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CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

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IMPROVING GRAIN SECTOR CLIMATE-SMART AWARENESS AND DECISION-MAKING

KEY LESSONS FROM PRIVATE SECTOR ENGAGEMENT IN THE USAID LEARNING COMMUNITY FOR SUPPLY CHAIN RESILIENCE

Summary

Nile Breweries Limited, a subsidiary of AB InBev, has sought to improve their supply chains of sorghum and barley through local sourcing and sustainability commitments. This outcome story shares how Nile Breweries Limited leveraged the Guide to Assessing Climate Resilience in Smallholder Supply Chains, part of the USAID Feed the Future Learning Community for Supply Chain Resilience, to further understand their climate risks and the possible interventions available to build resilience against climate change. This case also highlights the challenge of private sector actors to justify resource use to combat climate change and the complexity of working with smallholder farmers. The case was developed by the Sustainable Food Lab, in 2018 and draws from the results of the climate resilience assessment and qualitative interviews with Nile Breweries and partner TechnoServe.

CIAT

NARO

IITA
Transforming African Agriculture

TECHNOSERVE

Actors

AB InBev is the world's leading global brewer with over 400 brands and 200,000 employees. On October 10, 2016, AB InBev expanded their footprint combining with SABMiller PLC, adding an additional 70,000 employees spanning across 80 countries, including a strong presence in Africa. One of the many subsidiaries of AB InBev is Nile Breweries Limited (NBL). Located in Uganda, NBL is the manufacturer of popular beer brands such as Eagle and Nile Special.

The International Center for Tropical Agriculture (CIAT) is a non-profit research and development organization dedicated to reducing poverty and hunger while protecting natural resources in developing countries. It is one of the 15 institutes of the CGIAR global research partnerships, and a lead on CGIAR's global Climate Change, Agriculture and Food Security (CCAFS) program and the USAID Learning Community for Supply Chain Resilience. As a part of this case study CIAT contributed crop suitability climate projections.

The International Institute of Tropical Agriculture (IITA) is one of the 15 institutes of the Consultative Group on International Agricultural Research (CGIAR). IITA is a leading research partner in finding solutions for hunger, malnutrition, and poverty in Africa. Its research for development (R4D) addresses the development needs of tropical countries in general and smallholder farmers in particular. IITA works with partners to enhance crop quality and productivity, reduce producer and consumer risks, and generate wealth from agriculture.

The National Agricultural Research Organization (NARO) is the apex body for guidance and coordination of all agricultural research activities in the national agricultural research system in Uganda. Established by an act of Parliament, NARO is a government institution that works to enhance the contribution of agricultural research to sustainable agricultural productivity, sustained competitiveness, economic growth, food security and poverty eradication.

Sustainable Food Lab (SFL) is a global sustainability network that works to create more sustainable food systems by helping organizations turn ideas into action. As a partner in the US Government's Feed the Future initiative, SFL has been working to engage global private sector to implement climate-smart agriculture with smallholder farmers and is a co-author of the Guide to Assessing Climate Resilience in Smallholder Supply Chains.

TechnoServe is a leader in harnessing the power of the private sector to help people lift themselves out of poverty, with over 50 years of proven results. A nonprofit organization operating in 29 countries, it works with enterprising men and women in the developing world to build competitive farms, businesses, and industries.

Background

NBL has had a strong focus on sourcing locally for many years. NBL sources barley and sorghum from approximately 20,000 farmers across Uganda, with a focus on Eastern and Northern regions. Additionally, NBL's Eagle brand was created by working with local sorghum and cassava smallholders in 2002. NBL shifted from imported grains to locally grown sorghum and barley, creating supply chains from scratch. By working with local government and investing significant time and resources, NBL was able to procure directly from Ugandan farmers, which in turn has proven to be a worthwhile investment for the company in terms of efficiency and tax incentives and for Ugandan farmers in terms of a stable national market. Their parent company at the time, SABMiller, worked with the Sustainable Food Lab to develop an impact evaluation of the local sourcing program with IITA in 2015. Findings were that NBL's local sourcing had contributed to improved productivity, farmer livelihoods and enhanced commercial value, but there were areas for further improvement in supply chain efficiency, productivity and farmer resilience.

Building on this study, TechnoServe partnered with AB InBev as part of a grant from the Ford Foundation and a matching company investment, to further upgrade these supply chains. TechnoServe identified ways of enhancing commercial and social value in the trade, production and service delivery in both sorghum and barley chains in Uganda and cassava in Mozambique.

Two Key Takeaways

1. Initiatives to improve smallholder livelihoods should aim to reduce farmers' risk, as well as increase their incomes; and

2. Improvements to local supply chains can be made by corporations even when they do not source directly from smallholders by adopting an "ecosystem approach".[1]

[1] TechnoServe AB InBev case study, 2017.
https://www.technoserve.org/files/downloads/case_study_technoserve-initiative-for-inclusive-agricultural-business-models-abinbev.pdf

In late 2017 NBL, the Sustainable Food Lab and TechnoServe agreed to work together as part of the USAID Learning Community for Supply Chain Resilience to better understand the particular risks from climate change to sorghum and barley farmers. TechnoServe worked in collaboration with NARO, IITA and SFL to complete field work and research. SFL framed this project for USAID and CGIAR partners, facilitated the review of CGIAR tools and conducted company interviews on climate risk approaches. During this pilot NBL was responsible for providing access to staff and farmers, facilitating corporate interviews on the topic of weather/climate risk and reviewing results for strategic investment.

Key Challenges Addressed

Climate Change

Climate change is now real in Uganda. Changing climatic patterns – especially increasing temperatures, high variability in rainfall onset and patterns, and wet and dry spells during the growing season – are all negatively affecting farmer productivity and incomes. In the case of both barley and sorghum, farmers are facing a variety of challenges that will continue to affect NBL's ability to source. Challenges noted by NBL as a threat to their supply chain include erratic rainfall, which leads to crop loss and soil erosion, causing flooding and replanting of crops. For both NBL and its farmers, understanding climate risk and how to build resilience is key to their future success.

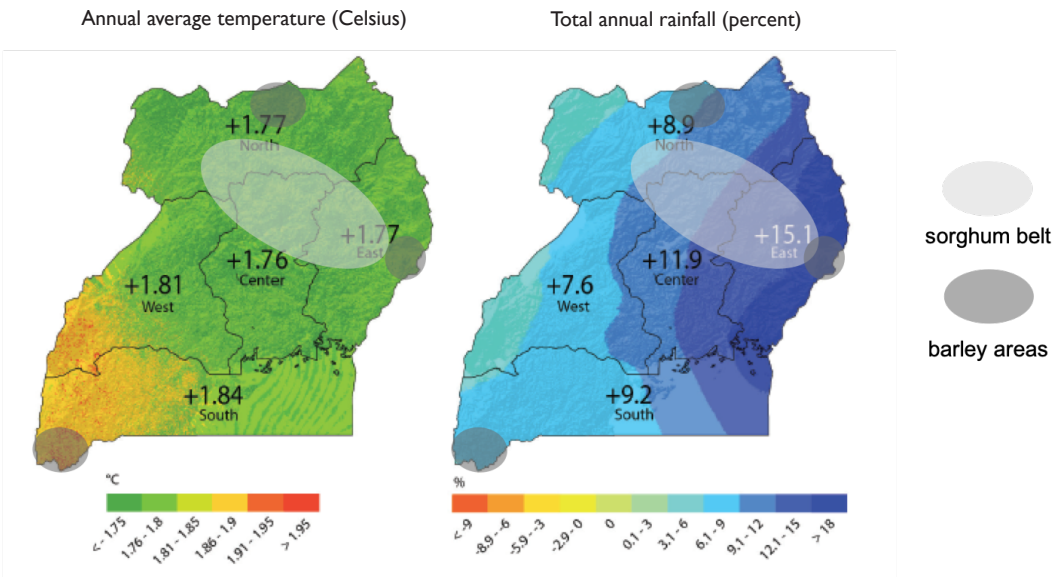


Figure 1: CIAT's projected changes in temperature and rainfall in Uganda by 20502

Smallholder Supply Chains

As with many supply chains, NBL's sorghum and barley supply chains are complex. NBL lacks visibility in some of the less organized chains where they depend on aggregators to provide insight on farmers priorities and challenges. Furthermore, with over 20,000 farmers across the entire country of Uganda, tools and resources needed for each farmer can vary drastically, meaning there is no one size fits all solution to improving resilience within NBL's supply chain.

Practical Investments

To be resilient against climate change, increased infrastructure is needed in Uganda. NBL noted the lack of cell phone service and good roads as threats to their entire supply chain. Additionally, NBL noted that it's difficult to influence farmer practices to increase yield, even if it is low investment. If practices require investment, finding financing can further complicate the issue. A key challenge for many of the NBL farmers is the lack of weather and climate information. NBL indicated that a weather station and localized weather information for farmers would help inform farmers of when to plant and harvest crops and would also allow farmers to prepare for drastic weather events, such as floods and droughts. Long term, NBL and individual farmers would be able to track climate change and make changes accordingly. Unlike many of its counterparts in AB InBev, NBL's farmers are operating in a country with little social or economic infrastructure. Working in an emerging market with smallholder farmers can be difficult, and as a publicly traded company, NBL's use of financial resources are limited. Long term projects needing financial resources must be approved by shareholders who are often

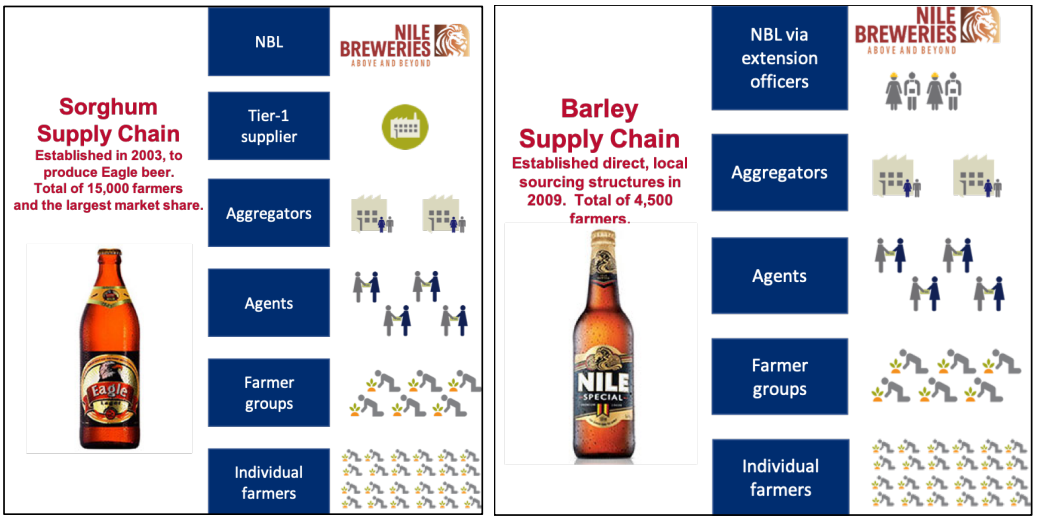


Figure 2: Sorghum and barley supply chains

interested in increasing shareholder value. Convincing C-Suite staff and shareholders, that spending financial resources is a worthwhile endeavor often requires a sufficient amount of information and requires a shift from quick wins to thinking long term.

Future Supply Risk

As climate change effects sorghum and barley growing, the future of farming is at risk. Younger generations don't find farming as appealing due to the perceived low levels of income and decreasing yields. For this reason, NBL sited the lack of interest in farming among the next generation as a major threat to their supply chain. While they have tried to change perception of farming as a viable income for future generations, this has required increased financial literacy among farmers. By teaching farmers about profit and yield versus just income, NBL has tried to preserve and improve the future pipeline of farmers. To increase sustain the number of farmers, NBL has also worked to create pride among farmers. By providing small tokens of appreciation like Eagle Beer t-shirts, NBL allows farmers to show pride in their hard work.

Learning Questions

1. How do we build resilience of smallholder farmers in NBL supply chains?

2. What climate smart improvements can be made to agricultural research and extension models through:
   - Agronomy, financial services, information communications, social services, farmer innovation platforms
   - TechnoServe's farmer field school and longer-term NBL extension model

Pilot Activities

Tools Used

The Sustainable Food Lab and TechnoServe teams used the Guide to Assessing Climate Resilience in Smallholder Supply Chains to structure the climate risk assessment. This guide can be used for organizations to assess climate risk and resilience. The guide follows a step by step process that includes: know your risk, know your farmers, know your resilience, know how to build resilience and know your progress. With the help of TechnoServe, the guide was used to assess both NBL's barley and sorghum supply chain. Results are shown below.

Results

Know your Risk

To best manage climate risk in their supply chains NBL needs to prioritize areas where resilience is critical for future supply security. Through previous work and conversations with NBL, it was evident that they are aware of climate risk affecting their supply chain, but further knowledge of their supply chain resilience was needed. Field reports show that for both barley and sorghum, highly variable rainfall is already present and can lead to low yield and declining quality of the crop. Similarly, warmer temperatures are an increasing risk. As temperatures gradually rise, yields will decrease and become more variable. Some areas will also become completely unsuitable for growing. Beyond highly variable rainfall and warmer temperatures, other climate risks include increased rainfall, including damaging hail storms and winds. Landslides, soil erosion, stronger dry seasons and drought are also present and worsening. Other climate risks include increased rainfall, warmer temperatures and damaging hail storms and winds. Landslides, soil erosion, stronger dry seasons and drought are also present and worsening. For a full list of risks see below.

CLIMATE RISK	TIMING	POTENTIAL IMPACTS ON BARLEY & SORGHUM SUPPLY CHAIN
HIGHLY VARIABLE RAINFALL	Already Present	• Variability at season onset: "lottery" for farmers on when to plant to maximize harvest • Variability at grain formation stage and physiological maturity leading to low yields and declining quality of crop • Increased moisture content (rains at harvest) and potential for crop damage after harvest
WARMER TEMPERATURES	Gradually Rising	• Lower and highly variable yield • Physiological effects, resulting in declining productivity/quality • Change in suitability zones
INCREASED RAINFALL, HAIL STORMS, WINDS & HUMIDITY	Already Present	• Crop damage and lower overall yields • Low quality grain due to increased diseases and pests (blights, rusts, molds and fungi) from increased humidity
INCREASED LANDSLIDES & SOIL EROSION	Already Present and Frequent	• Crop damage • Supply chain disruptions from severe weather events • Soil nutrient loss leading to low soil fertility and hence low yields
STRONGER, LONGER DRY SEASON AND DROUGHT	Already Present and Worsening	• Declining crop quality • Low crop yield

Figure 3: Climate risks and potential impacts on barley & sorghum supply chain

Know your Farmers

While NBL has been aware of climate risk it was important for them to understand the specific climate risks faced by different groups of their farmers. In Uganda, NBL sources 20-25 metric tons combined of sorghum and barley per year. Spanning across multiple regions of the country, sorghum and barley are grown in highland areas between 900-1500m and 2000-2700m respectively. Sorghum was introduced in 2003 due to the creation of Eagle brand beer, now the largest market share holder. With 15,000 farmers, sorghum is not only the largest commodity sourced but also holds the most intricate supply chain. Alternatively, NBL's barley farmers are generally newer to the crop and have smaller plots. Established in 2009, the barley supply chain includes only 4,500 farmers but still has a complexity similar to sorghum. Fieldwork was conducted to better understand the farmer populations and their perceived climate risks. A full list of farmer reported risks can be seen below.

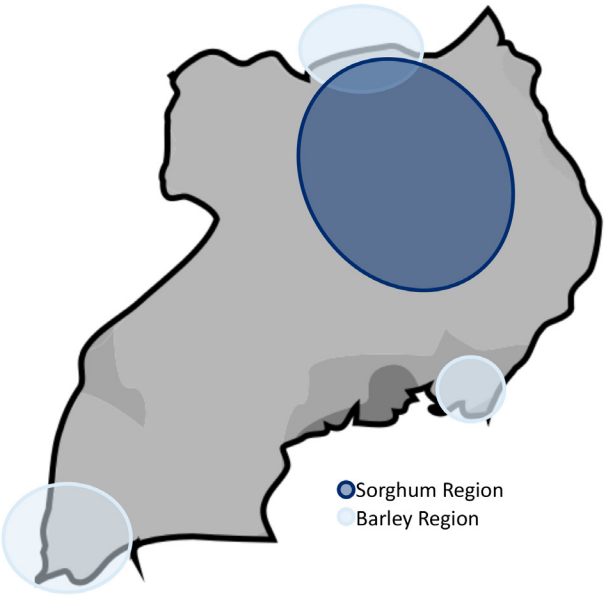


Figure 4: Sorghum and barley regions

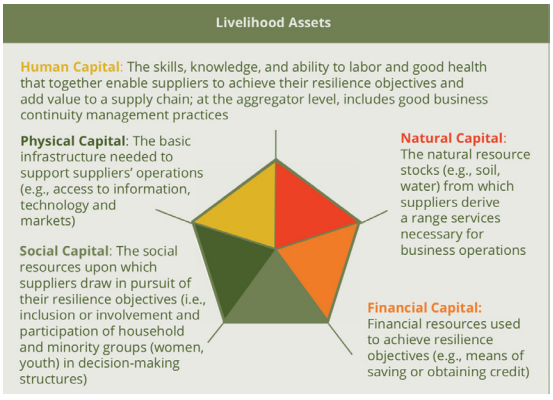
CROP	RISK ZONE	FOCUS GROUP FINDINGS
SORGHUM	Adapt	• Erratic rains and increasing temperatures are impacting farmer yields • Dry spells and periods of drought • Flooding • Declining soil fertility • Soil management issues • Pests and migratory birds • Shorter seasons
BARLEY	Adapt +	• Increasing temperatures • Declining soil fertility • Soil erosion • Variable rains • Highly variable length of growing season • Landslide and soil erosion

Figure 5: Farmer reported risks

Know your Resilience

Resilience is a set of capacities that in this case enables sorghum and barley farming systems (farm, farming family, or aggregator) to prevent or respond to threats to its health and stability. Knowing and understanding farmers resilience is an important step NBL can take to mitigate climate risks. During this pilot, proxies for resilience capacities were identified by using the Sustainable Livelihoods Framework, shown at right.

Figure 6: Sustainable Livelihoods Framework



For both barley and sorghum, a resilience capacity map was created, shown below.

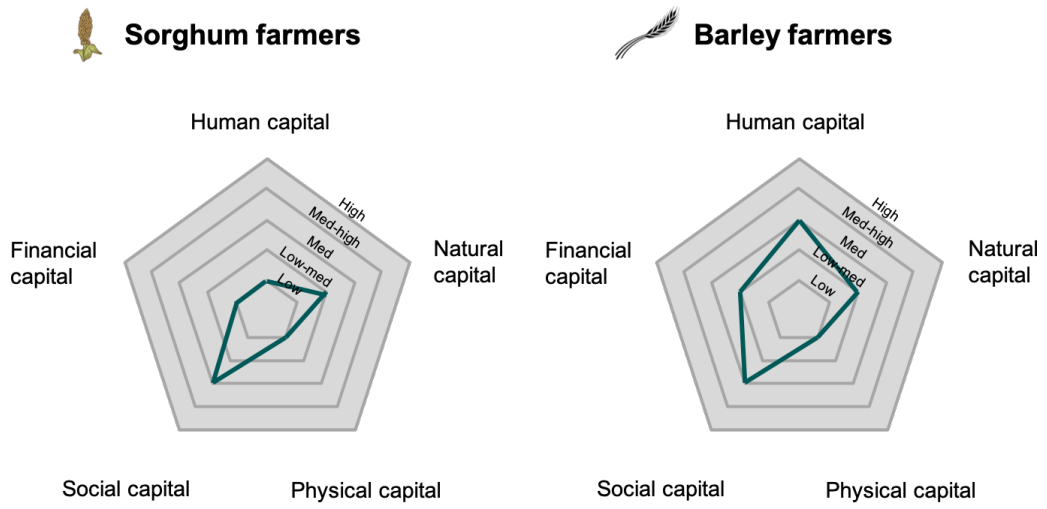


Figure 7: Resilience capacity map

Each capacity was then further examined. An illustrative example of the process can be shown below:

Figure 8: Resilience capacity

	HUMAN CAPITAL	FINANCIAL CAPITAL	NATURAL CAPITAL	PHYSICAL CAPITAL	SOCIAL CAPITAL
LOW CAPACITY	Food security and nutrition	Net income/ poverty level	On-farm soil health	Access to early-warning systems	Access to informal safety nets
MEDIUM CAPACITY	Use of relevant climate smart agricultural practices	Use of credit	Access to "climate-ready" varieties of focus crop	Access to climate change projections	Access to knowledge-sharing groups
HIGH CAPACITY	Innovation potential	Saving sufficient for on-farm investment	Access to quality planting material for alternative, climate ready crops	Access to alternative, climate-ready value chains	Quality of enabling environment

	SORGHUM	BARLEY
EDUCATION	LOW	LOW
FOOD SECURITY	LOW	MED
KNOWLEDGE OF CROP REQUIREMENTS	LOW-MED	MED
APPLICATION OF PRACTICES	LOW	MED
OVERALL ASSESSMENT	**LOW**	**MED**

Know How to Build Resilience

Using the information gleaned from fieldwork following the Guide to Assessing Climate Resilience in Smallholder Supply Chains, a robust set of resilience building strategies were identified. The possible interventions included increased information on weather patterns, soil health and seed varieties for both barley and sorghum. Individual resilience recommendations were also made for both barley and sorghum. For some resilience capacities, local NBL staff was already aware of a need, for example, an early warning weather system was noted as a necessary tool for NBL to improve farmers' yields. By connecting a resilience strategy, like a weather system, to specific climate risks, NBL was able to link recommended solutions with their strategic investment strategy in these supply chains.

Figure 9: Prioritized strategies for sorghum and barley

RISKS	RECOMMENDATIONS
Erratic Rainfall *Made worse by lack of physical weather station infrastructure and lack of service interpreting and communicating information to farmers.*	• Coordinate with Uganda Met and potentially commercial suppliers to install additional weather stations • Pursue partnerships with providers of forecasting information allowing dissemination to all providers • Support development of enabling environment (e.g. set up co-investment committee with other interested parties such as coffee growers in Mount Elgon area to develop weather station and communication infrastructure)
Prolonged Dry Season *Made worse be low usage of hybrid seed (available but not widely used).*	• Invest in further extension activities to help farmers understand need, best use, and see benefit from improved seed • Explore partnerships for input-credit model to reach farmers directly or via aggregators
Drought Periods Leading to Reduced Soil Moisture *Made worse by the lack of access to irrigation systems.*	• Focus extension on use of low-cost conservation agriculture practices to increase soil organic matter: • Up-scale practices that increase soil organic matter, incorporation of crop residue, composting, mulching, ridging etc. • Improved information on soil quality post drought – providing farmers with systems to test soil moisture wilting points and be able to manage accordingly
Increase of Pests *Made worse by low understanding around pest management, low availability of service providers for pest management and a lack of financial capital for pesticide or pest services.*	• Focus extension on integrated pest management systems • Support development of spraying service providers • Explore partnerships for input-credit model to reach farmers directly or via aggregators
Changing Suitability of Areas Due to Climate Change *Made worse by poor coordination at enabling environment level*	• Increase coordination between government, private sector and other actors to promote crop diversification systems • Lead research coordination initiative in partnership with relevant government and non-government bodies
Overall Increased Incidence of Weather Shocks and Lowering of Incomes *Made wore by gender inequality*	• Integrate gender mainstreaming into extension to enable greater participation and benefit of women in the supply chain

Figure 9: Prioritized strategies for barley

RISKS	RECOMMENDATIONS
Limited Viability of Barley Areas Becoming more Marginal Due to Increasing Temperatures *Made worse by a lack of access to alternative crops and poor vegetation cover which increases ground heat.*	• Prioritize sourcing areas and dedicate extension resources to these areas, including incorporation of best practices • Test new areas for viability • Support farmers to plant trees along grass bands (e.g. caliandra, gravellia which prevent soil erosion and provide wind break) • Support farmers to diversify crops by adding training modules to extension services on rotating crops and potentially facilitating access to alternative crop seed

Soil Erosion
Made worse by low human capital around climate smart agriculture practices and low financial capital to be able to invest.
	• Support farmers to plant trees along grass bands (e.g. caliandra, gravellia)
	• Focus extension on use of low-cost conservation agriculture practices:
	  • minimum tillage practices (e.g. rip lines and maintenance of permanent soil cover to increase soil organic matter and reduce impacts of erosion)
	  • trenches, grass bands, grass strips

Changing Rainfall Patterns Season to Season *Made worse by lack of access to irrigation and over-reliance on rainfall.*	• Explore natural irrigation using hillside systems linked to streams / reservoirs

Figure 10: Prioritized strategies for sorghum

RISKS	RECOMMENDATIONS
Declining Soil Quality *Made worse by low understanding around appropriate fertilizer use, lack of access to fertilizer and lack of financial capital for fertilizer.*	• Invest in further extension activities to help farmers understand need, best use, and see benefit from fertilizer • Explore partnerships for input-credit model to reach farmers directly or via aggregators
Pests and Weeds *Made worse by low understanding around appropriate pesticide/herbicide use and application as well as a lack of access to and lack of financial capital for pesticides/ herbicides.*	• Explore partnerships for input-credit model to reach farmers directly or via aggregators • Partner with chemical companies to deliver trainings to farmers

Findings

Key Challenges

As climate risks become real so are the effects on NBL's barley and sorghum supply chains. Not only are NBL's supply chains complex, they also have incidence of **low human, social, financial, natural and physical capital, making them vulnerable to climate change**. There is a need to provide better information, learning tools and financial services to farmers, which will in turn save money, increase yield and allow farmers to better react to climatic shocks. In addition, the supply chains need improvements in gender equality and road and cell phone infrastructure. These efforts will require not just NBL's engagement but will take a multi-stakeholder or "ecosystem" approach.

Beyond financial capacity, **building resilience will require engagement with other stakeholders.** For example, addressing cultural norms around gender inequality should not be tackled by NBL alone, but should be accomplished with the help of specialized NGOs. Additionally, Uganda's government must play a critical role in some of the critical needs of roads and cell phone infrastructure.

Taking on these challenges will require financial capacity and long-term planning. Investing long-term is often difficult for publicly traded companies. As a subsidiary of AB InBev, NBL is often given metrics or budgets to abide by, making it difficult to present the case for investment in a topic outside of core business goals. A strong business case and link to company goals must be made.

For NGOs and researchers, engagement with the private sector requires knowledge about the culture and organizational structure of the company being engaged. **Finding a company champion who has the time and influence is crucial to success.** That champion's ability to influence key decision makers is often the most important factor in applying climate-smart agriculture. The use of data ascertained from tools like the Guide to Assessing Climate Resilience in Smallholder Supply Chains better allows NGO partners to structure input and for company champions to make the business case for investment.

Recommendations for Private Sector Engagement & Learning

1 The engagement between AB InBev, the Sustainable Food Lab and TechnoServe grew out of **long term, trusted relationships.** AB InBev and TechnoServe had both participated in the SFL's smallholder resilience learning communities, and done collaborative projects together previously. When approached about possible partnership on climate resilience, the global lead for smallholder impact for AB InBev felt that Uganda would be a country where this topic was both relevant and critical for insight, and could build on the value chain upgrading work with TechnoServe. Having both a global team champion and influential lead at NBL was critical for the uptake and success of the research.

2 Having a **competent implementation partner** like TechnoServe, able to both manage local researchers and structure findings for a business audience, was another critical element of success. Looking for a win-win-win, NBL saw the benefit of partnering with TechnoServe to provide information about climate risk and ways to increase resilience building on their prior program. The tools brought by the SFL and the USAID Learning Community coupled with TechnoServe's adaptation to NBL's context were able to provide a business case for investment and long term thinking around climate-smart agriculture. According to Theunis Coetzee, Agro Manager at

NBL, the value of the pilot was "mostly to confirm perceptions – having it quantified and written enables [me] to make the case for resources because it is better for swaying decision-makers".

3 By creating **lessons that were useful but simple,** TechnoServe was able to create a better understanding of the need for climate investments. According to Julia Sorensen from TechnoServe, there was a "need to put the business case into a framework (climate-smart agriculture) ... that needs to sing through loud and clear". The tools showed financial implications of inaction and provided an easy process to take action. With the help of NBL champions, in this case Urvi Kelkar, Global Sustainability Manager and Theunis Coetzee, a better understanding of the key decision makers and their interests were helpful in linking results with the company's priorities.

4 **To drive results, companies with long term thinking are more well equipped to take on climate-smart agriculture as a way to mitigate risk.** To engage any company, the ability to find a champion is crucial. **Champions require significant time and resource allocation to the effort and must be aware of the intricacies of their companies' organizational structure and decision-making process.** As Sorensen notes, "Even if you're using external resources you always need an internal champion".