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SCALING IMPACT: CAMBODIA MSME EX-POST ASSESSMENT

LEO
Leveraging Economic
Opportunities

REPORT NO. 33



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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

CONTENTS

ACRONYMS.....IV

I. INTRODUCTION 1

II. MSME BACKGROUND AND THEORY OF CHANGE 3

III. RESEARCH METHODOLOGY..... 7

IV. PROJECT CONTEXT AND ITS EVOLUTION 9

V. KEY FINDINGS 11

VI. CONCLUSIONS..... 17

ANNEX: BIBLIOGRAPHY 22

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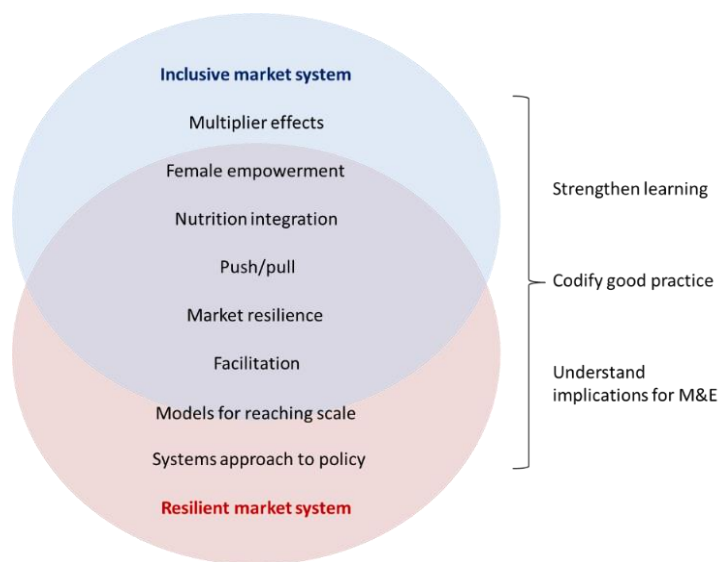
ACRONYMS

BEE	Business Enabling Environment
DAI	Development Alternatives, Inc.
LEO	Leveraging Economic Opportunities
MSA	MarketShare Associates
MSME	Micro Small Medium and Enterprise
PAT	Poverty Assessment Tool
PPI	Progress out of Poverty Index
PPP	Purchasing Power Parity
TOC	Theory of Change
USAID	United States Agency for International Development

I. INTRODUCTION

The goal of the Leveraging Economic Opportunities (LEO) activity¹ is to increase the capacity of USAID staff and its development partners to use evidence-based good practices to: (i) design new projects and activities that promote inclusive market development, (ii) effectively manage their implementation, and (iii) evaluate their results. LEO pursues an ambitious learning agenda that explores a number of interrelated research topics, as shown in figure 1. One of these research streams focuses on models for reaching scale. Many small-holder farmers face multiple barriers to accessing input and output markets, including isolated location, small farm size, inadequate financial assets and services, and limited market and agricultural skills. LEO is researching a diversity of models that implementing agencies are using to solve the issue of linking smallholders, including the very poor, to input and output markets. The research focuses on the principles and conditions that made these models effective.

Figure 1. LEO Research Topics



Since 2013, LEO has conducted research into projects² that have addressed these issues through a market systems facilitation approach (see textbox 1). In Phase 1 of this research, LEO conducted two desk-based reviews of 50 projects, with a more detailed study of 16 projects. The results were summarized in two papers (Fowler & White, 2015a and b). Phase 2 of this research includes two field-based case studies focused on expanding the learning of priority cases from Phase 1. This is the final report from the second of those research projects, assessing the legacy of the input supply sector development activities of the USAID/Cambodia Micro, Small and Medium Enterprise (MSME) project’s Phases 1 and 2.

MSME promoted the use by the private sector of an embedded training model, in which companies would provide technical information on input selection and application at no direct charge to swine farmers in order to increase input sales. This study finds that the embedded training model has endured and even expanded since the end of the project, being used to varying

TEXTBOX 1: KEY DEFINITIONS

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

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

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

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

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

extents by the majority of the firms in the sector. Only one of the 11 surveyed wholesalers that MSME worked with had discontinued its use of the model. Firms have adapted their training offering vis-à-vis the model originally promoted by MSME, and are also using other methods (e.g., direct farm visits) to provide technical information. New input wholesalers who launched following the end of the MSME project are also applying an embedded training model, indicating that it has become an industry norm.

Section two of this document summarizes the MSME project's objectives and theory of change for the growth of embedded training models in the swine input supply sector. Section three presents the field research methodology, including limitations. Section four outlines the broader economic and social context in which the project operated, including drivers of change to which the project was responding and/or shaping. Section five presents the findings of the field research. Finally, section six presents overarching conclusions.

II. MSME BACKGROUND AND THEORY OF CHANGE

The USAID/Cambodia-funded MSME and MSME 2 projects were implemented from 2005 to 2012 by a consortium led by DAI and Nathan Associates. The first phase lasted between 2005 and 2008 with a budget of \$5 million. It focused on three value chains (swine husbandry, pond-raised fish production, and clay tile manufacturing) in four provinces. The second phase, called MSME2/Business Enabling Environment (BEE), operated from 2008 to 2012 with a budget of \$21 million. MSME2 expanded to 9 value chains across 17 provinces. It built on the work of phase one with a stronger emphasis on strengthening the business enabling environment. Because phase two continued phase one's activities in the swine sector, both projects are collectively referred to as "MSME" for the remainder of this report and analyzed together.

In contrast to the majority of agricultural projects funded by international donors in Cambodia, MSME used a market facilitation approach (see textbox 2) in which it avoided directly financing its target beneficiaries: small-scale farmers. The final evaluation summarized the MSME approach as follows:

“As a major underpinning of its implementation methodology, MSME 2/BEE did not attempt to entice participation through subsidies, such as free fish, seedlings, or per diem payments, and this practice served as a reliable self-selecting recruiting tool for true entrepreneurs and ambitious members of the private sector. The project's pitch to potential clients was the offers to assist them in learning how to grow their business and facilitate introductions to other value chain actors who can help them help themselves. While imperfect, this filter eliminated many of the firms that lacked entrepreneurial energy. The Project became known in local communities as the “banana and water project” because that was all MSME 2/BEE offered to meeting participants.” (Mendez et al, 2012)

TEXT BOX 2: FACILITATION APPROACH

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

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

MSME concentrated on identifying and working with high-potential farmers who were willing to invest in their businesses and experiment with new approaches. It strove to strengthen relationships and build linkages between value chain actors, thereby improving productivity and enhancing the business enabling environment in Cambodia. This assessment focuses exclusively on the swine value chain, which contributed the majority of MSME 2's reported impact. The MSME project carried out a wide variety of activities along the swine value chain, from improving access to quality inputs (e.g., vaccines, medicine, commercial feed) to promoting home feed production, upgrading physical markets, improving slaughterhouse operations, creating linkages to markets, and addressing broader issues in the business enabling environment.

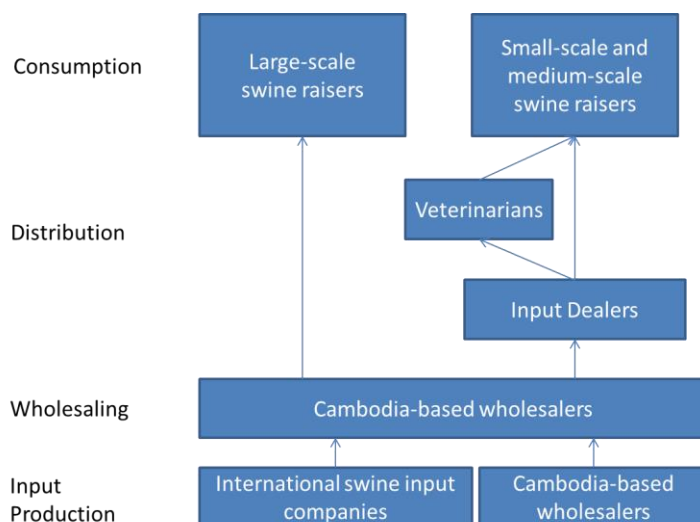
MSME’s focus was on improving the performance of swine raisers, particularly those with small and medium size operations (i.e., under 10 swine). At the beginning of the project, most swine raisers had low productivity, paid high feed costs, and used few, poor quality inputs. Low or negative returns caused many farmers to view swine rearing as a store of assets or source of food rather than as a business. From among MSME’s activities in the swine sector, this assessment examines particularly its work in improving the input supply sector.

Quality inputs are critical for productive swine rearing. Vaccines and other medicines prevent diseases that otherwise cause high mortality rates. Well balanced pig feed can greatly increase the pace of weight gain, allowing faster sale and higher returns. However, MSME’s market analysis showed that most Cambodian swine farmers either did not purchase inputs. Farmers wouldn’t purchase inputs given distrust of their efficacy. This was often informed by past experience in which poor quality or counterfeit inputs had no effect, or farmers had misapplied the inputs. Common forms of misapplication included applied medicine that was inappropriate to the ailment affecting the swine, waiting to apply vaccinations until after swine were already showing signs of sickness, and using imbalanced feed that would not maximize weight gain. The project discovered that a systemic driver of these issues was the lack of information on quality inputs flowing through the market system. At the time MSME started operating, swine raisers could not easily access information about proper input selection and usage. While local input suppliers existed, they generally stocked poor quality products and knew little about how to use them. that they could explain to swine raisers. Farmers often purchased from itinerant salespeople, who with no fixed location had little incentive to provide quality inputs or customer service. These challenges were driven by underlying weaknesses in the market system, including wholesalers not investing in long-term relationships with their customers, a lack of trust between farmers and input suppliers and many farmers’ belief that swine production was not a business activity that merited investment and careful attention.

To address these systemic constraints, MSME encouraged wholesalers to directly invest in educating their customers through trainings and seminars that promoted their products and explained how and when to use them. MSME initially organized seminars at which wholesalers’ staff would present on their products and train MSME-selected swine raisers on their use. Input dealers would sometimes attend as well, but were not the focus of the training. The swine raisers who were trained – like all MSME beneficiaries – had initially demonstrated themselves to be prepared to take risks and invest in their businesses. In some cases, wholesalers directly organized multi-day seminars, for which MSME covered a steadily reduced portion of the accommodation, food and venue costs. MSME termed this *embedded training*, as the cost of the training was to be embedded in and indirectly paid for by input sales rather than being directly covered through a training fee. Figure 2 provides a stylized depiction of the main players in the Cambodian swine input supply system.

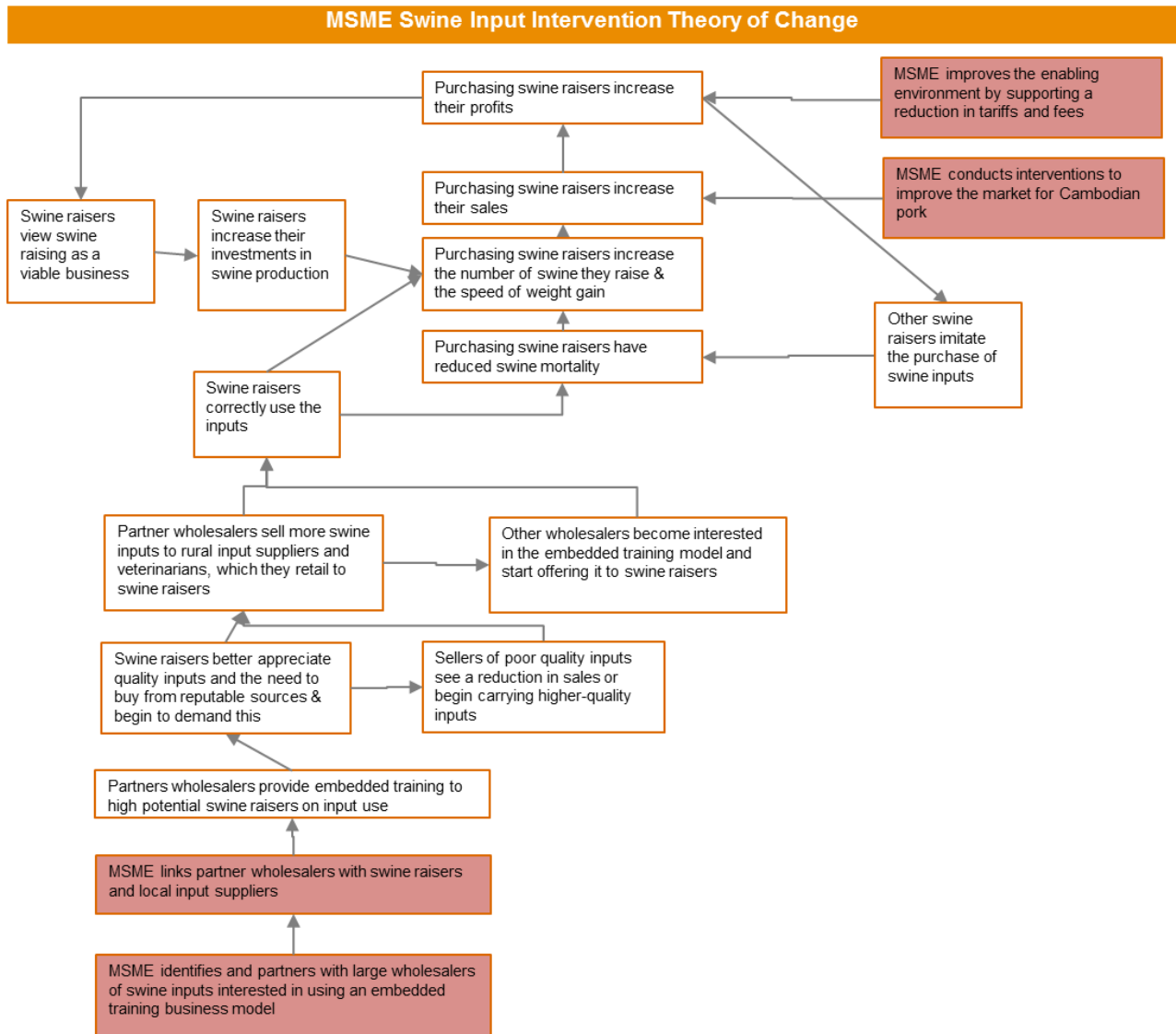
In the absence of a documented theory of change (TOC) that fully articulated the anticipated logic of MSME’s work in the swine input sector, figure 3 below presents a TOC constructed by

Figure 2. Structure of Cambodian Swine Input Supply System



the research team of MSME's embedded training intervention. The TOC was reviewed and agreed upon with MSME's former Chief of Party and M&E representative. It outlines the anticipated linkages between MSME's activities (shaded in pink) with wholesalers and its ultimate anticipated impact of increased profitability of swine raisers. As reflects its facilitation orientation, MSME did not work directly with swine raisers. It rather worked through wholesalers as the market actor who could develop and maintain an embedded training model post-project. MSME expected the information that wholesalers provided to farmers through trainings to generate increased demand for quality inputs and a corresponding increase in sales for the wholesalers. The success of the model and MSME's active recruitment of other wholesalers were expected to cause them to also offer embedded training. As a result of the new information, swine raisers were expected to correctly use inputs, reducing swine mortality and increasing the number of swine they kept and their speed of weight gain. This, together with complementary MSME interventions to improve the market for Cambodian pork and the enabling environment, would increase swine raisers' sales and profits. This benefit would cause other swine raisers to also want to purchase and correctly use swine inputs, and for swine raisers to increasingly view swine rearing as a business meriting investment and attention.

Figure 3. MSME Swine Input Interventions Theory of Change



III. RESEARCH METHODOLOGY

The original review of the MSME project that informed this study took place between June 2014 and January 2015. That included a review of MSME documentation and phone interviews with former project staff. The preparation for this study began in March 2015 and continued until January 2016, including the set-up of logistics, development of a sampling frame and sampling strategy, and review of background documentation. The research methodology that was selected drew from process tracing and contribution analysis (Mayne, 2001 and 2011) in their focus on weighing the evidence for multiple causal contributors and (in the case of contribution analysis) constructing or analyzing theories of change to guide investigation.

The research team undertook field research in February and March 2016. Data cleaning and analysis was performed from March to June 2016. To understand how the embedded training model had evolved, the research focused on conducting interviews at three levels in the value chain: the wholesalers; the input dealers and veterinarians; and the end consumers for the inputs (the swine raisers). The research team obtained MSME’s list of partner wholesalers to identify the sample frame and requested interviews from all of them.

To survey a representative number of farmers, input providers and veterinarians within its available budget, the research team conducted interviews with those actors in two provinces. To ensure that it could reach its sample size targets, the research team eliminated from consideration provinces with fewer than 200 beneficiary farmers, five input suppliers and five veterinarians. From the resulting shortlist, Kampong Cham and Kampot Provinces were selected randomly. This selection was opportune, given that the former was targeted by MSME in Phase 1 and 2 while the latter was only targeted in Phase 2. Although MSME maintained a database of its beneficiaries, it did not include contact information. The team therefore first contacted those interviewed during the endline survey, where contact phone numbers were collected. As this did not yield a sufficient sample size, the team also reached out to MSME’s former contact people in the targeted province for referrals to MSME beneficiaries. When visiting the target villages, the research team asked interviewees if they knew other project beneficiaries, making reference to the MSME database as needed. Non-beneficiary input suppliers and swine raisers were identified using a snowball sample method in which interviewees suggested others who they knew were engaged in the swine sector. The target and actual number of interviewees is presented in table 1.

Table 1. Targets for Informants and Actual Achieved

MARKET SYSTEM ACTOR	TARGET	ACTUAL	NOTE
Wholesalers	10	14	Interviewed 11 beneficiaries and 3 non-beneficiaries. From original 15 beneficiaries, 2 had closed, and 2 did not respond.
Input Suppliers	11	11	6 of 5 target interviews were completed in Kampong Cham. 5 of 6 target interviews were completed in Kampot (2 of these were found to be feed makers, not input sellers)
Veterinarians	65	6*	*During the interview testing process, it became clear that veterinarians had a smaller role in the embedded model than had been originally understood (i.e., in practice, they usually had no role at all), and so interviews with veterinarians were quickly discontinued.
Swine Raisers: beneficiaries	202	200	100 of 108 target interviews were completed in Kampong Cham. 100 of 94 target interviews were completed in Kampot

Swine Raisers: non-beneficiaries	202	185	91 of 108 target interviews were completed in Kampong Cham. 94 of 94 target interviews were completed in Kampot
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LIMITATIONS

Finding project beneficiaries: It proved difficult for the enumerators to find a sufficient number of project beneficiaries to meet the sampling targets given the aforementioned difficulty of obtaining contact information. It was exacerbated by the number of swine farmers who were not raising swine at the time of the survey, either because they had stopped engaging in agriculture entirely or had temporarily ceased production given poor prices. The enumeration team found that many swine farmers were entered multiple times within the MSME client database, meaning that the actual number of project beneficiaries was smaller than initially believed. Once identified, some beneficiary swine raisers listed in the MSME database did not remember the project, even after receiving several prompts by the enumerators. This may indicate that the ‘light touch’ of a market systems approach made identifying MSME more difficult, but may also reflect the length of interaction between the project and the farmers: MSME was only active in Kampot in Phase 2. The research team also found that the input supplier category in the database included a mix of input sellers, feed makers and veterinarians. Identifying interviewees to meet the target sample sizes was therefore more difficult.

Respondent recall: Interviewees often struggled to answer certain questions, given the time that had elapsed between project activities and this ex-post assessment. Changes in personnel among the wholesalers meant several interviewees had not personally engaged with the MSME project. Such respondents were often unaware of the reason that their company had made certain decisions, such as to adopt embedded training, which were taken up to 10 years prior during MSME Phase 1.

Lack of original comparison group: The MSME project and its external evaluators did not survey non-participant swine raisers. Moreover, MSME’s strategy of working with more entrepreneurial farmers meant that it would not be possible to assume that the MSME baseline also represented the original status of the non-beneficiary swine raisers that were surveyed during this research. Consequently, this research had to reconstruct a baseline for the comparison group by having them recall various things to either the beginning or end of the MSME project. Given the amount of time that has elapsed since those two points, respondents experienced difficulty recalling certain information such as the number of pigs they owned at that time and their primary motivation for pig raising.

Comparability with MSME 2 endline: The sample frame for this study differed from the MSME 2 baseline and endline. To fit within the available budget, this study sought a representative sample from two provinces, whereas the endline interviewed farmers across 12 provinces. Thus there is a risk that the farmers from Kampot and Kampong Cham provinces may not reflect the characteristics of the entire suite of provinces in which MSME operated. Moreover, MSME applied the Poverty Assessment Tool (PAT) during its endline to estimate the poverty status of its target population. However, as of 2012 the PAT is no longer being updated. Consequently this ex-post assessment used a different tool to assess poverty, the Progress out of Poverty Index (PPI). While the study originally hoped to compare the PPI and PAT findings, this proved difficult to do.

IV. PROJECT CONTEXT AND ITS EVOLUTION

Market systems do not operate in a vacuum; their trajectory is influenced by many factors beyond project activities, and their condition in any time and place is a function of what has happened to them in the past. Thus the findings of this assessment must be understood by looking at the trends and dynamics among swine raisers, government, private-sector input supply, and swine industry-focused projects. Table 2 presents a summary drawn from secondary documentation, including MSME documents, of some of the drivers in the Cambodian swine sector that have influenced the swine input supply sector.

Table 2. Evolution of swine input availability and capacity development

MARKET SYSTEM ACTOR / ASPECT	PRIOR TO PROJECT LAUNCH (2005)	PROJECT IMPLEMENTATION (2005-2012)	FOLLOWING PROJECT CLOSURE (2012-2016)
Small-scale swine raisers	<p>Small-scale farmers (having 1-6 pigs) dominate pork production.</p> <p>Farmers have high pig mortality rates and high costs.</p> <p>Limited geographic access to veterinary and medical services. Small-scale swine raisers use relatively few inputs.</p>	Smallholders are purchasing more swine inputs than previously.	<p>Migration of working-age population out of rural areas to garment factories and cities.</p> <p>Minimum viable size for swine raising increasing as low market prices force increased economies of scale.</p> <p>Cessation of pig farming by many farmers.</p>
Commercial swine raisers	Very few large swine farms.	Growth in number of commercial swine farms.	Continued growth in number of commercial swine farms.
Input supply companies	<p>Medivet and CP are among the only active wholesalers of quality swine inputs in Cambodia.</p> <p>Only Medivet is conducting embedded training to farmers, but on a small scale.</p> <p>Most local input suppliers “offer limited advice and few services, at best; most are located in the provincial markets and sell outdated Thai, Vietnamese, and Chinese chemicals, seeds, and medicines with little practical knowledge or advice. Few if any input suppliers provide services at the farm gate. Pig feed is too expensive for raisers</p>	Rapid entry of new wholesalers into the sector, and fast expansion of existing wholesalers.	<p>New swine input wholesalers continue to enter the market.</p> <p>Input suppliers vertically integrate into production.</p> <p>Rural input suppliers face declining sales as small-scale swine raisers exit the market.</p>

	due to the distance from the suppliers of feed.” (San et al, 2006)		
Sector assistance programs	Four donor-funded projects were operating prior to MSME in the swine sector, primarily on the provision of para-veterinary services, vaccination usage, pig rearing techniques and feed making.	MSME is the main swine-oriented project in Cambodia.	No major new donor or government investments in the swine sector.
Market conditions	Cambodia market is not very integrated with its neighbors, though increasingly a destination for Thai and Vietnamese pork imports.	Prices collapse in 2005/2006 due to large-scale dumping of Vietnamese pork in the Cambodian market. Prices then temporarily surge in 2007/2008 owing to a government ban on pork imports.	Decline in swine prices cause many small-scale swine raisers to exit the market. Very small-scale swine raisers cannot compete at the prevailing market prices. Lower-cost Thai and Vietnamese pork imports continue.

V. KEY FINDINGS

ENDURANCE OF MSME'S MODEL AND OUTCOMES

The embedded training model that MSME supported continues and has spread in the industry since the close of the project. This is true among providers of feed, vaccinations and other medicines. Of the 11 surveyed MSME partner wholesalers, seven (64%) have expanded their use of embedded trainings while one has continued to offer a similar number of trainings as during the project. Two have reduced the trainings they offer – one because of a strategic shift towards serving large-scale farmers – while one company has stopped offering embedded trainings entirely. In the latter case, the decision to stop offering the training was made by a new director who had not previously worked in the swine sector and perceived farmers either did not pay attention or did not come at all when they offered embedded trainings. As a result, he decided to stop offering trainings and to offer technical assistance directly to farmers on their farms instead – another form of embedded training in which farmers do not pay directly for the training but rather via their purchases of products and services.

Consistent with the model that MSME promoted, wholesalers remain responsible for organizing and delivering the training. They provide trainers and cover any relevant costs. If they already have an established supply network, local dealers that carry their products are responsible for publicizing the training and circulating invites to swine raisers who visit their shops. There have been adaptations though. The multi-day trainings that MSME offered are now provided very infrequently and never at the village level; they are mostly provided when an international supplier is visiting and typically target large-scale farmers. **Wholesalers' trainings oriented at small-scale and medium-scale raisers now follow a standard model:** half-day morning trainings hosted in a local dealer's shop or other local venue. The first half is devoted to the presentation of new products and explanations of how to address common problems, while the second half is a question and answer session for farmers to share their queries. Trainings are open to all farmers, including non-customers. No village-based input suppliers are offering embedded training independently though some – primarily veterinarians – are conducting farmer visits.

Evidence that smallholders have continued access to technical information is reflected by the finding that **32% have attended embedded trainings or workshops within the last 12 months, while 81.7% have received information at the time of purchase in the last year.** Input suppliers are typically supplied by more than one wholesaler providing embedded training. Surveyed local input suppliers are supplied by an average of 2.4 wholesalers, of which 1.7 on average were providing embedded training to their customers. **Sixty-six percent of input suppliers report wholesalers being their most important source of information on inputs,** and 100% listed the wholesalers as either their first or second choice. The utility of this information is also highly valued; they ranked the information received as 4.2 out of 5.

Beneficiary farmers judged the availability and quality of training to have evolved. Compared to during the MSME project, **65% of swine raisers reported that the frequency of trainings has declined** and 25% stated that it increased. **However, nearly all respondents thought that the quality had either increased (44%) or remained the same (41%)** with no change to the cost or duration.

DRIVERS OF THE MODEL'S ENDURANCE

There were several factors that contributed to the model's endurance, including factors that were external to MSME's influence as well as those over which they had more control.

1. Profitability of embedded training

A key driver is the financial benefit of the model for wholesalers and input suppliers. Among the 10 (91%) wholesalers who have continued to offer the trainings all agreed that it has increased their revenues and profits. Estimates of revenue increases are between 5% and 50%, owing to the increased sales that result from better-informed farmers. Companies view the model as a cost-effective method for reaching and marketing to small-scale swine raisers they could otherwise not afford to reach. Local input suppliers also saw that the embedded trainings were financially beneficial, by increasing demand from local farmers who would then come to purchase in their shops. Reflecting the very minimal investment that they are required to put into organizing and hosting the trainings, they estimated the trainings have increased their revenues and profits by an average of 39% and 36% respectively.

2. Nature of swine products and investment levels

A critical factor supporting the continuation of the embedded training was the average value of purchases made by farmers. On average, beneficiary and non-beneficiary farmers were found to be purchasing over \$2100³ in swine inputs annually. This level of spending is sufficient to support the wholesaler's investment in providing educational services. Moreover, animal health products in particular (e.g., medicines, vaccines) are critical as a quasi-insurance product to protect farmers' considerable investment in their swine. This increases the incentive for raisers to know what products to use, when and how. Diseases are regularly evolving, requiring raisers to continually access new information.

3. Strong information flows

The international ownership and supply linkages in the swine input sector support strong vertical information flows. The large European and regional drug and vaccine suppliers have a bias towards providing frequent knowledge to customers, sending experts to Cambodia an average of three times yearly. The wholesalers use these experts to provide on-farm support to their largest customers and host seminars for input suppliers and occasionally smaller-scale farmers. Thus the norm of providing frequent informational updates to customers is modelled by the very largest companies in the sector, perhaps as a result of customers' and suppliers' needs for frequent informational updates noted above. These information flows can create significant benefits. One wholesaler explained receiving a recommendation from his parent company that he hire technical specialists rather than generalist marketing staff to conduct visits to farmers. He has found this to be very important to his company's credibility with farmers, as the staff are able to field farmers' product-related questions. This innovation is used by many of the wholesalers.

The steady churn of employees from the wholesalers also created knowledge spill-overs within the industry, as employees familiar with training methods either started their own input companies or left to work for startups where they replicated the embedded training model.

³ Consisting of over \$3000 for beneficiaries and \$1100 for non-beneficiaries, when considering responses within two standard deviations of the norm.

4. Sector competitiveness

There is a large number of swine input wholesalers in Cambodia (more than 16 companies currently) and strong competition between them. This means that wholesalers, particularly the less-established ones, must invest in other strategies to market their products and are more willing to try innovative approaches such as providing information to input suppliers or even working directly with farmers to create demand. The large number of wholesalers has fostered a diversification of business strategies, with significant variations in the quality, price and target market of their offerings. The wholesalers marketing higher priced inputs explained that they had the greatest need to educate their customers on the benefits. Moreover, companies are quick to copy practices they think will give them an edge. Former MSME staff described how wholesalers would follow MSME to its village meetings so that they could be the first to present their products to groups of swine farmers. This competitiveness is likely partially fostered by Cambodia's high population density, which makes it profitable to reach large number of farmers with modest expenditure.

5. Continuing engagement of former project staff

Former MSME local staff have stayed active in the sector following the closure of the project. Two former staff continue to provide technical guidance on swine rearing independently and in collaboration with swine wholesalers. They have in some cases actively participated in companies' decisions to offer embedded training, and in others are available as experts to provide embedded training to farmers.

6. Available rural infrastructure

The prevalence and capacity of the input dealers located close to swine raisers greatly supports the model. Some of the small market towns visited during the assessment had ten or more input suppliers selling swine inputs. This allowed the wholesalers to cost-effectively serve rural small-scale swine raisers, because they could refer the farmers to the input suppliers for ongoing sales and support. The large number of input suppliers also allowed many wholesalers to secure distributors of their products. The prevalence of these input suppliers reduced the investment that wholesalers would have otherwise needed to make in distribution; many wholesalers can operate with just a single office in Phnom Penh. While MSME rarely prompted new input suppliers to start—though in a couple of cases those surveyed during the research had launched after receiving project training—MSME did raise their capacity through study tours and other educational inputs.

DRIVING THE MODEL'S CREATION AND PROLIFERATION

Although the research team initially assumed that MSME had introduced the model, stakeholder feedback indicated that the model had more complex origins. Multiple interviews indicated that Medivet was the first company to launch embedded training in Cambodia in approximately 1996—several years before the launch of MSME. Medivet's founder felt strongly that educating farmers was critical to their use of inputs. He steadily adapted his delivery from his office, to hotels in Phnom Penh, to finally offering them in the countryside.

Subsequent to its creation, multiple factors enabled the proliferation of the model. One was staff churn from Medivet—former employees left to launch their own enterprises and replicated the Medivet model. Interviewees at Vyphavet, Betagro and BKP all referenced their time at Medivet as instrumental to their decision to offer embedded training, while FLS's owner introduced the model when launching his own business after working with another MSME grantee. Another factor was parent companies in Thailand and Vietnam, who introduced their training methodologies to their Cambodian subsidiaries. A third very important influence

was MSME's investment in training and promotion. Two companies fully attributed their launch of embedded training to MSME, while another gave significant credit. Yet although MSME was not the reason many companies started offering embedded training, MSME played a large role in the scale-up or improvement of the model within the sector. For three of the wholesalers, including the originator of the training model, MSME contributed to the rapid expansion of the model to new areas in Cambodia. For two wholesalers, MSME helped wholesalers to improve the quality of the training (e.g., less theoretical, more responsive to farmer interests) that they offered so that farmers better responded to it. Only three wholesalers said that MSME had little to no impact on their embedded training delivery. Several companies strongly expressed their gratitude to MSME for the major role that it had played in their business expansion.

EVIDENCE OF SYSTEMIC CHANGE IN THE MARKET SYSTEM

As illustrated in MSME's theory of change, a critical aim was to sustainably improve swine raisers' access to technical information by making information provision commercially viable through increased input sales. There are several signs that this has occurred. One is **evidence of proliferation of additional models of technical information provision**. While nearly all wholesalers offer embedded training to large groups of farmers, every wholesaler now employs staff that visit swine raisers experiencing technical problems to diagnose the issue and sell tailored solutions. This even includes the wholesaler that discontinued providing group-based training. In most cases, wholesalers began offering this service after first introducing embedded training. They particularly provide the training to larger-scale farmers, though most wholesalers insisted they would also visit smaller-scale swine raisers who requested it. This model is particularly interesting given that it represents a much higher degree of investment in individual farmers than does the embedded training model, which can reach as many as 50 farmers at once. Thus wholesalers are actually using models that require increased expenditure on marketing and sales relative to what MSME had encouraged. Wholesalers explained their decision for doing as a necessity to adequately diagnose specific challenges (e.g., animal health) and recommend an appropriate treatment. Thus they see it as complementary to the embedded trainings, which offer the opportunity to reach large numbers of raisers at relatively low cost, but with untailored information.

A second sign of systemic change is wholesalers' **adaptation of the embedded training model**. Whereas MSME involved local governmental authorities in nearly everything they did, the wholesalers now rarely include them as they feel the authorities slow down the process. Moreover, companies have developed other business models for providing technical information to farmers. Angkor Green, for example, has recently launched a fee-based training for farmers on feed preparation with prices set at a level that is affordable for small-scale swine raisers (\$50). The Mong Reththy Group is also offering fee-based training for topics not directly related to the products that they sell. Many of these innovations supported MSME's original aims, though this was not exclusively so. In the case of Mong Reththy, they adjusted their corporate strategy to target farmers with at least 50 pigs for their training seminars; they felt the significant investments in the training were not worthwhile for smaller-scale farmers.

A third indication of systemic change has been the **imitation of the embedded training model by new entrants to the wholesale market who were not active during MSME**. Two of three wholesalers who were contacted have started offering embedded training, while all three offer on-farm training. This is reflected in non-beneficiaries' access to information: 25% are accessing embedded trainings, while 76% are receiving information through other channels from suppliers (primarily during purchases at suppliers' shops). 71% of recipients ranked the training as high quality, while 58% of information recipients did the same.

One anticipated systemic change that did not occur was any change in farmers' mindsets around the purpose of swine rearing, from a mechanism for saving or a source of food, to being a source of income, the survey did not find a significant change from prior to the project to the present: the beneficiaries rearing primarily for income dropped from 59% to 55% while non-beneficiaries who reared primarily for income increased from 36% to 39%. It is unclear whether this is due to competitive pressure from imports (and therefore to the reduced profitability of pig rearing). However, farmers were now significantly more likely to decide where to buy inputs based on quality, and less likely to decide based on other factors like price or location. This was true both for beneficiaries (from 39% to 64%) and non-beneficiaries (from 40% to 59%).

ENDURANCE OF MSME'S OUTCOMES: SMALLHOLDER ACCESS AND BENEFITS

Another important objective of the study was to understand how MSME beneficiaries' access to inputs has changed over time. This is important because even if the embedded training model itself had not endured, farmers' enduring access to inputs is a critical goal of the business models that MSME introduced. **99% and 98% of beneficiaries and non-beneficiaries respectively had purchased feed and feed ingredients in the previous 12 months. Beneficiaries were less likely to purchase veterinarian services (16% vs. 38%) but more likely to purchase vaccines (83% vs. 41%) and other medicine (71% vs. 43%) to administer themselves.** This likely reflects the greater sophistication of MSME beneficiaries and the training they received.

The study also examined how swine raisers' businesses have evolved, which presumably reflects in part the impact of better access to and use of inputs. MSME project documentation indicates swine raisers averaged two pigs each in 2005, 26 in 2008, and 46 in 2012 (DAI 2012a). This upward trend has continued, with farmers who continue to raise pigs averaging 59 swine. It has not been matched by the current value of farmers' investments in their operations however, which now average \$3,897 compared with \$4,712 in 2012 (DAI 2012a). This is likely explained by the depreciation in value of assets that were purchased previously, and reflects a lack of recent investment into the business given low output prices and poor returns. Median sale prices for piglets and fattening pigs were both 9% lower than at endline. Average sales over the previous 12 months have stayed relatively flat, with the median farmer selling 20 piglets and 15 fattening pigs vs. 20 piglets and 17 fattening pigs at endline. Median land devoted to pig production has also declined to 36m² from 40m². Moreover, swine raisers' profits have dropped dramatically at the time of the survey. Mean profits from swine production in 2008 were \$780, which increased to \$2,098 by 2011 (DAI 2012a). At the time of the survey, however, mean profits for all respondents were actually negative at -\$621. Excluding outliers, they were \$1,585. This suggests that the majority of swine farmers who are still raising swine are profitable, albeit their rate of return is substantially lower than it used to be when accounting for their increased number of animals. An important contextual factor that influenced the findings was the poor pork prices prevalent at the time of the survey. This has caused many to exit the industry. Across the two examined provinces, significantly fewer than 85% of surveyed beneficiary farmers have continued to raise swine.⁴ A majority of the wholesalers who were surveyed expressed their opinion that small-scale swine farmers with fewer than 20 sows would be increasingly squeezed out of the business, given low economies of scale and consequent difficulty competing on

⁴ This figure does not represent the actual percentage of MSME beneficiaries that have discontinued swine rearing, as many were no longer farming at all and therefore not included in the statistic.

price with Thai pork. This trend threatens the benefits created by the MSME project for many of its beneficiaries.

A final focus of the study was to assess the poverty status of those engaged in the swine sector. This was done by applying the Progress out of Poverty Index to beneficiaries and non-beneficiaries. The results suggest that nearly none of the control and treatment groups were under the national poverty line. However, the treatment group was significantly less likely to fall under 150% of the national poverty line (17% vs. 27%) and 200% of the national poverty line (39% vs. 53%). The reason for this difference is unclear; it may reflect the impact of MSME programming, or possibly also MSME's focus on targeting swine farmers who seemed most likely to apply their guidance and make new investments.

VI. CONCLUSIONS

The MSME ex-post assessment has generated a range of conclusions of relevance to market facilitators and policy makers. These relate both to the strategies used by the MSME project and also to the process of conducting ex-post assessments.

MSME-RELATED

1. Remain flexible to enable the identification and pursuit of promising opportunities

MSME's support to an embedded training model was not among the opportunities originally identified in its Phase 1 value chain analysis and subsequent analyses. Yet it became among the project's most important points of focus. This demonstrates the importance of implementers remaining open to new opportunities that are identified during programming.

2. Facilitate change by private actors to support sustainability and ownership

Unlike many of the donor-funded projects in Cambodia, MSME's facilitation approach did not provide direct training to farmers. The results of the ex-post assessment demonstrate how supporting private actors to provide information and inputs as part of a commercial business model leads to more durable change than direct service and input provision.

3. Look for existing but nascent business models with the potential for scaling-up

The MSME case suggests that market facilitators do not always need to invent new inclusive business models in order to meet their objectives. In some cases, nascent but viable models already exist but have yet to scale throughout the industry. Such existing models often have the advantage of having already been tested and found to be effective in the target sector, thus not requiring the extensive testing and iterating that introducing a new model would require. Market systems programs should include a thorough analysis of existing business models in focal markets at the outset, or in the early stages, of programming.

4. Consider and support multiple avenues for business model imitation

The MSME case suggests that practitioners' expectations of how innovation spreads in a sector are often overly narrow. Practitioners commonly anticipate that the success of a business model for one firm in a sector will incentivize other firms to observe and replicate that model. While that was the pathway for some firms, in several cases innovation spread via staff turnover or the influence of parent companies. Each of these pathways – and others – should be considered by market facilitators seeking to facilitate the imitation of certain business models. For example, international suppliers are critical to technical information flows in the Cambodian input supply sector. Through their regular visits and periodic seminars, these suppliers help to pass cutting-edge research directly down to Cambodian swine raisers. In designing their interventions and identifying leverage points, market facilitators should consider what role these international input suppliers do and could play in supporting sector upgrading.

5. Anticipate that business models will differ between companies

The MSME experience demonstrates that competitors are unlikely to copy business models exactly as they are practiced by early adopters. Wholesalers have adapted the training model in various ways (e.g., charging a fee, shifting to focus on larger farmers) to fit with their strategic objectives, competitive position and capacity. This implies that projects should focus primarily on demonstrating the purpose and principles of a given business model, rather than overly dictating specific features.

6. Understand whether industry conditions support or impede systemic change

It is clear with hindsight that a series of conditions enabled the spread and durability of MSME-promoted innovations as outlined in Section V above. Market facilitators who are selecting what sectors to target should consider where the conditions are most likely to support systemic change. The MSME experience suggests that one potential condition is the degree to which incentives exist for market actors to innovate, and provide and access information. This in turn is driven by the speed of evolution of knowledge in the sector and the duration of information validity. In the swine sector, the former is high and the latter is low given the pace at which diseases evolve and new treatments are developed and eclipsed.

7. Firms with sufficient human and financial resources are best positioned to maintain and expand innovative business models

Fowler and White's review of effective models for supporting input and output markets (2015a) found that input suppliers drove most of the initiatives that improved the access to quality inputs for large numbers of smallholders. Moreover, larger firms were better able to sustain project delivery models:

Although a resilient system will typically include a diversity of firm sizes, a comparison of the performance of project partners in the selected cases shows larger firms (e.g., input manufacturers or wholesalers, exporters) have proven better able to continue growing their outreach post-project compared with smaller entities. Conversely, those actors more attuned to the needs of disadvantaged farmer groups (e.g., microentrepreneurs, producer collectives, or buyers) are less likely to have the capacity to manage ongoing input delivery past a project's completion. (Fowler & White, 2015a)

The MSME experience supports this finding. No local input suppliers had replicated the embedded training model themselves. Moreover, although local input suppliers and veterinarians strongly benefited from the provision of embedded training, they at times have even been unwilling to support wholesalers to organize the trainings despite the very limited input that this requires. Critically, the large wholesalers have the resources to continue offering the training. Many wholesalers have maintained their use of the model despite changes in senior leadership and significant fluctuations in the swine market, whereas a number of the input suppliers in the MSME database were no longer in business following the retirement of their owner or a downturn in the market.

8. Improvements in input delivery are typically not enough to retain smallholder farmers

Although the MSME project proved very successful at catalyzing access to inputs, unfavorable price trends have proved more important in determining smallholders' participation in the sector. This is partly driven by small-scale Cambodian swine raisers' lack of economies of scale relative to competitors in neighboring countries, but also by opportunities in other fast-growing industries, particularly garment production. While there has been a longstanding pattern of these raisers entering and exiting the industry depending on industry conditions, the trend line clearly favors larger-scale farmers with lower costs of production who can compete

with producers in neighboring countries. Nearly every stakeholder who was interviewed expected this trend to continue, with fewer, larger farms remaining. This raises an important policy question in terms of the role that projects can play in supporting sectors that have the conditions for growth but may ultimately only be a stepping-stone for small-scale farmers who lack the economies of scale to maintain a position.

9. A project's spill-over benefits should be estimated but also validated

The MSME project was innovative among USAID projects of its era in that it sought to understand the indirect impacts that it had for non-beneficiary swine farmers. Therefore it did not only measure the number of farmers it influenced 'directly' (i.e., who attended the trainings it organized with wholesalers). It also asked those beneficiary farmers to estimate the number of other swine farmers with whom they had shared the knowledge they gained from the MSME project, and how many of them partly or fully adopted the new technologies or business practices they shared with them. The project found that the 3,849 small-scale swine enterprises that MSME considered to have reached directly had reached "as many as 41 people per enterprise with 27 people partly or fully adopting the technologies shared" (DAI, 2012b). Accordingly, they reported having benefited 125,076 swine raisers indirectly. Given what a large percentage of total project outreach this represents, it is critical that more effort is made to explore and verify these figures. The MSME performance evaluation did not validate any project-reported results, and doing so was also outside of the scope of this assessment. Better understanding how deep the benefits are for swine raisers who imitated the direct beneficiaries and the durability of those behavior changes are both important.

10. Working with highest potential farmers can yield substantial impacts

MSME's project design was to work with farmers that were most oriented towards farming as a business. It theorized that these farmers would be most likely to adopt new practices and to make investments in their businesses. Such an approach very likely improved MSME's impact. This increased the enthusiasm of wholesalers to offer embedded training to MSME beneficiaries, given the motivation and potential purchasing power of the assembled farmers. And in some cases, MSME unlocked substantial investments in the sector. The Mong Reththy Group's Chairman, for example, launched a pig operation after a presentation from MSME that will have 18,000 pigs by 2018 (Mong Reththy, 2016).

For many projects, identifying potential early adopters and targeting them with interventions is understood to hasten the quick uptake of new technologies, which are then expected to spill-over to more risk-adverse neighbors. As noted above, MSME found this to be the case, with substantial imitation by non-beneficiary farmers. This pathway has been very influential in donor funding for agricultural programming. In Cambodia, where agricultural transformation is encouraging less competitive farmers to exit the business, this approach undoubtedly helped to advance the competitiveness of the sector and the expansion of its more dynamic members while leading the least-competitive farmers to exit the sector and find other agricultural or non-agricultural opportunities.

11. Collective action is challenging

Assessing MSME's work on supporting collective action was not one of the objectives of the assessment. However, interview findings suggest that in some areas, the collective action efforts it supported in phase 2 did not continue following project closure. Several of the farmer feed production businesses that were considered most successful during the project have disbanded. In fact, only six beneficiary and two non-beneficiary farmer survey respondents reported having purchased community-produced feed. Many of the largest wholesalers no longer participate in the advocacy council meant to lobby for industry issues. This is in spite

of the industry facing a lot of existential issues such as dumping of supply by neighbors. Given MSME's significant success in supporting a dynamic input supply sector, further analysis of the barriers that prevented these models from continuing following the project would be fruitful.

ASSESSMENT-RELATED

12. Projects should collect and document information that will support ex-post assessments

It was occasionally difficult for respondents to recall with certainty when they started to offer embedded training and the specific causal factors. With time, a respondent may be more likely to attribute the decision to their own foresight rather than to other influences like a development project. Consequently projects should treat wholesalers and other large private sector partners as they do their target beneficiaries. That would imply clearly documenting the existing business models being applied prior to their interventions, and subsequently collecting information during the project lifetime on how and why businesses changed their models. Moreover, conducting the ex-post study was made significantly more difficult by the omission of telephone data in the MSME database and the unwillingness of the firm that conducted the final evaluation to engage with the research team. Collecting telephone data should be standard during beneficiary research and monitoring activities. Finally, it would have been impossible to conduct the MSME ex-post assessment without access to the project's monitoring information and databases; project reports alone are inadequate to the task of constructing sample frames for surveying. A system for filing these important documents should be in place to allow more ex-post assessments to be conducted.

13. Beneficiaries of market systems programs cannot be uniformly defined

MSME's indirect approach to influencing its target swine raisers necessarily meant that the intensity of their participation varied. MSME's theory of change relies on their accessing and applying new technical information received from wholesalers. But the strength of that effect differed based on the number of trainings they attended and the structure and quality of those trainings, among other factors. The variability in beneficiaries' exposure to project interventions can become problematic when comparing beneficiaries' performance with non-beneficiaries; given that some beneficiaries will have had very little exposure to the treatment. Assessments should therefore assess beneficiaries' depth of exposure and assess whether this has influenced the strength of their outcomes.

14. Evaluating results is challenging in volatile agricultural markets

A long-standing feature of the Cambodian swine sector is significant volatility in prices and, consequently, production. This is a feature of most commodity markets. It presents a significant challenge for ex-post assessments, as well as project-led baselines and midlines, because it can greatly skew the common project indicators used to assess farmer-level (and therefore project-level) performance. For example, low output prices reduce the selling prices that farmers receive for their swine, which in turn causes many farmers to stop producing altogether. Price levels and weather patterns are almost entirely out of the control of the project yet have a significant influence on the perceived performance of a project given the prevailing metrics that USAID-funded agricultural projects employ. Conducting the ex-post assessment at a time of low prices means that the position of farmers will look worse than it would at a time of better conditions. This implies

careful consideration of conditions at the time that assessments are conducted, and also a need to consider metrics that are less easily influenced by factors outside a project's control.

15. Only examining value chain-specific benefits is inadequate

The recognition that many smallholders are not going to remain permanently in any given value chain has significant implications for the scope of ex-post assessments and project monitoring systems themselves. Many value chain projects rest on the assumption that farmers' pathway out of poverty occurs via agriculture. They assume that as farmers improve their productivity and increase their factors of production, their returns will continue to grow to the benefit of themselves and their families. However, this specific route out of poverty does not always occur even for farmers who have experienced significant success in their agricultural business. Such families may be pulled into new non-farm opportunities, or hit a plateau where a substantial increase in investment is required that they are unable or unwilling to make. In both cases, an assessment approach that only examines their performance within a project-selected value chain may yield inaccurate conclusions in terms of the family's well-being. New methods are therefore needed that can look at a household's broader economic status and what contribution, if any, value chain programming played in equipping them for success in other sectors.

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