

CTA Discussion Paper

A Business Case for Engaging the Private Sector in Climate-smart Solutions for Smallholder Farmers





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Executive summary

Large and growing numbers of poor rural households depend on climate-sensitive agriculture and operate on the margins of the mainstream economy. This combined with a broken public extension service and faltering international development efforts places millions of smallholder farmers at disproportionately high risk from a changing climate. Acknowledging the magnitude of the challenge and the required pace and scale of response, coupled with honest introspection on past performance, has prompted the need to look beyond the public sector for delivering climate-smart solutions. Harnessing the financial, technological and intellectual capital in the private sector to complement public sector-driven climate responses is a new dimension in delivery of sustainable climate-smart solutions at scale.

Climate change presents farmers and businesses with risks (and opportunities) that affect their operations, their competitiveness and their profits. Many of the risks and opportunities are shared. Increasingly, proactive businesses acknowledge these as ‘shared imperatives’ which they can tackle only jointly with those who also face them. They are investing in innovative, mutually beneficial and commercially sustainable solutions for addressing shared climate risks in ways that unlock value for all involved, while building the resilience of key players (such as farmers) in their supply chains. This approach is built on the self-interest of businesses and farmers, and is proving to be a game changer in scaling up and sustaining responses.

This report presents compelling evidence of win-win outcomes from private-sector investments that unlock access to technology (e.g., drought-tolerant seed varieties and livestock breeds), finance, markets, information, insurance and other risk-management tools which build the resilience of smallholder farming systems. By helping smallholder farmers increase productivity, stabilise yields, improve quality of products, reduce production costs and transfer risk (through insurance), such investments are concurrently helping businesses stabilise supply (or demand in the case of input suppliers), increase trade volumes and capacity utilisation, access better quality products, lower transaction costs and minimise contractual defaults while building trust and a better understanding of the smallholder context. Benefits go beyond farmers

and businesses. Governments and aid agencies are benefiting from the reduced need for safety nets and disaster recovery costs. New commercial opportunities have also emerged for service providers (including NGOs and research entities) involved in supporting implementation.

Yet resilience-building partnerships between smallholders and the private sector cannot be sustained without significant productivity improvements. Ensuring that smallholder farmers reach the required productivity and quality thresholds to unlock the value that sustains mutual interest in these partnerships is central to success. While low productivity among smallholders presents a major challenge for private-sector engagement, it also offers huge opportunities to unlock untapped potential at relatively low cost.

Extension services are critical

While there are commercial options for supplying farmers with productivity and resilience-enhancing inputs, such as adaptable crop varieties and livestock breeds, providing the required extension support presents particular challenges. Although the payoff has been shown to be significant, the upfront costs of providing extension support and farmer organisation are very high, and usually only large corporations with large market share can afford to finance such investments. Innovative, performance-based funding models for providing farmer support are the key to unlocking shared value between smallholders and the private sector. This is a critical area of investment by national governments and international development partners, although caution is needed to avoid undercutting commercial service providers that are better placed to support the industry sustainably.

Partnerships perform best with an ‘ecosystem’ approach

Rather than addressing risks individually, more holistic ‘ecosystem’ approaches that address a number of risk factors (not only climate risk) concurrently, often in the form of multi-stakeholder partnerships of public, private, NGO and donor partners, have a better chance of success as they maximise complementarities.

This approach has been particularly important for weather-based index insurance, which typically has to be bundled with other interventions, such as improved access to productivity-enhancing inputs, so that farmers are more able to afford premiums. In turn, index insurance unlocks access to credit and more favourable interest rates as it lowers the farmer's risk profile by giving them the means to meet contractual obligations in the event of a climate shock.

Engagement of the private sector in climate-smart solutions is still in its formative stages. There is huge scope to shape how this will evolve over the next few years. Innovative deployment of policy levers, incentives, and regulatory and funding mechanisms at national and international levels will have a significant impact on whether these approaches will become the preferred way of doing business. In addition, knowledge institutions have a key role to play by providing evidence and refining business models to better deliver both resilience and commercial outcomes for all. Local and international research and academic institutions and other knowledge partners need to support a better understanding of climate risk by the

private sector, including supporting smaller agribusinesses to originate, screen and structure funding for climate-smart investments that create shared value for businesses and important value-chain actors, such as farmers.

Governments in developing countries and other development agencies are likely to receive significant funding from international funding mechanisms for tackling climate change, such as the Green Climate Fund. Investing such resources to promote engagement of the private sector in delivering sustainable climate-smart solutions needs to be an area of focus. Providing affordable, tailored and long-term finance through a blend of commercial and quasi-commercial instruments could be the single most powerful instrument for shaping such investments at scale.

A culture of responsible business needs to be nurtured by institutionalising the promotion, rewarding and recognition of progressive business models in ways that transform the private-sector landscape in favour of those that proactively invest in unlocking shared value.

Introduction

Efforts to engage the private sector as a key partner in designing and implementing climate change-response measures are gaining considerable traction. While the private sector has always been an important player in mitigation-related investments, especially through the carbon markets, its potential role in adaptation has received little attention. Discussions to date have largely focused on what the public sector should do and who should pay to support adaptation, especially among poor communities, which are most vulnerable to the impacts of climate change. Acknowledging this limited focus on the private sector, the Global Environmental Facility (GEF) noted that:

“in one critical respect, however, we need more progress: making the private sector a partner in helping nations build resilience and adapt to climate change. The business community needs to be our partner as we build resilience against and adapt to climate change. Yet to date, adaptation discussions inside and outside official climate negotiations have had surprisingly little business engagement... in some quarters, business interest has even been viewed as inappropriate competition for scarce resources. This is changing in a few countries, but not yet in developing nations where the biggest needs exist. Adaptation planning and investments must include the private sector – and the sooner this happens, the better.”
GEF, 2016

“In a sense Africa is facing a perfect storm with food deficit, climate change impacts and rapid population growth. The key is to help smallholders manage their natural capital in a sustainable manner – the land, soil, water, vegetation and genetic resources that are vital for continued and increased agricultural productivity.”
GEF CEO Naoko Ishii

As the full scale of the challenge becomes apparent, there is growing consensus that the public sector alone will not be able to come up with solutions to climate change at the required pace and scale. With 836 million people in the

world living in extreme poverty (UN, 2015), the majority of them dependent on climate-sensitive forms of agriculture, climate change will have far-reaching consequences unless urgent and decisive action is taken. In the face of this, faltering efforts by national governments and their international development partners to transform production systems and eradicate poverty over many decades are a cause for alarm. Despite half a century of rural development cooperation, at least 70% of the very poor are still found in rural areas, most of them depending partly or completely on agriculture for their livelihoods (IFAD, 2011; FAO, 2016). Climate change-induced water scarcity, higher temperatures, changing precipitation patterns and more frequent extreme weather events threaten to deepen the problems already being faced by millions of farming households across the developing world.

“Shared imperatives – they are ‘shared’ because we can only tackle joint risks in partnership with those who also face them. By working together with local communities, suppliers, governments, consumers and beyond, we can create value for all.”
SABMiller

Confronted by these grim statistics, the poor track record of public sector-led development approaches, exponential growth in population in developing regions, and the staggering cost of adaptation¹, development practitioners have been jolted to look again at how agriculture, particularly within smallholder systems, needs to be supported to build resilience in the face of climate change. While there are promising climate-smart agricultural solutions that have been developed to address some if not most of the threats, smallholder farmers have not been able to access them to solve the challenges they face. It is already clear that a ‘business as usual’ approach to supporting climate-smart agriculture will fall short, leaving the poorest and most vulnerable populations in developing countries at great risk. New strategies are urgently needed if climate-change adaptation is to happen at the

¹ Current and projected adaptation costs for Africa far exceed average climate finance flows. Despite the difficulty in accurately estimating the flows, the US\$1–2 billion a year that is flowing to Africa for adaptation is way short of the need, estimated at about US\$7–15 billion a year (UNEP, 2015). World Bank estimates show that developing countries need US\$70-100 billion per year through 2050 to meet current and future climate adaptation needs. In 2011, only US\$4.4 billion in adaptation finance went to developing countries. This leaves a gap of anywhere from US\$65.6 to US\$95.6 billion per year between what developing countries need and what developed nations are giving.

speed and scale required to avoid catastrophic and irreversible loss of livelihoods for millions of poor smallholders, especially those who depend on rain-fed agriculture. A key part of this new thinking emphasises the engagement of the private sector, which has largely been on the sidelines in development efforts targeting smallholder farmers, despite their vested interests.

“It is our firm belief that, for a company to be successful over time and create value for its shareholders, it must also create value for society. We call this Creating Shared Value. The Sustainable Agriculture Initiative at Nestlé is our initiative to support farmers and promote sustainable development worldwide.”
Nestlé

Harnessing the financial, technological and intellectual capital within the private sector to complement public sector-driven climate responses is a new dimension in designing and implementing climate-smart solutions. Climate change presents businesses with risks that threaten their operations, competitiveness and profits. The self-interest of businesses should be a major driver of adaptation actions. While ‘climate proofing’ their investments is important to the private sector, their interest is not limited to managing their own climate exposure. There are also emerging business opportunities in helping other players to reduce their climate risk, by designing, manufacturing and distributing goods and services that help reduce the vulnerability of individuals and communities to climate change, and providing risk-management tools, including insurance (Agrawala *et al.*, 2011; SEI, 2011). In many cases, businesses themselves share the same climate risks with other players within their value chains. A growing number of businesses now acknowledge these as ‘shared imperatives’ which they can tackle only jointly with those who also face them. They are investing in commercially sustainable approaches for addressing shared risks. Such innovative and inclusive approaches present compelling arguments for private-sector engagement; tackling climate change while also unlocking shared value. Expressing concern with the huge adaptation finance gap, the World Bank acknowledged that “the private sector may be the answer to this question. Already, proactive private companies are beginning to address climate change in their investments and business planning. With a little work on the part of the public sector, the private sector may be inclined to invest more in adaptation – to reduce their own risks, as well as those of vulnerable

populations”. The Private Sector Initiative of the United Nations Framework Convention on Climate Change also concluded that:

“while climate change poses a number of risks to vulnerable communities and businesses around the world, many opportunities are unfolding for private companies to implement actions towards reducing risks to their business operations, as well as investing in adaptation action in vulnerable regions in a sustainable and profitable manner. The unique expertise of the private sector, its capacity to innovate and produce new technologies for adaptation, and its financial leverage can form an important part of the multi-sectoral partnership that is required between governmental, private and non-governmental actors.”
UNFCCC, 2018

The private sector-led approach is particularly promising in designing and implementing climate-smart solutions for smallholder farmers who otherwise have limited means to invest in the technology, finance, information and other risk-management tools they need. These areas of mutual benefit need to be fully explored as a basis for sustainable adaptation investments.

Despite the growing optimism, numerous questions remain. If private sector-led climate-smart solutions have such potential, why do they remain an exception rather than the rule? Can these approaches work in smallholder contexts where the majority of farmers use low-input, low-output systems, and operate on the margins of mainstream financial and output markets? Could this renewed impetus to strengthen mutually beneficial commercial relations open the way for broader transformation of smallholder agriculture at scale? Are such arrangements transparent enough to ensure fair share of the value for smallholder farmers? What institutional frameworks are required to incentivise, monitor and regulate such engagements? How best can national and international public resources be deployed to leverage such investments for the benefit of farmers?

This report explores these questions and presents a business case for engaging the private sector in designing and implementing sustainable, climate-smart agriculture solutions in ways that reduce the risks not only for businesses, but also those faced by smallholder farmers. There is compelling evidence that private businesses can indeed improve their commercial imperatives by making investments that also build the resilience of smallholder farming systems. This is the best time to create an enabling environment

for inclusive, climate-smart solutions as the majority of agribusinesses are still assessing their adaptation responses. Timely action on the part of governments, the international development community and other development partners could sway decision-making on climate risk management within the private sector in favour of investments that build resilience of farmers while also unlocking value. The report tackles some of the questions stated above using examples from pioneering companies that have embraced inclusive business models to address shared risks, and case studies from the Southern Africa region and elsewhere in the developing world. While many of the examples are not necessarily designed as climate-smart solutions, they do utilise inclusive business models that address common challenges faced by private businesses and smallholder farmers. The report concludes by reiterating that an inclusive business culture needs to be refined, promoted and rewarded as the new norm and the preferred way of doing business.

CTA's flagship project on climate change

Inputs from this report are intended to inform the design and implementation of CTA's new flagship project on climate change titled 'Promoting Climate-resilient Agrifood Solutions for Cereals and Livestock Farmers in Southern Africa'. The project aims to contribute to the scaling-up of four proven climate-resilient agrifood solutions (CRSs) to increase food security, nutrition and income for smallholder farm households under changing climatic conditions². One of the expected outcomes of the project is 'Successful agribusiness models for private-sector engagement in the scaling-up of the four CRSs'. Implementation will focus on six countries in Southern Africa: Botswana, Malawi, Namibia, South Africa, Zambia and Zimbabwe.

² The four CRSs are drought-tolerant seeds, weather-based insurance, climate information services and diversified livestock options.

The business case for private-sector engagement in climate-smart agricultural solutions

To fully understand what motivates private businesses to undertake adaptation investments, one needs a deeper understanding of how they perceive climate risk. Businesses are the single biggest entities that face climate risk. Climate change will affect companies in many different ways: in the way they operate and the profitability of their operations. Yet climate change may also create opportunities. Businesses may be exposed to different risks as a consequence of climate change, including systemic risks across the entire economy and specific risks at the industry, sector and company levels (Hoffman and Woody, 2008). These risks can be both direct and indirect, and include: physical risks, supply chain and raw material risks, reputational risks, financial risks, product demand risks, regulatory risks and litigation risks. To better understand how the private sector is perceiving climate risk and adapting to climate change, a comprehensive study by the OECD used a three-tier framework that considers: (1) risk awareness, (2) risk assessment and (3) risk management (Agrawala *et al.*, 2011). Risk awareness is the starting point for private-sector considerations of climate change and indicates that a given company is aware that climate change could affect its business. This can lead it to undertake a risk assessment that moves from a general awareness towards specific understanding of the risks and opportunities for the business and operations. Depending on the results of this process, the company may decide it is necessary to implement explicit risk management strategies. The OECD analysis also considered whether companies were taking advantage of the wide range of new business opportunities arising from climate change.

The OECD study found compelling evidence that there is a high level of awareness among companies of the broad range of risks (and opportunities) posed by climate change. Not all companies carry out assessments of risk or of possible adaptation responses. While three-quarters of the companies interviewed acknowledged climate change risks, only two-

fifths of these companies had conducted risk assessments. Most companies assessed risk from current climate variability and extreme events, but fewer also assessed risk from future climate change. Only a third of companies assessed possible adaptation options. Risk assessments are generally more concerned with direct impacts and often focus on increases in frequency and intensity of extreme events. Some companies use existing systems for assessments, such as incorporating climate change into risk management processes. Others adapt existing tools or develop new tools for considering climate risk. Most companies do not possess the in-house capacity to conduct assessments, especially of future risk, and utilise external expertise.

One of the conclusions from the OECD study was that there is a gap between risk assessments and the implementation of risk management actions. Only one-fifth of respondents that assessed risk also implemented actions to manage them. The majority of companies interviewed decided not to implement hard adaptation measures, such as investments in infrastructure. Companies may not implement such measures because they believe they are already taking necessary actions to address climate change, or that supply-chain flexibility limits the need for specific anticipatory actions. Others have implemented 'no regret' or soft measures, which are synergistic measures that are also beneficial to general business operations or which address current climate or environmental concerns. Soft measures, such as addressing water scarcity or supply issues, allow companies to react flexibly to climate change while limiting the risk of potentially unnecessary investments in adaptation measures. Only a third of interviewed companies had implemented hard measures, such as infrastructure investments.

“Facing numerous challenges left by civil war, including unproductive land and a dearth of infrastructure, SECO (a wholly owned subsidiary of Olam), with its partners COMPACI, CmiA and GIZ, have developed an inclusive business model

that has enabled overlooked farming communities in Côte d'Ivoire to transform their livelihoods, while simultaneously growing Olam's volumes, bottom line and customer base. By taking a long-term approach that addresses commercial, social and environmental needs, we have created a win-win situation for SECO and the smallholders. When they do well, we do well. We urge others to recognise the mutual benefits of such inclusivity."

Sunny Verghese, Co-founder and Group CEO, Olam International

It is important to note that the visible level of activity may understate the actual level of activity on adaptation. Actions to improve the management of climate risks may occur as part of standard risk management or planning processes, without being explicitly labelled as adaptation. Unlike with mitigation, where the public good element is obvious, there is little incentive for companies to identify and publicise the work they are doing on adaptation. In addition, information on adaptation can be a source of competitive advantage so companies are reluctant to share it publicly. Adaptation benefits are typically private and local so they do not fit the typical corporate social responsibility model.

A closer look, however, reveals that the private sector is indeed already getting engaged in adaptation. First, the private sector is producing new goods and services that protect assets and livelihoods of businesses and individuals. While the products aren't always marketed as 'climate resilient', they help businesses and individuals who can afford them to reduce their vulnerability and build resilience. Second, most private-sector action on climate change has gone to 'climate-proofing' operations. Companies are purchasing weather insurance, and reducing water and energy usage. Third, some companies are climate-proofing supply chains, making their own supply chains more resilient. Such corporations are helping vulnerable populations, such as farmers who are part of their supply chains, build adaptive capacity as in the case of improving access to drought-tolerant seeds. This last form of climate-proofing is part of a new generation of responsible business models which are demonstrating that adaptation measures can be both profitable and inclusive. Companies are focusing on reducing not only their own risk but also that of those who are a key part of their 'ecosystem'. This holistic

approach means businesses reduce their own risk by finding creative, mutually beneficial and commercially sustainable ways of tackling climate risks that affect supply chains, employees, customers, distribution networks, finance options, insurance costs and the broader macro-economic environment. The next sections describe examples of these business models to demonstrate the feasibility and sustainability of such investments.

Feasibility of private sector–smallholder partnerships

A review of private-sector initiatives in Southern Africa showed that it is possible to achieve win-win outcomes for farmers and agribusinesses. Although the inclusion of climate-smart agriculture (CSA) dimensions were fairly recent in many of these initiatives, several investments were already showing benefits for both farmers and businesses by increasing productivity and stabilising yields, reducing costs and diversifying income streams³. Typically, the main benefits farmers receive from well-managed partnerships with the private sector include the following:

1. secure access to markets – farmers are guaranteed a market and, depending on the terms, they are also guaranteed a basic price, shielding them from market volatility
2. access to high-quality inputs – farmers get inputs on credit, to be repaid after harvest
3. extension (depending on the respective partner) – farmers often also receive technical support services, either directly from the private-sector partner or a third party
4. improved organisation – farmers benefit from better organisation, reducing transaction costs, and improving learning and exchange.

The last three points often lead to higher productivity, better quality produce, increasing or stable production capacity, and ultimately higher income for the farmer.

On the other hand, the private-sector partner stands to gain in a number of ways, including:

1. increased quantity and quality of products – this leads to higher volumes and capacity utilisation, lower costs and profitability

³ See the East African Breweries case (see Annex, case 3).

2. stable/consistent supply due to stable yields, better organisation and improved relations with farmers
3. more sales and bigger market share – in the case of input supplier partners, more informed and productive farmers demand higher volumes of productivity-enhancing inputs.

The convergence in the two sets of interests is clear and is the basis for any partnership between farmers and agribusinesses. Meeting these expectations on both sides is essential for a sustainable partnership.

Consultations with agribusinesses revealed that the most challenging aspect of this relationship was ensuring that smallholder farmers reached the expected productivity and quality thresholds and sustained these over time. Providing farmers with high-quality inputs, especially the right livestock breeds and crop varieties for their soils

and climate, is a big part of achieving productivity objectives. Equally important is getting farmers the extension support they need to improve their technical and managerial competencies and to better organise themselves. Smallholder farmers lacking extension services is one of the greatest barriers to private-sector involvement (see page 20, Smallholder farmers). Empirical evidence from the work done by ICRISAT shows that the productivity response from introduction of improved seed varieties is almost negligible if not complemented by improved management (see Figure 1). A combination of high-quality seed varieties and extension resulted in a doubling of the yield. Evaluations by cotton companies in Mozambique also confirmed productivity gains from effective extension without any extra inputs, of up to 90% (see Table 1). These productivity gains were from the adoption of CSA/GAP⁴ (precision and timing) in combination with good crop husbandry.

Figure 1: Production gains from technology (seed) and extension

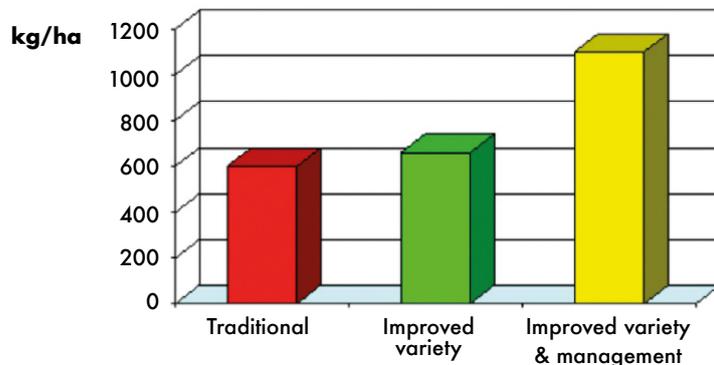


Table 1: Cotton yield gains from GAP extension

Company yield	2014/15 (kg/ha)	%
Whole company	370	100
GAP farmers	705	190
Yield gain	335	90

Note: Farmers received no extra/other inputs but enhanced extension on GAP, and adopted most GAP measures.

⁴ GAP – good agricultural practices (specifically planting time, plant spacing/population, weeding and crop protection).

Extension services

While there are well-established commercial options for supplying quality inputs to farmers, this is not the case with providing high-quality extension. To start with, extension has never been perceived as an 'input' into the production process that smallholder farmers would be willing to pay for. Instead, it's perceived as a free service that government should provide. For various reasons, state extension services have been very poor or in a state of collapse across Africa. Many governments in the region have invested sizeable resources (often supported by donors) in agricultural extension but overall impact remains low. The reasons for this are many, though it is still generally agreed that extension leading to adoption of better practices is a key element of farmer support.

Almost all successful private-sector partnerships that were reviewed had to come up with innovative, commercially sustainable models of providing quality extension. Lack of effective extension was described as the single biggest cause of failure in smallholder-private sector partnerships. The viability of these partnerships essentially rests on finding a commercially sustainable approach to providing effective extension support.

The intangible nature of extension makes it a tricky input to commercialise. Directly asking smallholder farmers to pay for their own extension has never been successfully applied even in cases where it is theoretically feasible. A number of innovative, commercially sustainable extension models have since emerged on the back of private-sector partnerships with smallholders. The common thread through these models is that extension costs need to be covered by the additional value unlocked by increased productivity or, in the case of input suppliers, a bigger market share and brand loyalty. Without this additional value, such models would not be sustainable. That's why it is non-negotiable to ensure that extension is of high quality to ensure that the additional value created justifies the cost. Creative methods for evaluating the cost-effectiveness of extension have since emerged, allowing objective assessment of returns to such investments.

Measuring extension impact in private-sector partnerships

The most basic approach to measuring the cost-effectiveness of extension compares the cost per farmer and the marginal productivity

increases as a result of such support. As such, the extension approach needs to be rated and adjusted according to output (productivity and income gains). While there are no agreed cost-profit calculations (input versus return) for extension, creative methods currently being used seem to work well. A simple model has been introduced and tested with four cotton companies in the Competitive African Cotton Initiative (COMPACI) programme in Mozambique and Zambia (see Table 2). Here extension costs are calculated per farmer or area and compared to the value of additional yield at the prevailing prices. To verify impact, the extension services identify farmers that have followed and applied extension messages and compare their yields with the general average. Table 1 shows a yield gain for farmers with improved extension. Here a sub-group of farmers (about 600 farmers) received enhanced extension. Farmers were visited more regularly, with a specific focus on GAP. The sub-group did not get any additional input compared to the other farmers. As a result of the more intensive extension, farmers adopted better agronomy and achieved a 90% higher yield over the company average. This yield increase was purely due to better management, good practices, timely and precise operations and more effective resource utilisation, based on extension advice. The gain demonstrated the potential impact and value of the extension. With the company average cost of extension being US\$23 per farmer, the cost of extension for the sub-group, who received about double the intensity of extension, was around US\$50/farmer. The yield gain of 330 kg cotton per farmer had value of around US\$100 (at US\$0.30/kg). In this simplified model the gain through the extra extension and adoption of the extension messages was US\$50 per farmer. In this case, the yield increase was considerably higher than the yield required (130 kg) to cover extension costs.

This analysis shows that it is feasible to provide commercially sustainable extension support to farmers even for a low-value crop such as cotton. That's why private companies are willing to provide the service as long as they are guaranteed of the returns to their investment (see discussion above). Although the upfront cost is high, productivity benefits, reduced transaction costs that come with better organisation, and the improved trust and loyalty are generally significant enough to justify the investment. Even in cases where the private-sector partners preferred to outsource extension services to another commercial service provider, there is compelling evidence to show that a performance-based

agreement is feasible and could form the basis for such a relationship. Levels of payment could be tied to pre-agreed productivity thresholds.

A more detailed extension cost-benefit calculation will improve the assessment of benefits of extension and would lead to better targets and enhanced outputs. More robust yet simple extension costs and profit models will help dispel widely held sentiments that extension is not cost-effective. Based on such calculations, companies could keep track of their extension costs and the productivity thresholds needed to cover these costs. This would allow them to set targets for farmers, extension staff or service providers and to effectively monitor extension costs and benefits. Although this assessment has not been applied to other services, such as climate information services or weather-indexed insurance, it is certainly feasible to extend these cost-benefit comparisons to other farmer support services. Where there are favourable cost-benefit ratios, these services could be commercially provided to farmers. Just as in the case of extension, simple and yet robust models demonstrating commercial viability need to be developed to influence decision-making within private companies.

Partnership models for extension services

Here are some of the extension models that are being applied successfully by private-sector partners in Southern Africa. The success of each approach depends on how well it is suited to the local context.

In-house private extension

This is where the private-sector partner employs specialised staff within its establishment to provide full-time farmer support services. The services provided are usually specific to the commodity of interest. Since the upfront costs could be quite high, this approach is common within bigger agribusinesses with a significant market share. Large seed companies in Zambia, Zimbabwe, Malawi and South Africa are currently providing in-house extension support to farmers although the coverage is limited. Similarly, cotton, sugar, tea/coffee, cocoa and tobacco companies in a number of countries have also been providing in-house extension support to their contract farmers. These services have come under serious strain due to growing competition in instances where there are multiple buyers (and

Table 2: Comparison of four cotton company extension costs by number of farmers

Company	Extension costs	No. of farmers	Extension costs/ farmer (per season)	Extension cost per kg cotton	Extension cost per kg cotton (at US\$0.20/ kg)
1	460,000	30,000	15.33	51	77
2	1,400,000	66,000	21.21	70	105
3	1,350,000	51,000	26.47	88	133
4	803,000	73,000	11.00	37	55

Note: Figures requested for 2014/15 season as model, from cotton companies in Zambia and Mozambique. The calculation of extension costs was based on company information provided, including staff salaries, logistics (transport, daily subsistence allowance, etc.) and some supervisor costs as far as they related to extension. Average extension costs are about US\$20 per farmer (ranging from US\$11 to US\$26), which relates to 30 to 133 kg of cotton (prices at US\$0.20 or US\$0.30 per kg cotton). At extension costs of US\$11 per farmer (4) and cotton prices of US\$0.30, an extra 37 kg of cotton produced through the extension would cover the extension costs. At US\$26 extension costs per farmer (1) and a cotton price of US\$0.20, about 130 kg cotton extra per farmer would be needed to cover the extension costs of that company. At US\$23 per farmer and US\$0.20 per kg cotton, the extension value per farmers would be 115 kg.

the resultant challenges of side-selling). Smaller companies with limited market share have also found this to be unattractive unless they have a way of securing benefits from their investments (as in the case of concessions in Mozambique).

Third-party private extension service

A market is emerging for private extension service providers that are contracted by private agribusinesses to support their farmers with specialised extension support. This approach is mostly utilised by agribusinesses that do not fully understand the dynamics of the farming community and prefer to use the services of others who have a history of working in such communities. This model is particularly preferable in a multiple-buyer environment where agribusinesses have no guarantees to output. With the necessary coordination (and regulation if necessary) companies could contribute (based on their market share) to a central service provider that is engaged on performance-based terms. Some NGOs have also successfully reinvented themselves, commercialised this service and are using their understanding of smallholder farmers to provide performance-based extension services to private-sector partners. Examples include the Lead Trust and Green trade in Zimbabwe and the Conservation Farming Unit in Zambia. These service providers have sometimes come under competition (or have been pushed out of business) from NGOs funded by donors (often costing much more) that offer similar services to agribusinesses for free. These distortions need to be addressed if this market is to thrive.

NGO/donor-funded extension

Some private companies have partnered with NGOs funded by donors to provide extension support to farmers with the agreement that this is necessary only early on when the upfront costs are expected to be quite high. The private-sector partners would then take over the funding of extension services once productivity gains are significant enough to justify the cost, and the farmers are also well equipped such that the ongoing extension needs are lower. This approach was used successfully in the COMPACI programme in Mozambique and Zambia, and the East African Breweries case in Kenya. Both examples are now running on commercially funded extension services.

Hybrid public/private-funded extension

Although not many successful examples of this nature have been documented, there are ongoing discussions in the region on the feasibility of using a hybrid of public/private-funded extension services to support private sector-led initiatives with smallholder farmers. This is based on the argument that the private sector in some countries used to be effective until government funding was reduced. As such the extension offered lacks operational resources and is poorly remunerated. This partnership would utilise existing extension services, with the private sector providing additional training and operational resources and a performance-based bonus to officers. Although there are compelling arguments for this approach, there are also potential pitfalls, including differences in agro-ecological potential in each country and the associated distributional problems in applying the concept consistently.

Seizing opportunities and overcoming barriers to private-sector investment

Successful models

In this review of approaches and business models deployed by the private sector in adaptation, they are summarised under three categories: the local sourcing model, the ecosystem approach and the risk management approach. It is important to note that these are not entirely discrete models; there are overlaps between them as well as great diversity within them. Some businesses use a hybrid model that combines at least two of these approaches. Though the approaches to smallholder partnerships are various, the most successful ones share the two non-negotiable outcomes of commercial sustainability and significant mutual benefit. These are usually achieved through improved or stable supply of quality inputs, increasing productivity and quality, and improved access to factors of production.

“Using locally sourced crops means less risk of supply-chain disruption, while also avoiding exposure to currency volatility. In addition, the economic boost given to rural communities has been recognised at government level, with several countries (including Mozambique, Ghana, Tanzania and Uganda) cutting rates of excise duty on beers made with locally sourced ingredients. This in turn allows them to be priced more attractively for our consumers.”

SABMiller

Local sourcing model

This summary starts with the local sourcing model because of its simplicity and wide application. It is also perhaps the most common and has been applied successfully across the developing world. This model encompasses many sub-types and variants that have numerous descriptions, such as contract farming, supply-chain development, out-grower schemes, responsible sourcing, or trade out of poverty. They share a common objective of providing a sustainable market for local farmers. While many of the ongoing private-sector initiatives that are based on this model were not originally designed with adaptation objectives

in mind, they are fast evolving into adaptation-focused investments through promotion of climate-resilient production systems (e.g., use of conservation agriculture) or targeting of drought-tolerant crops and crop varieties, such as the case of sorghum (see Example 1), cassava, sesame (see Sidella, case 7, in the Annex) and chillies (see Windward, case 16, in the Annex). The initial objective was to increase market opportunities for local smallholder farmers by giving them access to stable and more lucrative markets. Farmers benefit from improved access to markets and increased income opportunities. In the case of sorghum and cassava, the private sector is providing new markets for crops that otherwise had no commercial significance. In some cases farmers also receive inputs such as improved seed, fertilisers and chemicals, which they pay back after selling crops (see Delta, case 2, in the Annex). The private-sector partner benefits from cost-effective, more predictable supply of raw materials for their production process. In other cases, however, businesses also benefit from entirely new product lines that exclusively use locally produced inputs. Some governments are also rewarding businesses with reduced excise duties and other taxes as incentives for local sourcing.

Example 1: Local sourcing model – East African Breweries Project.

To promote sorghum as a replacement for barley as an ingredient in beer.

Motivation. (1) The promotion of sorghum as a replacement for barley was driven by cost considerations on the part of East African Breweries, which was looking for a substitute for expensive imported barley. (2) Improve the level of food security and living standards of sorghum farmers in Eastern Africa by increasing the yields and overall quality of, and providing a sustainable market for, sorghum.

Support to farmers. Conservation agriculture/ climate-smart agriculture (CA/CSA) promotion, input supply, farmers groups support, third-party extension, assured markets, cheap loans to more than 10,000 farmers.

Climate resilience. Sorghum highly drought tolerant, a good substitute for barley which is more climate sensitive, mostly imported into East Africa. Promotion and training on CA. Partnerships. FAO/EU, Kenya Agricultural Research Institute (KARI) (research)

The ecosystem approach

Also sometimes referred to as the prosperity approach, this business model is perhaps the most holistic, aiming to transform various technical, social and economic aspects of the farmer's life beyond simply supporting production of a single crop. Again, this approach encompasses a wide spectrum of business models with varying levels of complexity. It is based on the view that a business can only prosper in the long term when the community it is linked to also prospers. As such, this approach takes a long-term view, recognising the interlinked aspects of farmers' lives, and endeavours to promote economic activities and related support systems that promote positive outcomes for the business. Examples range from a cotton company supplying farmers with improved seed, extension services and support for cattle restocking programmes (to improve access to draught power) (see Plexus, case 8, in the Annex) to a dairy processing company supporting access to adaptable breeds and training farmers on fodder management and better organisation, while at the same time promoting a culture of milk consumption in individual lifestyles and through a school feeding programme.

"How can a company hope to develop in a social and economic desert? It is in a company's best interest to take good care of its economic and social environment, in one word, its ecosystem."

Franck Riboud, CEO Danone

"When our business prospers, communities prosper. When communities prosper, so does our business."

SABMiller

Another demonstration of this concept is the three-way partnership between two private-sector partners, East African Breweries (EABL) and Imara Kenya, a pulse-buying marketing company, and smallholder farmers in Kenya. Following a successful sorghum programme supported by EABL, Imara Kenya came on board to support production of pulses, complementing the CA approach (through introduction of legumes and rotations), while also taking advantage of more productive, better organised farmers with higher levels of technical competencies. In addition, Jubilee Insurance Company provides weather-

indexed insurance to the farmers, leveraging on higher capacity to pay the premiums.

The risk management model

The two most commonly used risk management tools (weather-based index insurance and provision of climate information services) are still in the formative stages in the region. Available examples from other regions suggest that these are better provided as bundled services (i.e., as part of a package) which could include credit, seed and other inputs. For smallholder farmers, index insurance has the potential to build resilience, not only by providing a payout in bad years to help farmers survive and protect their assets, but also by helping to unlock opportunities that increase productivity in the non-payout years, which might allow them to escape from poverty traps (Greatrex *et al.*, 2015). For example, insurance might allow farmers to access credit, which they can then use to invest in new agricultural technologies or inputs. This could allow the farmers to use their increased profits to pay for the insurance premium, knowing that the insurance would allow them to repay their loan in the event of a climate shock. There is growing evidence to suggest that index insurance has a positive effect on adoption of more profitable production technologies.

The example of East African Breweries (see case 3 in the Annex) suggests that weather-based insurance is more viable when other interventions are already creating capacity for farmers to afford the premiums. A number of examples in the Annex (cases 15, 17 and 18) show how reducing climate risk through insurance can unlock opportunities for accessing credit or even create more favourable financing terms as financial institutions lower the risk profile of farmers. In East Africa (Kenya, Rwanda and Tanzania), the Agriculture and Climate Risk Enterprise (ACRE) has recently scaled up to reach nearly 200,000 farmers, bundling index insurance with agricultural credit and farm inputs. ACRE has built on strong partnerships with regional initiatives, such as M-PESA mobile banking which reduces transaction costs while ensuring efficient and timely pay-outs (Greatrex *et al.*, 2015).

The example of ICICI Lombard (case 1 in the Annex) demonstrates the multifaceted nature of benefits from insurance across a number of stakeholders. Penetration into the rural economy and an expanded customer base, in addition to enhancing weather risk-related knowledge, are key incentives for the insurance company.

ICICI Lombard now uses weather data and analysis in designing broader natural disaster and catastrophic risk coverage and products. BASIX, the microfinance partner on this initiative, has increased its client services; poor farmers have access to cash in the event of low rainfall and low crop yield, thereby reducing their vulnerability; the government has had to invest less in establishing a safety net for its vulnerable populations; microfinance institutions and banks have a lower risk of loan defaults; and international development agencies have far fewer costs associated with recovery from catastrophic disaster events. This has enabled farmers to purchase insurance on low premiums. The ICICI Lombard case study demonstrates the convergence of common interests that justifies joint action by multiple stakeholders to support access to insurance for smallholder farmers.

With strong public and private-sector cooperation, the Mongolia Index-Based Livestock Insurance Project (IBLIP) (case 17 in the Annex) insures more than 15,000 nomadic herders and links commercial insurance with a government disaster safety net. IBLIP uses a layered private-public insurance approach depending on recorded levels of livestock mortalities. Farmers self-insure for small losses (less than 6% mortality), the private-sector Livestock Risk Insurance (LRI) covers medium losses (6–30% mortality), while livestock losses that exceed 30% are covered by the Government of Mongolia's Government Catastrophic Coverage (GCC), formally designed as a disaster risk response instrument. The LRI is sold to farmers at fully loaded, actuarially correct premium rates. Herders select the percentage of the value of their herd that they would like to insure – typically about 30%. The public-private risk-layering strategy is a new innovation for index insurance and has been an effective element of the project. Government coverage of catastrophic mortality events reduces risk premiums for herders and protects the insurance industry from risk of bankruptcy.

Greatrex *et al.* (2015) concluded that explicitly targeting obstacles to improving farmer income; integration of insurance with other development interventions; investing in local capacity; and investing in science-based index development are common features of successful index insurance. Index insurance has been successful where it has generated opportunities for farmers to make more money by unlocking a productive opportunity (e.g., new seed, new technology, new practices, credit, improved techniques in husbandry such as better fodder storage) that was previously

unattractive because of risk. The increased profit from this opportunity provides a value for the insurance and a mechanism to pay the premiums.

Most of the examples cited in Greatrex *et al.* (2015) adopt a holistic approach where index insurance is integrated into broader programmes for development and climate risk management. Insurance has rarely been successful as a stand-alone product; instead it has been located within a more comprehensive climate risk management portfolio. In the examples presented, index insurance has been used to target a clearly defined risk, such as drought, complemented by other risk management approaches that might be more appropriate to address more frequent, less severe events. In most of the cases, insurance has also formed the last component of a climate risk management plan, only used to transfer risk that cannot be reduced in any other way. This has been achieved by formal bundling to credit or improved inputs. Bundling tools has the added advantage of exposing farmers who might not have normally purchased the product to insurance. IBLIP shows another approach to holistic risk management, as a combination of self-insurance, market-based insurance and a social safety net.

Insurance projects that have been scaled up have invested in policy frameworks, supply-chain integration and market integration. Working in advance with policy-makers, market leaders and businesses to develop supply chains and legislative frameworks is critical to the success of index insurance. In addition to engaging insurance supply chains, providing access to and supply chains for productive assets attached to the insurance has proven equally important. The examples given here demonstrate the importance of working with national governments to build the legislative landscape for insurance to be scaled up. They also show the importance of basing index insurance on robust science and of working closely with research organisations. Agro-meteorological research and knowledge has been used to quantify basis risk and social science research has aided communication with farmers.

Despite the positive signs, the potential pitfalls of risk transfer measures (insurance) have also been raised. While insurance might decrease short-term vulnerability by providing cash immediately after a weather event, it is difficult to tell what long-term impacts it might have for adapting to climate change. By encouraging people to continue engaging in highly climate-sensitive economic activities or by making people

more risk averse with insurance than they would have been otherwise, it may prove maladaptive in the long run. Incentives for risk management need to be aligned well with insurance premiums to avoid maladaptation.

Barriers to engagement

The barriers to private sector investment in climate smart solutions are complex and multi-layered. Those identified from the literature and consultation in the region fall within three broad categories: those that are specific to smallholder farmers, those that are specific to the private sector and those that relate to the wider policy and macro-economic environment.

Smallholder farmers

Low levels of productivity that characterise most forms of smallholder agriculture in the region was identified as the most significant barrier to private-sector engagement in climate-smart solutions. With low productivity, farmers need higher prices to break even while the private partners fail to meet their volume and quality thresholds. This often cascades into side-selling, defaults on loan payments and breach of contractual obligations. While other causes of low productivity (e.g., limited access to high-quality inputs or vibrant output markets) can easily be resolved by such partnerships, raising the technical, organisational and managerial competencies of farmers was highlighted as the most pressing challenge. Without significant investments into extension services over a substantial period of time, smallholder farmers cannot achieve the required productivity, quality and consistency thresholds required for such partnerships. Large numbers of smallholders typically operating on small landholdings make this a particularly complex and costly undertaking. Only a limited number of private companies with the internal capacity or financial resources to outsource such services have been able to overcome this barrier. Creative solutions for overcoming this bottleneck will be required if smallholder-private sector partnerships are to be successful. This is potentially a worthwhile area of investment for the donor community, especially where it can be proven that such investment will help overcome the high initial cost, and that a real graduation is possible such that the costs will decline and level out to an affordable level that can be carried sustainably

by private-sector partners. Caution is needed, however, to avoid distorting the commercial imperatives that ensure sustainable solutions.

Equally pressing is the difficulty of enforcing contractual agreements within smallholder settings. Commodities with single or a few large buyers (e.g., cocoa, sugar, milk and sorghum) are almost always the most successful for sustainable partnerships established with smallholders. This eliminates potential for side-selling and provides a long-term incentive for the private-sector partner to keep investing in the development of the sector as they have reasonable assurance that they will get a return on their investment. Issues of fairness in contracts and whether farmers receive a fair portion of the value chain under less competitive market conditions still need careful attention. On the other hand, some of the examples reviewed in this report show successful partnerships on the back of government-controlled concession-based buying systems⁵ (e.g., cotton in Mozambique). While there is evidence of more private-sector investment in developing farmers' productive capacity, the impact of government intervention to prevent unfair pricing regimes is yet to be verified.

Private sector

Barriers to engagement in climate-smart solutions that are specific to the private sector are related to three elements: perspectives on the need; capacity to make the necessary assessments and investments; and commercial sensitivities and incentives for taking such action.

Businesses need better, more actionable information on climate change and its projected impacts to be able to make informed investment decisions. Current climate projections are fraught with uncertainty and contradictions which are often difficult to reconcile. Levels of long-term uncertainty are difficult to take into account when making short-term investment decisions. For example, a survey of 72 businesses found that most respondents thought climate change information was hard to incorporate into their business plans because of uncertainty about the magnitude, timescale and precise location of climate impacts (Terpstra *et al.*, 2013). Furthermore, scientific information about the climate system is difficult to decipher for many audiences, which compounds the

⁵ Where only one buyer is licensed to buy in a given concession area.

challenge of making informed decisions on how to best respond. Businesses, therefore, need information from public and academic sources that help them make informed decisions on dealing with climate change impacts. Equally as important are well-structured, off-the-shelf project pipelines that provide compelling businesses.

The study by Terpstra *et al.* (2013) concluded that companies with previous negative experiences of natural disasters or extreme climate conditions or of managing climate sensitivities may be more likely to adapt since they have firsthand awareness of the potential costs of climate change and of how to manage environmental risks. The framing of opportunities versus risks was found to affect engagement, as companies may invest more readily when climate change presents opportunities rather than costs. The Terpstra report suggests three areas for future analysis: the economic case for adaptation (whether observed adaptation levels match the efficient level) and the costs and the benefits of early versus delayed responses (whether companies' responses to current climate variability help or hinder their responses to future climate change).

While more corporations are investing in making their operations more climate resilient, few small and medium-sized enterprises (SMEs) are able to do so, due to lack of capacity and resources. They are unlikely to have in-house experts on climate change and their capacity to outsource such services is limited. SMEs, therefore, are less prepared for climate impacts and more likely to suffer from them. Private-sector partnerships with the public sector, scientific organisations and academia can facilitate decision-making and encourage adaptation. Furthermore, SMEs in the region often lack access to affordable financial products, such as loans and insurance. This lack of financial and technical resources makes it difficult for SMEs to invest in adaptation planning. Providing affordable, tailored and long-term finance through sustainable commercial instruments could be one of the single most useful tools for national governments and their international development partners to significantly shape and upscale private-sector investment in climate-smart solutions. One of the most innovative features of the Green Climate Fund is its Private Sector Facility (PSF). It aims to mobilise at scale private funding flows from local, regional and international commercial banks and institutional investors (i.e., insurance

companies, pension funds and private equity funds). The PSF targets renewable energy, transportation, energy efficiency, agriculture and water efficiency, forestry and land use, waste management and urban planning as areas for action. The Green Climate Fund will use debt, equity or guarantees to tailor financing solutions that support private-sector investment with significant climate and development outcomes. Originating and structuring compelling project pipelines in the region, ready to take advantage of such investments, should be a priority for the private sector.

Information regarding companies' climate vulnerabilities may be sensitive because it indicates potential weaknesses to competitors or negatively affects competitiveness or market valuations, so companies may not publicise the climate risks they face or the actions they have taken to manage these risks. Furthermore, if adaptation actions provide a competitive advantage, there is a disincentive for companies to share that knowledge more widely. This complicates partnerships with other important stakeholders that do not share the same sensitivities.

Uncertainty about the impacts of climate change can limit companies' incentives to invest in adaptation measures. Flexibility in production can reduce the need for pre-emptive measures, as companies may be able to adjust production or supply sources, while inflexibility in operations or locations increases the incentive to invest in adaptation measures. Policy and regulatory environments can stimulate private-sector engagement by encouraging or requiring adaptation, including responsible models of partnership with farmers. Some companies' business planning horizons may be too short to consider long-term climate change impacts, which may reduce their incentives to implement adaptation.

Wider policy and macro-economic environment

The slow pace of policy reform and the lack of supportive legislative and other institutional frameworks have been noted as constraints to private-sector engagement in climate-smart solutions. While a number of examples credit an evolving legislative framework that supported scaling up and institutionalisation of interventions that started as projects, many others were hamstrung by a restrictive policy and legislative environment. Equally pressing is

the general lack of targeted and well-designed incentive structures at various levels to make public, private and farmer partnerships attractive and easier to implement. While a number of examples highlighted progressive incentive structures with respect to duties and taxes that recognise the contribution of private-sector investment, there is generally a lack of creative instruments that encourage the private sector to become involved.

Facilitating engagement in climate-smart solutions

Although this review has shown that there is wide scope for private-sector engagement in implementing climate-smart solutions, the reality on the ground is that this potential is not being exploited. While climate-smart investments are a recent phenomenon that is likely to grow exponentially in the near future as the need and opportunities become more apparent, the anecdotal evidence gathered as part of this review suggests several potential bottlenecks. Given the multifaceted nature of these bottlenecks, action to facilitate widespread engagement of the private sector will need to be multi-pronged, targeting a number of key stakeholders and addressing constraints at various levels. These actions should have among their primary targets the private sector, national governments, farmers' organisations, bilateral and multilateral development partners, financial mechanisms of relevant international bodies and other fund managers. This section outlines the spectrum of support required by each of the key entities and highlights important actions to be taken by each entity.

The private sector

While the private sector is a primary actor in ensuring commercially sustainable climate-smart solutions, it requires significant support to be enabled to act at scale and in a manner that benefits smallholder farmers. This review identifies three areas of support that will help the private sector in making sound investments that also build the resilience of farmers. First, the limited capacity to undertake detailed climate risk assessment was identified as a major reason why many companies do not have a climate risk management strategy. This is a key area that requires technical support if companies are to prioritise and budget for climate-related risk management investments. Second, originating, structuring and demonstrating the financial and economic viability of climate-smart

investments that yield significant commercial and resilience benefits for both the private sector and smallholder farmers is critical to influencing the decision-making and resource allocation of private companies as well as governments, development partners and fund managers. This should involve modelling the potential influence of different economic levers and incentives (institutional, policy, regulatory) on the viability of investments. This exercise will need to be undertaken for targeted value chains in the region, identifying prime areas of investment and conducting financial and economic appraisal to make a case for each opportunity. Finally, co-development of a regional responsible business code (charter) that outlines the spirit and intent of the approach, the minimum ethical standards and best practice as well as a monitoring and evaluation framework for performance-based assessments of private-sector engagement will facilitate investment in climate-smart solutions.

National governments

For national governments to create a conducive environment for private-sector engagement, they need to be fully aware of the opportunities and constraints and of their role in facilitating such investments. As discussed, making a compelling case to showcase the feasibility of this approach will be critical to influencing government decision-making. Giving clear, evidence-based assessments of bottlenecks or the potential role of government policy and regulatory instruments in incentivising investments is also important. Sharing experiences from elsewhere will also influence governments and other stakeholders to make favourable decisions.

Farmers' organisations

Well-organised farmers are a key ingredient in successful partnerships with the private sector. The cost of providing essential services and materials to individual farmers is reduced significantly when dealing with better organised farmers due to significant economies of scale. Relationships between farmers and other partners are better managed at the farmer organisation level than with individual farmers. Issues such as negotiating and ensuring adherence to contracts are potentially problematic unless farmers work as a cohesive unit, supporting each other to ensure compliance. While farmers' organisations will need to be strengthened with the necessary technical, organisational and institutional

means to effectively represent their members, their functions also need to be fully priced into financing models for such partnerships. Transparent, performance-based financing instruments for such support will need to be agreed as a standard approach to building robust and sustainable relationships with farmers.

Bilateral/multilateral institutions and fund managers

Although the donor community is slowly warming up to working with programmes that use a private-sector approach, many remain sceptical and will need a lot of convincing. Robust financial and economic assessments demonstrating feasibility and sustainability will be essential in changing these perceptions. These will also largely satisfy commercial fund managers. Swaying development budgets and some impact capital fund managers will require a demonstration of significant socio-economic benefits for smallholder farmers. Equally important are science-based monitoring frameworks that demonstrate the resilience-building benefits of such partnerships. Effective participation of development agencies could also be aided by clearly demonstrating the investment need of each opportunity, making the case for how donor funds can leverage certain aspects (e.g., offsetting the high initial cost of extension) of an otherwise self-sustaining venture.

Conclusion

The important role of the private sector in designing and implementing climate-smart agricultural solutions is now beyond doubt. Common climate risks faced by both businesses and farmers present a compelling case for jointly tackling these risks in ways that not only build resilience, but also unlock value for those involved. With the necessary support, it is feasible and viable to leverage private-sector investments to support large-scale resilience-building for key players in supply chains, such as smallholder farmers. While some big corporations are already undertaking such investments, smaller agribusinesses will need support to better understand climate risks, to originate and appraise potential investments, and to fund components of such investments that require high upfront capital outlay.

While there are well-established commercial approaches for improving farmers' access to resilience-building inputs and finance, services like extension and information provision are not easily amenable to commercial arrangements. Innovative, commercially sustainable approaches to supporting farmers with high-quality extension are critical to the success of private-sector partnerships. Without significant productivity, quality and organisational improvements to offset the associated costs, smallholder-private sector partnerships will not be sustainable. The examples reviewed in this report show that it is indeed feasible to provide commercially funded extension, even for low-value crops such as cotton. The additional benefits from higher productivity are far higher than the cost of providing such services.

Private-sector partnerships in climate-smart solutions are anchored in a number of approaches: from simple contract farming models to more complex, holistic 'ecosystem' models that concurrently address a multiplicity of risks, often by bringing on board several public, private, NGO and donor stakeholders. The ecosystem approach is shown to create complementarities

that improve the commercial viability of risk management tools, such as insurance and weather information services that would otherwise not be viable as stand-alone products. Blending insurance with other productivity-enhancing interventions, such as provision of inputs, builds the capacity of farmers to pay off premiums they would ordinarily be unable to afford.

Despite the demonstrated potential, participation of the private sector in climate-smart solutions is limited. While big corporations now have well-developed risk management strategies and inclusive business models for tackling climate risk, many smaller companies have not yet developed their climate responses. While this is a concern, it is also a great opportunity as there is still scope to influence the evolution of climate risk management strategies within such companies towards more inclusive approaches that also build resilience across entire supply chains. The barriers that limit participation of the private sector in climate-smart initiatives require attention from government, academic, research and financing partners with a common interest.

National policy, regulatory and budget instruments and international financial mechanisms have a key role in shaping the nature and the scale of private-sector investments in sustainable and commercially viable climate-smart solutions. Improving access to long-term and affordable but commercially sustainable finance can increase the pace and scale of private-sector investment in climate-smart solutions and refine its targeting to improve the resilience of vulnerable groups, such as smallholder farmers.

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Annex: Examples of private-sector engagement

Case study	CRS/benefits for farmers	Description
<p>1. Micro-insurance reducing farmers' exposure to weather risk</p> <p>Companies ICICI Lombard - insurance BASIX - microfinance</p> <p>Partners World Bank</p> <p>Location Andra Pradesh, India</p> <p>Year started 2003</p>	<ul style="list-style-type: none"> • Weather-based index insurance • Microfinance 	<ul style="list-style-type: none"> • Index-based insurance uses the strong correlations between crop yields and rainfall to trigger insurance payments. • Insurance companies are not required to assess crop damages for individual farmers, dramatically cutting transaction costs and making insurance more affordable. • The sale of rainfall index insurance contracts to small farmers has been piloted. • New weather monitoring stations have been installed to measure rainfall levels. • Innovative features include doorstep delivery and quick pay-outs when index triggers are reached. • Around 40 crops are insured under the category for various climatic risks, such as deficit rainfall, dry spells, excess rainfall, low temperature, high temperature, high humidity and high wind. • Incentives for risk management need to be aligned well with insurance premiums to avoid maladaptations. • Started very small and simple, with 230 participants and a focus on only crop-specific risks. During the 2005 monsoon, BASIX sold over 7,600 policies to almost 7,000 customers in 36 locations in six states. It now covers over 13 million farmers. • Strong existing delivery channels, strategic planning, effective and transparent communications with farmers and a complementary partnership with local organisations greatly contributed to this success. • BASIX's existing presence in more than 10,000 villages in seven states across India and a staff of 1,280 meant that adding weather insurance to its comprehensive set of livelihood services created many economies of scale. • The project has increased ICICI Lombard's penetration into the rural economy and expanded its customer base, while enhancing the company's weather risk-related knowledge. • BASIX has increased its client services; poor farmers have access to cash in the event of low rainfall and low crop yield, thereby reducing their vulnerability; the government has had to invest less in establishing a safety net for its vulnerable populations; microfinance institutions

<p>2. Beverages Sorghum Contract Farming Scheme (BSCFS)</p> <p>Company Delta Beverages</p> <p>Location Zimbabwe</p>	<ul style="list-style-type: none"> • Drought-tolerant crop (sorghum) • Improved seed on loan • Access to assured market 	<p>and banks have a lower risk of loan defaults; and international development agencies can focus on providing fast relief to victims of disasters.</p> <ul style="list-style-type: none"> • Delta Beverages plans to inject more than US\$1.1 million into its BSCFS during the 2016/17 financial year, as it forges ahead with plans to support local farmers. • Delta requires about 15,000 tonnes of sorghum annually and sources it locally through contract farming. • In the financial year 2015/16 the company injected about US\$4.13 million into the scheme and received 15,675 tonnes in grain deliveries. • Sorghum beers have grown in importance within Delta's product mix, as demand for clear beers and sparkling beverages continues to weaken due to a sluggish economy. • In the first quarter of 2016, sorghum beer volume increased by 9%, while revenue inched up by 3%. • Lager beer volumes dropped 14% and revenue went down 17%, but demand for the lower priced Eagle lager increased. • In the 2015 financial year, sorghum beers made up 55% of total beverage volumes, up from 50% the previous year. Sorghum contributed 72% to total beer volumes in 2015, up from 67% the previous year, with lagers making up the balance. • Weak economic fundamentals, cash shortages, underperformance of agriculture and significant policy shifts were cited as major threats to the company's performance. • Delta's BSCFS is a farmer development programme with training and extension support, ensuring accessibility of farming inputs in order to guarantee future supply of malting sorghum for the business while also guaranteeing a market for the sorghum producers. • The total contracted hectareage for the 2015/16 season was 4,711 hectares, a 10% reduction compared to the prior season, through 9,381 communal farmers and 28 commercial farmers. • The reduction in the 2016 contracted hectareage was due to the need to minimise the crop failure as a drought was predicted for the country due to the El Niño effect. • Delta offers a free and extensive quality assurance programme that ensures access to technical information by growers, improved yields and grain quality. The farmers are also supported with input finance in the form of agricultural inputs. • The benefits for the farmers are a guaranteed
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<p>3. Increasing climate resilience through the promotion of sorghum-based beer</p> <p>Company East Africa Breweries Limited Kenya (EABL)</p> <p>Partners Jubilee Insurance Company KARI Equity Bank European Co-operative for Rural Development</p> <p>Location Eastern Province, Kenya</p> <p>Year started 2003</p>	<ul style="list-style-type: none"> • Drought-tolerant sorghum • Certified gaddam sorghum seeds • Cheap loans for farmers • Sustainable market for sorghum • Food security • Guaranteed a fair price to farmers, with timely payment 	<p>market for their produce and free agronomic services that have resulted in improved grain yield and quality.</p> <ul style="list-style-type: none"> • Changing and unpredictable weather patterns contributed to increased costs for local and imported barley, a main raw ingredient in beer making. • The promotion of sorghum as a replacement for barley was driven by cost considerations on the part of EABL, which was looking for a substitute for high-price barley. • EABL saw an opportunity to develop a new product and developed a low-cost beverage brewed with sorghum, a drought-resistant local crop that is less expensive than barley. • Facilitated by dryland crop research undertaken by the Kenya Agricultural Research Institute (KARI). • EABL introduced Senator Keg into the local market in 2003, a sorghum-based alcohol drink that was cheaper than barley-based beer, targeted at low-income consumers as a cheap and safe alternative to illicit liquors. • Senator now accounts for about 40% of Kenya's regulated beer market, with a supply chain that employs over 100,000 people. • Sorghum production for beer brewing was encouraged by a public-private partnership formed by the Ministry of Agriculture, KARI, the provincial administration, Smart Logistics Ltd, Equity Bank and EABL. • Jubilee Insurance Company provides weather-indexed insurance. • Over a three-year period, EABL invested Ksh 35 million in farmer mobilisation, recruitment and training on sorghum farming and markets. KARI helped to produce and supply certified gaddam sorghum seeds to 3,000 farmers in Eastern province. • Farmers trained on modern agricultural methods and provided with subsidised seeds, and agents arranged for harvest collection. Improved agricultural practices meant that farmers produced up to 600 kg of sorghum per acre in 2011. • Commercial production clusters of 20-30 farmers created to facilitate collection of the grain. • Cheap loans provided for farmers. • Sorghum-based beverage has created new market opportunities for EABL while providing a cash crop for farmers in the semi-arid lands, helping them improve livelihoods, increase climate resilience and address food security. • KARI - a strategic partner in the promotion of
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<p>4. Support to sugarcane growers</p> <p>Companies Illovo and RCL</p> <p>Partners Dutch funding</p> <p>Location South Africa, Zimbabwe, Zambia, Malawi, Tanzania and Mozambique</p> <p>5. Société d'Exploitation Cotonnière Olam (SECO)</p> <p>Company Olam International</p> <p>Partners Cotton Made in Africa, COMPACI and GIZ</p> <p>Location Côte d'Ivoire</p> <p>Source: <i>Annual Responsible Business Awards 2016. Unilever Global Development Award</i></p>	<ul style="list-style-type: none"> • Using climate information systems and specialised technology • Improving water use efficiency of smallholders <ul style="list-style-type: none"> • Increased productivity • Improve access to markets and finance • Better varieties of seeds • Accessible finance options, including 0% microfinance 	<p>sorghum and works to improve sorghum varieties for commercial use. Sorghum farmers benefit from micro-credit programmes that offer loans for the purchase of seeds and other inputs to improve farm productivity, while EABL reaps the benefits from greater quantity and quality of production.</p> <ul style="list-style-type: none"> • Tens of thousands of smallholders supply Illovo's and RCL's mills through traditional contract farming agreements. • Both companies have invested significantly in resources to support the farmers through training and infrastructure development. • RCL is only present in South Africa but is the biggest milling company in the country, present in Malelane, Limpopo and North KwaZulu-Natal. • In Malelane RCL was a recipient of a Dutch grant to improve water efficiency of the smallholders and is using climate information systems and specialised technology to do so. This has proven very successful and the smallholders increased production even in the last drought-ridden period. The company helps farmers access government grants for infrastructure (RECAP) and inputs and provides technical services to smallholder farmers. • Illovo also works with smallholders, whose sugar cane input is critical to the operations of its mills. While it does have sustainability programmes, these are more active in South Africa than in the other countries in which it operates. <ul style="list-style-type: none"> • Olam's inclusive cotton business model in Côte d'Ivoire, SECO, was set up to tackle low productivity and social vulnerability among local farmers, poor infrastructure, and access to markets and finance. • It expanded and strengthened its supply chain by offering training, health care and accessible finance to the farming communities it works with. • In six years, SECO increased its smallholder network from 3,000 to 19,569 farmers. By the 2013/14 season, yields had nearly doubled to 1,126 kg/ha from 626 kg/ha in the first season. • Farmers supported by Olam International have seen their net annual revenues rise from \$200 in 2009 to \$1,200 in 2015. • SECO also gives farmers the opportunity to sell to a reliable buyer at a fair market price. Farmers are not obliged to sell to Olam, but many do as it provides protection from market volatility and fluctuating prices. • Additional inputs were also offered for farmers to grow maize for household consumption and to
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		<p>help diversify their incomes.</p> <ul style="list-style-type: none"> • A range of accessible finance options were provided, including 0% microfinance plus financing for cattle and ploughs. • Farmers were trained to reduce risks to crops from pests or poor weather. The team delivering the training, which grew from 35 to 135 people over five years, kept an ongoing record of each farmer’s operations such as land area, yields and loan repayments, to help track progress and mutually manage financial risks. • The company has improved 610 km of roads and built 12 storage facilities. • By applying best practice processing efficiencies, the company saved US\$460,000 compared with the previous season. • The holistic nature of the programme is embedded into the business’s overall approach and strategy, tackling wider societal issues such as food security, forest management and gender empowerment. • SECO’s programme has “the potential to impact an entire industry and admirably demonstrated an effective and sustainable business model”. • Good agricultural practice is an amalgamation of adapting farmers’ traditional techniques and bringing in modern, cost-effective measures to improve productivity. • SECO has established Farmer Business Schools with modules on nutrition and crop diversity. • SECO provides training on climate-smart agricultural practices. • SECO has established a travelling ‘health caravan’ and HIV/AIDS awareness programme. • It has established 15 literacy centres. • The programme distributes better varieties of seeds, subsidised fertilisers and pesticides. • SECO has improved road networks and built post-harvest facilities such as warehouses. • SECO engages farmer cooperatives through an end-of-season fete with rewards and recognition. • SECO issues weekly and monthly newsletters to staff, with information on what is happening across the network. There is also an annual picnic and staff outing, annual dinner, Christmas celebration with gifts for children, and achievement awards for SECO staff. <p>Tips</p> <ul style="list-style-type: none"> • Make sure you have field staff working closely with farmers all year round to offer timely advice, maximise local knowledge and show commitment. • Don’t just invest in your product; invest in the
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<p>6. Sustainably produced cotton</p> <p>Company Primark</p> <p>Partners CottonConnect Self-Employed Women's Association</p> <p>Location India</p> <p>Source: <i>Annual Responsible Business Awards 2016, Unilever Global Development Award</i></p>	<ul style="list-style-type: none"> • Sustainably produced cotton • Training to increase yields, improve the quality of cotton • Increased incomes • Reduced use of fertiliser, pesticides and water 	<p>whole community behind the product to protect and strengthen your supply chain.</p> <ul style="list-style-type: none"> • Make the most of partnerships to deliver your targets. They bring essential expertise, assurance and the ability to scale up. • Make sure you understand the context in which your suppliers are operating. A business decision that makes sense from a developed-world perspective may not necessarily work on the ground in a developing country. <ul style="list-style-type: none"> • As part of Primark's aim to use only sustainably produced cotton, the company is training farmers in India to adopt more sustainable methods, enabling them to increase their income while reducing fertiliser and pesticide use. • Primark provided training to 1,251 female smallholder farmers about sustainable farming methods, and the farmers reduced their fertiliser usage by more than 10%, their pesticide usage by 50% and water usage by 27%. • The cotton produced is of higher quality. • Through classroom sessions, in-field training and learning groups, farmers are trained on the most appropriate techniques for their land. Subjects covered range from seed selection, sowing, soil, water, pesticide and pest management to picking, fibre quality, grading and storage of the harvested cotton. • The training also covers health and safety and working conditions. • The training has helped the farmers to increase their yields, improve the quality of their cotton, reduce the environmental impact of their farms and ultimately grow their livelihoods. The farmers' income increased by 176% in year one of the programme and by 211% in year two. For many households these women are now the main breadwinners and they have used their increased profits to support their families, educate their children or improve their housing and lifestyle. • The training programme is helping Primark to achieve its long-term ambition of ensuring all the cotton in its supply chain is sourced sustainably. • It also provided Primark with valuable insights into the cotton supply chain and the lives of the smallholder cotton farmers. • It has been so successful that Primark has extended the programme for another six years. It will train another 10,000 female smallholder farmers and provide additional business skills training to those already trained.
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<p>7. Enhancing access to high-value markets for sesame farmers in Zimbabwe</p> <p>Company Sidella Trading Private Limited</p> <p>Partners Bountiful Foods Agritex Extension</p> <p>Location Zimbabwe</p>	<ul style="list-style-type: none"> • Seed supply • Offtake market • Training • Drought-tolerant crop (sesame) 	<p>Tips</p> <ul style="list-style-type: none"> • Work with the right on-the-ground partners with the local knowledge and relationships that will allow you to deliver. • Ensure you fully engage with the community in ways that are appropriate for them. • Tailor your training to the community’s needs so that locally appropriate environmental methods can be adopted. <ul style="list-style-type: none"> • Sidella is a small-scale agricultural contractor and commodity broker linking rural farmers to commodity markets. • Business and market linkage is provided through a sustainable and transparent contract farming model with smallholder farmers. • Commodity-specific associations are used as a tool for supply-chain development to promote the interests of smallholder farmers and for product promotion, quality development, training and information provision. • Market information revolution. • All market players that are directly involved in the sesame value chain are part of a virtual electronic exchange market information system.
<p>8. COMPACI Programme</p> <p>Company Plexus</p> <p>Partners COMPACI GIZ/Gates foundation</p> <p>Location Mozambique</p>	<ul style="list-style-type: none"> • Contract farming – cotton production • Improved seed • Input supply • CSA/CA • Assured markets • Extension support 	<ul style="list-style-type: none"> • Plexus provides CA/CSA promotion, input supply, farmer’s group support, own extension, assured markets (self-funded now, initially donor supported) to about 50,000 farmers. • Cotton traditionally is a crop produced with some sort of contract production arrangements. • Here the concession system in Mozambique secures the investment, as side-selling is not possible. • Plexus has tested CSA/CA and seen the positive results, hence is promoting this in combination with in-house extension.
<p>9. Pulses Production</p> <p>Company Imara Kenya</p> <p>Partner EABL</p> <p>Location Kenya</p>	<ul style="list-style-type: none"> • CSA/CA • Improved seed 	<ul style="list-style-type: none"> • Imara Kenya is a private company marketing pulses. • Collaborating with the EABL programme, it now contracts those farmers to also produce pulses. • The programme takes advantage of increased productivity and the need to introduce a legume for rotation in CA/CSA systems. • By including pulses, the targeted farmers include a second CA principle, based on the market need. • Imara Kenya provides input for pulses. • About 5,000 farmers are part of the programme.

<p>10. COMPACI Zambia: Cotton Production Company Cargill, Zambia Location Zambia</p>	<ul style="list-style-type: none"> • Cotton production • CA/CSA • Input supply 	<ul style="list-style-type: none"> • Cargill provides CA/CSA promotion, input supply, farmer’s group support, in-house extension, assured markets, holistic extension and rotation to about 65,000 farmers. • The programme is self-funded (initially supported by donors COMPACI and GIZ/Gates) • The cotton association (board) manages farmers to discourage side-selling.
<p>11. Cattle pen fattening Company Montana Meats Partners ZEST GIZ SAT EU Location Zimbabwe</p>	<ul style="list-style-type: none"> • Cattle fattening and marketing • Grazing management 	<ul style="list-style-type: none"> • A contract has been agreed for cattle pen fattening. • Montana provides input (feed) supply, farmer’s group support and assured markets to about 500 farmers. • It is self-funded now, initially donor supported. • Montana was supported by an extension programme to set up smallholder feeding pens. • The cattle are kept and fattened for sale to the company. • The programme reduces uncontrolled grazing and manages cattle numbers, especially during dry period. • Cattle losses due to degradation and overgrazing in many communal areas is avoided.
<p>12. Livestock development and marketing Company Meatco Foundation Location Namibia</p>	<ul style="list-style-type: none"> • Livestock development • Marketing • Grazing management 	<ul style="list-style-type: none"> • The Meatco Foundation has been working with traditional livestock farmers north of the foot and mouth disease control fence. • The programme improves stock quality and rangeland management. • Improved trade opportunities, mostly into Angola. • Trade of high-quality sustainable beef from south of the fence is being retailed into Europe.
<p>13. Preventive weather forecasting for West African farmers to increase agricultural yield Companies Ignitia AB Ignitia Ghana Ltd Location Ghana</p>	<ul style="list-style-type: none"> • Daily weather forecasts and warnings 	<ul style="list-style-type: none"> • Ignitia delivers daily weather forecasts and warnings to initially 90,000 farmers for a marginal cost to the farmer (as little as US\$2 per farmer, per year). • A unique agricultural business model has been developed to suit the needs of the individual farmers. The forecasts are not sold directly to the farmer. Instead, Ignitia cooperates with farmer associations. • The farmer gets a daily forecast in his/her mobile phone by an automatically generated text message, tailored to the farmer’s specific location by GPS coordinates. • When needed, an early warning is issued for severe weather and threat of natural disaster. • Not only does this help to increase the probability of enhanced agricultural yields, but it also contributes to more careful use of limited resources such as water, fertilisers and pesticides. • The weather forecast is largely automated.

<p>14. Smallholder cooperative for seed multiplication</p> <p>Company Zimbabwe Super Seeds</p> <p>Location Zimbabwe</p>	<ul style="list-style-type: none"> • Climate-adapted seed • Local multiplication 	<ul style="list-style-type: none"> • A seed multiplication and market distribution model. • The programme is smallholder cooperative-based, enhancing access to cheap, locally and readily available, climate and market adapted seed in semi-arid Zimbabwe. • Smallholder farmers are engaged as active certified seed multipliers of foundation seed into commercially available certified seed that can be sourced on the open market, through mainly a network of rural agro-dealers. • The development model allows ease of access to certified, climate-tolerant and locally available seed material for smallholder farmers.
<p>15. The Agriculture and Climate Risk Enterprise (ACRE) – Kilimo Salama</p> <p>Company Syngenta Foundation for Sustainable Agriculture</p> <p>Partners Banks and MFIs Mobile network operators (Safaricom) Seed companies Government agencies (ministries of agriculture and national meteorological services) Research institutions including IRI Insurance and reinsurance companies (UAP in Kenya, Soci�t� Rwandaise d'Assurance (SORAS) in Rwanda, Swiss Re, Africa Re) Global donors (Global Index Insurance Fund, GIIF)</p> <p>Location East Africa</p> <p>Year started 2009</p>	<ul style="list-style-type: none"> • Weather-based insurance • Microfinance • Input provision • Training • Mobile payments 	<ul style="list-style-type: none"> • This is the largest index insurance programme in the developing world in which the farmers pay a market premium, and the largest agricultural insurance programme in sub-Saharan Africa. • It is also the first agricultural insurance programme worldwide to reach smallholders using mobile technologies. • It transitioned from a project into a for-profit social enterprise in June 2014. • ACRE's approach has three pillars: <ul style="list-style-type: none"> - a wide range of products based on several data sources, including automatic weather stations and remote sensing technologies; - ACRE's role as an intermediary between insurance companies, reinsurers and distribution channels/aggregators. Such aggregators include microfinance institutions, agribusiness and agricultural input suppliers; - ACRE's link to the mobile money market, particularly the M-PESA scheme in East Africa. This allows quick enrolment and payment of claims without having to physically visit farmers, thus enabling the programme to quickly reach the many millions of farmers enrolled in M-PESA. This link has enabled ACRE to reach many thousands of remote farmers while maintaining low transaction and delivery costs. • ACRE has shown rapid scale-up in East Africa and is projected to reach 3 million farmers across 10 countries by 2018. • In 2013, the sum insured reached US\$12.3 million, the recorded insurance payout was US\$370,405 and the average cost of insurance was 5–25% of harvest value. • Donor money is currently used for feasibility studies, satellite ground proofing with automatic weather stations, and salaries during the early stages of growth in each target country.

		<ul style="list-style-type: none"> • From 2014 onwards, some donor money has also been directed into premium subsidies. • As of 2013, ACRE offered a range of insurance products: <ul style="list-style-type: none"> - Insurance linked to agricultural credit from microfinance institutions (MFIs), designed for farmers who wish to grow maize using improved inputs, thus the credit has to cover seed or mineral fertiliser and needs to be at least US\$100. It also included agronomic training from MFI field agents. - Contract seed grower insurance for large-scale producers (>20 acres) at an average value of US\$650 per acre. In this case the seed company paid the premiums at the start of the season, which was then repaid by the farmers at harvest when delivering their seeds to the company. - Dairy livestock insurance offered in partnership with a dairy cooperative (for farmers who already own cattle) or lending institution (for farmers who want to purchase them). These partners pay the premium upfront, then either deduct it from the payments to farmers for milk deliveries or combine it with the loan payments. The cover is linked to animal care packages and vaccines. - Insurance incorporated into a replanting guarantee by a seed company, linking ACRE, UAP Insurance and Safaricom. The insurance premium was incorporated into the price of a bag of seed. Each bag contained a scratch card with a code that could be texted to ACRE during the planting period to start coverage against drought. Each farm was then monitored using satellite imagery for 21 days. If the index was triggered the farmers were automatically paid via M-PESA for a new bag of seed so that they could replant. • Insured farmers have 16% more earnings and invested 19% more compared to their uninsured neighbours. • In 2012, 177,782 farmers received US\$8.4 million in financing in part due to ACRE's index insurance products. • One of the strengths of ACRE is that indexes used for its products are based on several data sources, allowing experimentation with new technologies without degrading trust and its baseline of users. Data sources include 130 solar-powered automated weather stations, satellite rainfall measurements and government area yield statistics. • Indexes have been developed for maize, beans, wheat, sorghum, millet, soybeans, sunflowers, coffee and potatoes.
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<p>16. Climate proofing chilli supply chain</p> <p>Company Windward Commodities Ltd</p> <p>Partner Better Agriculture</p> <p>Location Zimbabwe</p>	<ul style="list-style-type: none"> • Right-sized climate-smart input package • Offtake market • Training • CA 	<ul style="list-style-type: none"> • Windward is a private company based in London with global experience in building sustainable commodity brands, including certified consumer brands based on the ethical sourcing model. • Windward has a successful chilli sauce brand called Chilli Power currently available in 212 formal retail stores. • The Chilli Power brand has a supporting supply chain network of 2,000 chilli farmers in Zimbabwe who generate an average additional income of US\$ 114 per farmer per year. • The programme provides climate-proofing and scaling-up of the supply chain, and develops new markets for the Chilli Power brand. • The productivity of smallholder suppliers is sustainably increased by improved access to high-quality, adaptable chilli seed varieties and other inputs, better soil and water management techniques, and improved agronomic practices. • Sales have grown into new regional markets and a new climate-smart certified brand could potentially be added.
<p>17. Mongolia Index-Based Livestock Insurance Project (IBLIP)</p> <p>Company IBLIP</p> <p>Partners Government of Mongolia World Bank</p> <p>Location Mongolia</p> <p>Year started 2005</p>	<ul style="list-style-type: none"> • Index-based insurance for livestock 	<ul style="list-style-type: none"> • Developed by the Government of Mongolia with the support of the World Bank, IBLIP is an index-based mortality livestock insurance product available in every Mongolian province. • The aim of IBLIP is to protect Mongolian herder households from significant livestock loss by providing financial security, while encouraging them to adopt practices that build their resilience to extreme weather events. • This is a donor-supported index insurance programme that has successfully transitioned into a commercial entity. • The most important climate-related shock affecting Mongolian pastoralists is the dzud, where extreme winter weather conditions result in high livestock mortality. The poorest herders suffer the heaviest losses as they cannot afford the high costs associated with migration. • IBLIP was developed in response to a perfect storm, between 1999 and 2002, of increased livestock numbers, increased vulnerability and three consecutive dzud winters. This led to the loss of over 11 million animals, representing a financial loss of over US\$500 million. • The number of herders covered has increased from about 2,000 in 2009 to close to 20,000 in 2013. • Livestock numbers in Mongolia have increased from 25 million to about 45 million over the same period.

		<ul style="list-style-type: none"> • The losses from these extreme weather events were so severe that the small agricultural indemnity insurance industry went bankrupt trying to pay out the farmers and herders, and the private insurance system collapsed, destroying the risk management systems that were in place. • The index used in IBLIP is the livestock mortality rate at the local region level. The coverage period is from January to May, when more than 80% of the livestock losses occur. • As the IBLIP index is closely linked to loss, there have been very few basis risk events. • IBLIP is unique in its formal layering approach. When livestock mortality is <6%, farmers are encouraged to self-insure, but are supported by World Bank risk management tools. • When livestock mortality is 6-30%, farmers receive payouts from the Base Insurance Product, now called Livestock Risk Insurance (LRI), supported by the Livestock Insurance Indemnity Pool. The LRI is sold to farmers at fully loaded, actuarially correct premium rates. Herders select the percentage of the value of their herd that they would like to insure – typically about 30%. • Livestock losses that exceed 30% are covered by the Government of Mongolia’s Government Catastrophic Coverage, formally called the Disaster Response Product. • The public-private risk-layering strategy is an innovation for index insurance and has been an effective element of the project. Government coverage of catastrophic mortality events reduces risk premiums for herders and protects the insurance industry from risk of bankruptcy. • This scaling has been attributed to the strong partnership between the private and public sector and because the historical mortality rates are available across the country. The scaling also appears to be financially sustainable, with several insurance and reinsurance companies attracted to the project. • The success of IBLIP is reflected by its transition from being a donor-funded project to a private company. In June 2014, a draft Index-Based Livestock Insurance Law was passed and followed in August by the creation of the Agricultural Reinsurance Company of Mongolia. • This has been designed as a public-private owned reinsurance company which is fully compliant with Mongolian and international insurance and reinsurance legislation. Funding for IBLIP from the World Bank continued until 2016 during the transition period.
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<p>18. Index-Based Livestock Insurance (IBLI) – Kenya and Ethiopia</p> <p>Company Index-Based Livestock Insurance (IBLI)</p> <p>Partners Insurance companies Reinsurers Research organisations NGOs</p> <p>Location Northern Kenya and Southern Ethiopia</p> <p>Year started 2010</p>	<ul style="list-style-type: none"> • Index-based insurance for livestock 	<ul style="list-style-type: none"> • The IBLI project took on the challenge of making insurance commercially viable among poor nomadic herders who occupy vast remote areas in Kenya and Ethiopia with almost non-existent communication and transport options. • This project lacked the comprehensive 100-year mortality database that was used in Mongolia’s livestock insurance programme (see above). These challenges led the IBLI team to research innovative strategies and use new technologies in product design, for example using a statistical relationship between livestock mortality data (collected since the year 2000) and the remotely sensed Normalized Difference Vegetation Index (NDVI). IBLI has features including creative education methods for pastoralists, culturally specific products and a division-level mortality index. • The IBLI index is based on NDVI data collected by satellites, which was found to have a high correlation with forage availability. • As the livestock in East African pastoral production systems depend almost entirely on forage for their nutrition, NDVI functions as an indicator of the vegetation available in the area for the livestock to consume and is linked to mortality. • Farmers can choose the level of risk coverage (either a 10% or 15% trigger/deductible contract). • By 2014, IBLI had reached 4,000 households. • Although still at a small scale, IBLI has shown significant innovation in product design and implementation, and has demonstrated developmental impacts for poor pastoralists under particularly challenging conditions.
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