing field demonstrations and the benefits of adopting new products and technologies, farmers were willing to invest in upgrading.

- Focusing on behavior change and not individual transactions has proven effective for understanding why growth is or is not happening and can help broaden a project's understanding of how change can be catalyzed.
- A commercial input industry can be a key driver of innovation both on the farmer and input supplier side and critical for longer-term upgrading. Learning about the smallholder market and farmer needs through closer contacts with farmer communities helps drive product innovation by input suppliers, such as developing new seed varieties or packaging chemical products in smaller quantities to meet farmer needs.
- The shift to targeting smallholders is not just a process of promoting products to smallholders. It requires changing the business model to a volume-based business model that has systems to manage large numbers of customer relationships. Critical elements of such a management system include managing agents, better order tracking processes, staff training, staff performance compensation systems and better inventory management systems.
- Building the internal management capacity of input suppliers is critical to the effectiveness and expansion of agent networks. Critical factors are a) the input suppliers' capacity to manage their agents and view them as a core part of their business and not as outsiders; b) input suppliers' ability to forecast smallholder demand and manage inventory; and c) input supplier engagement at the community level through promotional activities and training to maintain quality control of agents, learn about farmer needs and build agent credibility within the communities.
- Inputs are a key component of agricultural value chains and should not be treated as public goods. Handouts and government-controlled subsidy programs lower the probability of upgrading by limiting access, increasing longer-term costs and reducing innovation by crowding out private sector investment in the input industry.

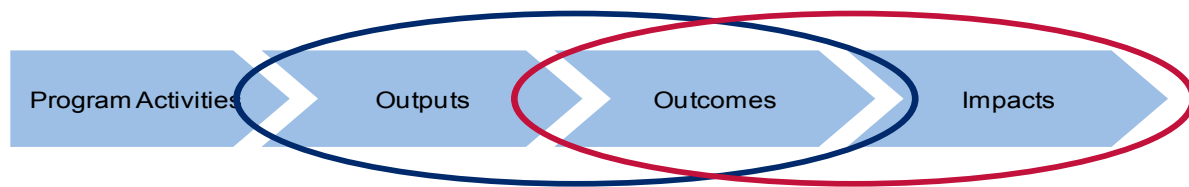


# ANNEX 1: CAUSAL MODELS

## CAUSAL MODEL PROCESS

A causal model shows the logical links between program activities and expected outputs, outcomes and impacts. The concept has been around for as long as PSD programs, although at times under different names. As a matter of practical necessity, all PSD programs are based on some kind of underlying causal logic.

FIGURE 2: CAUSAL MODEL



### Program Monitoring

*Whether we are on the right road*

- Measures outputs and outcomes
- Focuses on two levels: project and firm
- Does not attempt to “attribute” outcomes to project

### Impact Assessment

*Whether we have arrived at our destination*

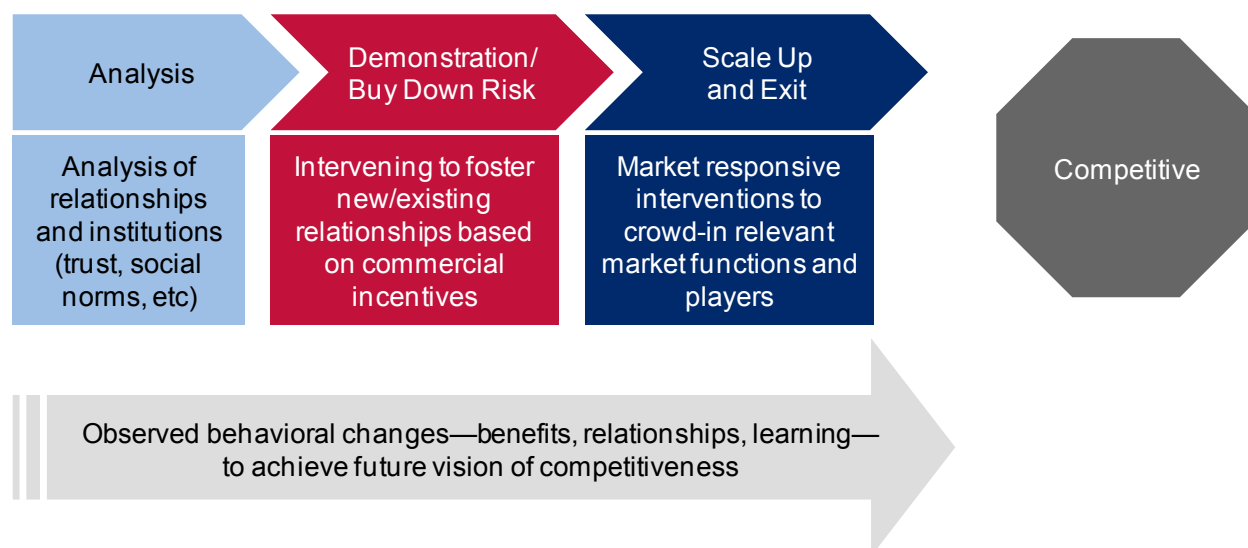
- Measures outcomes and impacts
- Focuses on three levels: household, firm, and sector
- Attributes outcomes and impacts to project
- Requires comparison to counterfactual: What would have happened in absence of project?

Although the concept of the causal model is well known, a surprising number of economic growth programs fail to articulate a formal causal model capturing all relevant program activities and associated outputs, outcomes and impacts. An even larger number of programs do not integrate the causal model into their project management activities or operations. The purpose and benefits of causal models in program design are generally well understood. However, program design is dynamic rather than static. Design flaws, unanticipated events, changing market conditions and external events often dictate that programs adapt and change during the course of their operations. Project managers need management tools to help them monitor and navigate this process.

In the PROFIT project, the causal model is one of the primary tools staff uses to address management challenges. PROFIT staff refer to their causal models as “industry pathways” to reflect the reality that while the project rarely changes its desired impacts or the intermediate outcomes, it continually modifies its activities in response to how the industry is progressing.

PROFIT has expected activities to change in response to changing sector conditions, the industry’s reaction to program activities and events outside the industry that affect industry performance. The industry pathway matches program activities to the industry causal model to show the expected sequencing if the industry is to increase its competitiveness. Industry pathways are revised regularly in response to feedback from staff and management and industry performance.

**FIGURE 3: AN INDUSTRY PATHWAY**



The use of causal models and industry pathways by PROFIT has yielded a number of operational benefits. They provide staff with vision of an industry’s competitive potential, which helps them to visualize why certain activities are relevant to program success. Industry pathways also provide a conceptual structure for discussing complex issues surrounding industry competitiveness. Program staff members regularly use pathways to determine whether program activities are moving an industry forward or are having an unintended effect. Pathways shift the focus of reporting away from outputs based on activities and towards analytical assessment of whether an industry is moving in the right direction and at an acceptable pace.

**TABLE 7: PROFIT PROJECT CAUSAL CHAIN: COTTON**

Activities (Facilitation)	Outputs (Service Delivery)	Outcomes	Impacts
<b>CFU Farmer Training (conservation training)</b> <ul style="list-style-type: none"> <li>• Training of trainings for lead farmers</li> <li>• Incentivized farmer extension</li> <li>• Demonstration plots</li> </ul>	<ul style="list-style-type: none"> <li>• # of trainers trained</li> <li>• # of farmers trained</li> <li>• # of demonstration plots</li> </ul>	<ul style="list-style-type: none"> <li>• Rising % of land under conservation farming practices</li> <li>• Rising yield/hectare in served areas</li> <li>• Rising % of land receiving proper early preparation</li> </ul>	<b>Sector Level</b> <ul style="list-style-type: none"> <li>• Increased competitiveness</li> <li>• Improved ability to sustain competitiveness</li> </ul>
<b>Facilitated Commercial Delivery of Sector-Specific Fee Services (spraying, tillage, weeding)</b> <ul style="list-style-type: none"> <li>• Identify potential suppliers</li> <li>• Promotion</li> <li>• Linkages</li> </ul>	<ul style="list-style-type: none"> <li>• # of commercial service providers</li> <li>• # of linkages</li> </ul>	<ul style="list-style-type: none"> <li>• Increased secondary cropping</li> <li>• Decreased production costs per hectare</li> <li>• Improved soil quality</li> <li>• Increase land sprayed</li> <li>• Increased diversification of services</li> </ul>	<b>Firm Level</b> <ul style="list-style-type: none"> <li>• Increased sales</li> <li>• Increased profits</li> <li>• Increased productivity</li> </ul> <b>Household Level</b> <ul style="list-style-type: none"> <li>• Increased income</li> <li>• Decreased poverty</li> <li>• Increased household assets</li> </ul>
<b>Sector-Specific Market</b>	<ul style="list-style-type: none"> <li>• # of services available</li> </ul>		

Activities (Facilitation)	Outputs (Service Delivery)	Outcomes	Impacts
<b>Information and Training</b> <ul style="list-style-type: none"> <li>SMS (cell phone) text messaging</li> <li>Radio advertisement</li> </ul>	<ul style="list-style-type: none"> <li># of people using services</li> <li># of radio programs on farming practices</li> <li># of hours of radio programming on farming practices</li> </ul>	<ul style="list-style-type: none"> <li>Increased revenue for service providers</li> <li>Better farmer knowledge of market opportunities and cultivation practices</li> <li>Increased use of appropriate tillage service</li> </ul>	

**TABLE 8: PROFIT PROJECT CAUSAL CHAIN: BEEF**

Activities (Facilitation)	Outputs (Service Delivery)	Outcomes	Impacts
<b>Vet Services</b> <ul style="list-style-type: none"> <li>Organize group payment mechanism for communities</li> <li>Facilitate service delivery structure based on herd plans</li> <li>Facilitate a vet networking</li> <li>Develop business expansion model (work with vet assistants)</li> <li>Facilitate development of livestock insurance (packages with services)</li> </ul>	<ul style="list-style-type: none"> <li># of private vets providing services</li> <li># of animals receiving health care (especially preventive)</li> <li># of vets organized into networks</li> <li># of vet assistants</li> <li># of insurance policies established</li> <li># of new bulls sold</li> <li># of stud service transactions/AI</li> <li>Sales volume of drugs sold through vets &amp; retail stores</li> <li># of vets given business training</li> </ul>	<ul style="list-style-type: none"> <li>Increased # of cattle under private vet schemes</li> <li>Decreased cattle mortality &amp; morbidity</li> <li>Increased value/animal</li> <li>Increased # of vet services provided (growth of vet industry)</li> <li>Increased # of smallholders accessing financial sector (decreased risk of loss)</li> <li>Improved margins</li> <li>New entrants of vets &amp; vet assistants</li> </ul>	<b>Sector Level</b> <ul style="list-style-type: none"> <li>Output growth by value &amp; volume</li> <li>Growth (in volume &amp; value) of output going through formal structure</li> <li>Access to high-quality market</li> <li>Growth in smallholder output share</li> <li>Increased smallholder price relative to commercial price</li> <li>Improved ability to withstand shocks</li> </ul>
<b>Market Transparency Activities</b> <ul style="list-style-type: none"> <li>Facilitate establishment of blind auctions with scales</li> <li>Facilitate grade &amp; standard pricing at abattoirs</li> <li>Link smallholders to feed lot systems</li> <li>Develop artificial insemination (AI) &amp; breeding services through vets</li> <li>Facilitate wholesale</li> </ul>	<ul style="list-style-type: none"> <li># of auctions established</li> <li># of scale services available</li> <li>Grades &amp; standards pricing structure established</li> <li># of feed lot outgrower systems established</li> <li># of cattle sold at feed lots</li> <li>Use of savings instruments</li> <li># of cattle sold through more transparent mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>Improved animal quality</li> <li>Decreased mean age at slaughter (increased stock turnover)</li> <li>Differential pricing by quality</li> <li>Increased awareness of market requirements among vets</li> <li>Shift from cattle as a store of value</li> <li>New entrants into beef industry (more</li> </ul>	<b>Firm Level</b> <ul style="list-style-type: none"> <li>Increased sales</li> <li>Increased profits</li> <li>Increased productivity</li> </ul> <b>Household Level</b> <ul style="list-style-type: none"> <li>Increased income</li> <li>Decreased poverty</li> <li>Increased household assets</li> </ul>

Activities (Facilitation)	Outputs (Service Delivery)	Outcomes	Impacts
distribution of vet drugs  <ul style="list-style-type: none"> <li>Develop savings alternatives for smallholders</li> <li>Link tanneries to abattoirs</li> </ul>		balanced market shares)	

**TABLE 9: PROFIT PROJECT CAUSAL CHAIN: RETAIL INPUT DISTRIBUTION**

Activities (Facilitation)	Outputs (Service Delivery)	Outcomes	Impacts
<ul style="list-style-type: none"> <li>Expansion model development using wholly owned stores, agent networks, modified franchises (corner of store), buyer clubs</li> <li>Create incentives to market inputs</li> <li>Conduct market research with agents &amp; retailers</li> <li>Work with larger retailers on packaging and inventory management</li> <li>Facilitate transparent contracts between wholesalers and retailers/franchises (clear responsibilities regarding payments &amp; dispute resolution)</li> <li>Work with Farmers' Union on dispute resolution</li> <li>Work on marketing programs of retailers &amp; agents</li> <li>Facilitate or provide agents' access to training</li> <li>Promote dealer networks; may help dealers access financial services</li> <li>Work with seed, chemical, etc. producers &amp; push them into the distribution network</li> <li>Facilitate outgrower schemes for seeds</li> </ul>	<ul style="list-style-type: none"> <li># of retailers signing MOUs</li> <li># of agents, franchise stores, wholly owned new stores &amp; buyer clubs</li> <li>Incentive scheme in place</li> <li>Agreements signed between retailers &amp; agents</li> <li>Marketing/inventory plans completed</li> <li>Market research conducted</li> <li>New dispute resolution mechanism in place</li> <li># of dealers in networks</li> <li>Linkages to wholesalers/ large producers established</li> <li># of outgrowers</li> </ul>	<ul style="list-style-type: none"> <li>Increased sales at wholesale &amp; retail levels among clients and within the sector</li> <li>Increased # of farmers accessing retail services</li> <li>Marketing activity launched by retailers</li> <li>Increase # of retail outlets</li> <li>Decreased cost/unit of inventory</li> <li>Increased access to finance from seed companies &amp;/or banks</li> <li>Smooth functioning of dispute resolution process</li> <li>Increased knowledge about inputs and their uses</li> <li>Increased used of inputs on farms</li> <li>Increased production of inputs (seed, chemicals)</li> <li>Reduced cost of inputs</li> <li>Reduced transportation cost for farmers</li> </ul>	<p><b>Sector Level</b></p> <ul style="list-style-type: none"> <li>Increased farm productivity (multiple crops)</li> <li>Increased farm income</li> </ul> <p><b>Firm Level</b></p> <ul style="list-style-type: none"> <li>Increased sales</li> <li>Increased profits</li> <li>Increased productivity</li> </ul> <p><b>Household Level</b></p> <ul style="list-style-type: none"> <li>Increased income</li> <li>Decreased poverty</li> <li>Increased household assets</li> </ul>

<ul style="list-style-type: none"> <li>• Add layers of services to input supply chains (e.g., sprayers linked to input providers)</li> <li>• Promote outgrower schemes for non-traditional crops</li> </ul>			
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# ANNEX 2: SUMMARY OF CHALLENGES

## RETAIL INPUTS AND SERVICES

Despite the successful implementation of the agent network model and its positive role in improving the agricultural input supply in rural areas, several challenges remain:

- Meeting individual farmer's needs for supplies at a particular time is complicated by the need for agents to order in bulk to offset the transport costs. Farmers complained that this sometimes prevents them from getting products when they need them. Input suppliers only deliver products directly to farmers for large orders. For smaller orders, the agents must wait for a significant number of orders to be placed before it is cost effective for them to make a trip to the input supplier.
- Agents also face challenges in transporting the products to their customers due to limited transport services. The roads are bad, the distances are long and finding transport is sometime difficult. Most agents use bikes, depend on rides with trucks, use public transport or get a ride with a PROFIT representative when he/she is in the area.
- A related challenge is the lack of finance for the agents to be able to purchase larger stocks of products that could be readily available in the village. Expansion/growth of agents will require access to finance for transport and product stock.
- A challenge for some input suppliers has been their limited capacity to forecast and fulfill the growing demand from the increasing number of farmers they serve through agents. Agents sometimes come to the input suppliers with orders and find that the products are not available. While supply is improving, it has undermined the trust of some farmers and agents in the system.
- A related problem is the limited capacity of input firms to shift management practices and systems from a focus on per unit market (a few large clients) to a volume-based model (thousands of clients). Volume-based management is critical to meeting the needs of the smallholder market and it has been a struggle for input firms to make this shift. The shift requires standardized reporting and record keeping with investments in management systems to gather and assess operational trends; track orders and inventory; perform market analysis, research and forecasting; and provide training for mid-level management staff.
- Input suppliers with centralized management structures, in which decisions are made by the head office in Lusaka, have experienced less dynamic growth in agent networks because decision-making is slow and the allocation of resources to regional offices for agent management and community involvement is limited.
- Changing farmers' attitudes toward the adoption of new technologies remains a challenge. Resistance to innovation in rural communities is strong; many farmers tend to rely on the old ways of production and ingrained perceptions until they see the direct impact of new products and technologies on crops.
- Input suppliers voiced some difficulties in managing agents and have problems with non-payment. However, this was mainly the challenge early on as the suppliers started working with newly selected

agents to discover that some of them were dishonest and tried to avoid the payment. With time, input suppliers were able to identify the underperforming agents and end their relationship with them.

## BEEF

The uptake of commercial veterinary services faced a number of interrelated challenges. Although the project succeeded in demonstrating the value of veterinary services to farmers as they experienced reduced cattle mortality, critical challenges remain around prepayment difficulties and the lack of investment incentives in cattle due to the fact that farmers traditionally view cattle as sources of social capital used to link families rather than as investments.

Although farmers' interest in veterinary services is growing, organizing payments in advance for a year of services remains a challenge. The relatively large upfront payment required by the HHP structure limits the program's uptake. Payment problems result not from lack of trust, but rather from shortage of funds and poor planning for expenses among farmers. The problem is made worse by farmers' unwillingness, for social reasons, to sell one animal to protect the rest. While farmers will sell an animal to buy crop inputs, it has proven particularly difficult to facilitate their taking a similar commercial decision to invest in vet services for cattle.

The private vet in Chongwe was struggling with erratic payments from farmers that caused instability for the vet's services and the HHP. At the time of the field research, he made a decision to put the HHP on hold until back payments were made and farmers could pay upfront in full. The private vet in Mazabuka experienced similar challenges.

## COTTON

Achieving changes in the cotton sector was complicated by the nature of the industry, where the decision to grow cotton was not driven by purely commercial interests but by the availability of input credit. Yields were low and the sector was managed extensively by increasing the number of low-

performing farmers, offering little opportunity for them to develop into competent commercial farmers. It proved a challenge to convince the lead cotton firms of the importance of farmer management and of providing a range of commercial and non-commercial incentives to farmers based on performance factors such as yields, quality and loyalty. In addition, upgrading and restructuring of cotton firms' internal management systems was necessary because they were not designed to capture information on farmer productivity and did not contain effective checks and balances at the level where farmers interacted with the firm. However, once competition hit the industry, cotton firms recognized the value of farmer selection and better supply chain management, and requested project assistance. Although companies such as Dunavant realize that shifting away from the input credit model is a good strategy in the long run, they are unlikely to move away from it in the near future because of the significant machinery investment they have in ginneries and the need to ensure the operation of their businesses, especially because, at the time of the qualitative research, many were operating significantly under capacity.

We can't allow farmers to pay late and can't provide credit, as they will never pay that way. But there are also farmers on the program who pay regularly.

—Vet assistant, private vet, Mazabuka



# ANNEX 3: SUMMARY OF GENDER ISSUES

## RETAIL INPUTS AND SERVICES

Both men and women farmers are engaged in farming and in decisions around the purchase and use of inputs and upgrading. Both genders interact with agents in purchasing inputs and receiving advice, and both have a favorable view of the agent network model. Men and women alike said they had good relationships with the agents and trusted them with the money they give them in advance for their input purchases. While there are only a few women agents, most farmers—women and men—said that the gender of the agent was not a major factor in their relationship with them.

Both the input suppliers and head office representatives interviewed suggested that women often are better agents than men because they are hard working and honest. However, this preference was not evident on the ground; there are still very few women agents and much can be done to promote their participation and actively reach out to women farmers. In delving deeper, the research found that while progress is evident, women continue to face constraints in terms of mobility, access to information, control over income and, in some cases, gender-biased attitudes.

The number of women agents is still limited—one input supplier said two out of 24 agents were women and five sub-agents were women; another said that out of 139 hubs<sup>10</sup>, 4-5 are women. However, input suppliers cited many advantages of working with and through women agents: they are good trainers, constructive and good at explaining things to farmers, more trustworthy with money, acceptable to the community and also well accepted by farmers. They are perceived as responsible and faster learners than men. They also are seen as more honest and hardworking than some men. The main constraint they see is that women are not as mobile because they cannot bike long distances to reach farmers.

Although there are only a few women agents, and few or no women input suppliers or representatives in the large input supply companies, actors all along the value chain had a very positive view of women agents, which suggests good potential to expand their involvement.

Respondents generally concurred that the gender division of labor in farming is breaking down, with women and men playing similar roles across activities. This positions women as active consumers of agricultural inputs, information and technologies, users of agent services and, potentially, beneficiaries of commercial farming.

Study participants describe a pattern of joint decision making at the household level around farming production and sales. While both men and women participate in the decision making process (suggesting a bargaining model of decision making), several people said that final decisions typically are made by

“These days all the work is the same for men and women. There are no such jobs that are for men or women only”

—Focus Group Participants, April 2009

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<sup>10</sup> Hub is a managing agent, see footnote 1.

men. This is especially prevalent in the Tonga, which is a more traditional area where polygamy is common.

Some ideas for how to expand women's participation as agents are to:

- Encourage women to participate more actively in community farmer meetings, especially in meetings where agents are nominated by community members;
- Work more with and through women's groups;
- Give tips in the training for how agents can be 'gender aware' in their work;
- Actively promote products and information services to women;
- Offer information sessions at women-friendly venues (places *and* times);
- Have a training session with input suppliers on the potential for expanding into the women's market (recognizing the needs of women farmers);
- Promote the participation of women as sub-agents;
- Provide more gender disaggregated data on agents to headquarters; and
- Build on the positive views of women agents and farmers.

"Before planting season, we sit down and decide how much to plant of which crop, based on the information we get from the farmers group. The final decision is made by men, but the agent has taught us how to make decisions to increase our income."

—Female farmer FGD, Mkushi

## BEEF

Livestock has traditionally been a male-dominated sector and cattle raising has always been a male activity. Gender dynamics might differ from region to region, depending on the ownership of cattle (because cattle is a tool for locking in family networks, the ownership depends on whether the assets are passed down through the female side). However, although women are seen as primary owners in some areas, they usually do not hold the decision-making power with regard to cattle. All decisions on sale of cattle or purchases of veterinary services are typically made by men, and it is usually men who take cattle for services.

The following observations on gender dynamics were made during qualitative research in Mazabuka (part of more traditional Tonga areas) and Chongwe (a mixed tribe area).

Male and female farmers interviewed report that access to information between men and women is the same because information is shared during meetings attended by both men and women. Men are still making most of the decisions in cattle rearing, especially where and how much to sell. A few men do discuss these issues with their wives.

Ownership of cattle is mixed and women do own cattle, but men typically negotiate HHP services and take the cattle to get services.

—Agent for private vet, Chongwe

Although men are at the forefront of cattle-raising activities, some interviewees said women play an active role in the adoption of veterinary services and in some cases are more adaptive to change than men.

Men usually keep most of the income, although women do keep part of the money earned. Men make decisions on how to use the money and which vet services to purchase. In some families, decisions on how money is spent are made jointly as a family, but this mostly happens in female-headed households.

Male and female veterinarians reported working well with all farmers regardless of their gender. Although there are female vets, the vet agents are mostly men because it is difficult for women to take on such public roles with regard to cattle, which is traditionally a male business.

During a focus group discussion in Chongwe, a female farmer identified the lack of female vets in the area as a constraint. The farmer claimed that, as women, they needed a female vet in order to be encouraged to become better farmers, since they believe a female vet would be more attentive to female concerns. She indicated that most male farmers prefer male vets.

## **COTTON**

Women and men are both involved in growing cotton. Gender dynamics are discussed in detail in the retail sector section (below), and the same general practices related to decision-making and income distribution apply to the cotton sector farmers. The following observations were made during the qualitative research and illustrate several gender issues related to cotton growing specifically:

- No differences were observed between men and women in terms of growing and selling cotton, where they perform the same functions.
- A lead cotton firm observed that women are more honest than men and tend to deliver all of the cotton they grow; men are more likely to side-sell or not repay input credit.
- A lead cotton firm also reported that women tend to spend more time in the field and, as a result, their cotton yields are better.