

S4C Sustainability for Competitiveness Guidebook: Small and Medium Enterprises in Eastern and Southern African Agri-food Sector



Cover photo: Irrigated onions from a Two Degrees Up project in the Mount Kenya region
Source: [Neil Palmer \(CIAT, 2DU Kenya 60\)](#)



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Executive Summary

This report is prepared for the Sustainability for Competitiveness (S4C) Initiative by the International Trade Centre (ITC), aiming to provide a suite of advisory products to help small and medium-sized enterprises (SMEs) leverage sustainability strategies to improve competitive positioning and integration into global value chains. SME's are defined as businesses ranging from 10 – 250 employees. This project, at the request of the ITC, aims to identify and assess best sustainability practices in the Southern and East African agri-food sector, with a focus on those that most directly enhance SME business competitiveness specifically for SMEs. The research team is comprised of graduate students from Columbia University's M.P.A in Environmental Science and Policy, School of International and Public Affairs, and the Earth Institute.

ITC aims to launch the S4C unit towards the end of 2016, functioning in a technical role that partners ITC personnel with SMEs in the agri-food sector to analyze current sustainability challenges. This report is a guidebook for ITC's S4C unit in assessing agri-food commodities in Southern and East Africa to help SMEs leverage sustainability strategies to become more competitive across value chains and increase connections to global markets. Specifically, the project will prioritize interventions with the strongest 'triple bottom line' case (environmental, social, and economic categories) for SMEs to improve business competitiveness. By using case studies and best practice approaches, the research team has created a management decision-making tool that can be used by the ITC work with SMEs to isolate and assess sustainability intervention strategies.

The guidebook in this report contains an intervention framework that suggests 'best practice' approaches for ITC and SMEs in the agri-food sector to implement. The guidebook was created with the first step of reviewing the ITC Standards Map and other international organizational standards (such as from the FAO, etc.) to identify standards relating to key sustainability issues in Environmental, Social, and Economic categories. The team, through a combination of literature reviews, expert interviews, and sector analysis, refined a list of sustainability categories provided by the ITC. The next step was to identify case studies for 'best practice' agri-food sustainability intervention practices in developing nations within the agri-food sector. Finally, the last step was to create an intervention framework that contained general social, economic, and environmental interventions required for a specific SME in the agri-food sector, along with providing case studies showing a clear benefit for using that intervention (such as an economic profit margin). Furthermore, ITC and an SME can use this tool to prioritize specific interventions that can be implemented in each unique case.

The research team used the honey sector in Zambia to test the framework, along with offering an example of how a particular sustainable intervention could be prioritized. Our framework

results show that the guidebook framework is a valuable tool in assessing SMEs in the agri-food sector for sustainability concern, for example finding improved water irrigation practices that could be implemented in Zambia. There is, however, some scope for further research. For example, one of our recommendations include further input on sustainable intervention risk, since addressing the exact monetary impacts of interventions proved challenging. These recommendations are further discussed in the report. This guidebook is a step in the right direction towards assessing SME sustainability and our goal is to provide accurate insight into how to broadly understand and implement sector-specific interventions that can be business competitive.

How to Use This Guidebook

This guidebook has three major sections – the research methodology, the interventions framework, and a case study example of the Zambian honey sector. The methodology section addresses how the thematic content of the guidebook was researched and implemented into the framework. The interventions framework section describes how the framework can be applied to an SME to provide sustainability interventions, with the complete intervention framework presented as a table. Finally, a case study of the Zambian honey sector provides an application of the framework.

Glossary of Terms

The following terms have been used throughout this report and are defined in further detail in this glossary of terms:

Eco-labeling

Eco-labeling is a voluntary method of environmental performance certification and labeling that is practiced around the world. An eco-label identifies products or services that are proven to be environmentally friendly. Most credible labels are awarded by an impartial third party for specific products or services that have been determined to meet certain environmental standards based on life-cycle considerations (Global Eco-Labeling Network, 2016).

Employee health & safety

The International Labour Organization (ILO) has more than 40 standards dealing with health and safety issues across nations worldwide. These standards work to protect employees from work-related injuries or diseases, along with promoting hygiene protocols (International Labour Organization, 2016).

Fair wages

Wage levels and wage-fixing mechanisms that provide a living wage floor for workers, while complying with national wage regulations, such as the minimum wage, payment of wages, overtime payments, provision of paid holidays and social insurance payments. (Fair Wage Network, 2016).

Forced labor

All work or service that is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily (International Labour Organization, 2016).

Global health and safety requirements

The International Labour Organization has a system of international labour standards aimed at promoting opportunities for women and men to obtain decent and productive work, in conditions of freedom, equity, security and dignity (ILO, 2015).

Green procurement

Purchasing goods and products that lead to minimal environmental impacts, such as goods produced with reduced greenhouse gas emissions, or harvested through sustainable agricultural procedures (Environment Product Declaration, 2016).

Green technology

The field of "green technology" encompasses a continuously evolving group of methods and materials, from techniques to generating renewable energy to non-toxic cleaning products (Green Technology Organization, 2016).

Integrated Pest Management (IPM)

Broad-based approaches to lowering pest populations with minimal use of pesticides to protect human and environmental health. Integrated practices may include introducing natural predator insects, manual control of pests, or preventative practices to increase plants' natural defenses.

Life-cycle assessment (LCA)

A tool for the systematic evaluation of the environmental aspects of a product or service system through all stages of its life cycle. LCA provides an adequate instrument for environmental decision support (UNEP, 2016).

Raw material efficiency

The minimization of waste concerned the usage of raw materials, allowing for not only improved efficiency, but also cost-minimization and increased profit margins from a business competitiveness standpoint.

Sustainability competitiveness

The set of institutions, policies, and factors that make a nation remain productive over the longer term while ensuring social and environmental sustainability (World Economic Forum, 2016).

Sustainability reporting

Also sometimes categorized as 'triple bottom line' reporting, sustainability reporting presents the organization's economic, environmental and social impacts. By combining the analysis of financial and non-financial performance, a sustainability report can demonstrate the link between an organization's strategy and its commitment to a sustainable global economy (Global Reporting Initiative, 2016).

Triple bottom-line standard

The triple bottom line (TBL) consists of three Ps: profit, people and planet. It aims to measure the financial, social and environmental performance of the corporation over a period of time. Only a company that produces a TBL is taking account of the full cost involved in doing business (The Economist, 2009).

Background and Problem Identification



Figure 1: Eastern and Southern Africa

Source: UNICEF

Agriculture makes up roughly 30% of the GDP in most countries in eastern and southern African countries and employs 65% of the regional population (Feed the Future, AGRA, 2013). Increasing the value of the agri-food sector represents an important economic, social, and nutritional pathway out of the poverty that 40% of the region's population experiences (Feed the Future, AGRA, 2013). However, there are several barriers to improving production and market value on a regional level, including lack of access to finance and credit, inadequate quality agricultural inputs, poor roads and infrastructure, and low levels of regional standardization and cooperation (European Union, 2013). Many of the countries in eastern and southern Africa are landlocked, creating limited access to ports and markets, and appear on the United Nation's list of Least Developed Countries because of their low gross national income and economic vulnerability.

Small and medium-sized enterprises (SMEs) create around 80% of regional employment and comprise over 95% of all business firms in Sub-Saharan Africa (dos Santos, 2015; Fjose et al., 2010). SMEs range in size from micro-firms with several workers making a subsistence-level revenues to medium-sized operations with up to 250 employees (Fjose et al., 2010). This guidebook will focus on SMEs ranging from 10 to 250 employees, which have potential for market growth but remain vulnerable to challenges such as lack of credit. Specific to the agri-food sector, SMEs also face dramatically different production bases in Africa. Countries in eastern and southern Africa have widely varying climates, rainfall patterns, soil types, and agro-ecological conditions. These differences, along with varied access to quality and quantity of agricultural inputs, contribute to crop yield variation among different size SMEs. Despite this variation, SMEs in the agri-food sector have the potential to benefit from a global growth in demand for processed and specialty foods by serving as a critical link between the food production base and regional and global food markets by creating added value for agricultural products.

However, challenges to agri-food competitiveness and efficiency occur across the value chain. At the input level, low agricultural yields may be due to lack of funding to purchase quality

seedlings, invest in sufficient pest management, and adequately apply fertilizers. Production issues result from post-harvest losses due to inadequate storage, lack of proper equipment and technology, electrical surges and power fluctuations, inconsistent product quality, and inefficient management of water and waste materials. At the distribution level, sustainability issues include poor road infrastructure, spoilage due to improper storage, high cost of fuel, and regulatory barriers to exportation. Crosscutting sustainability issues such as access to financing, gender inequality, and lack of regional organization contribute to inefficiencies along the supply chain.

Agroecological zone	Eastern	Middle	Northern	Southern	Western	AFRICA
Subtropic-arid		781	1448	501		1355
Subtropic-semiarid	546	726	295	392		338
Subtropic-subhumid			336	532		349
Subtropic-humid				837		837
Tropic-arid	89	208	186	336	225	184
Tropic-semiarid	336	469	100	351	246	270
Tropic-subhumid	496	479	161	491	1083	760
Tropic-humid	659	661	133	1571	1144	749
Average	480	536	433	398	580	517

Data source: You et al. 2012; FAO 2012; Sebastian 2009.

Note: All local prices converted to international dollars at 2004–2006 average purchasing power parity exchange rates.

Figure 2: Value of staple crop production (USD). *Source:* IFPRI, 2014

Guidebook Research Methodology

The research team had a four-step approach to creating the guidebook. This approach required refining the list of sustainability categories provided by ITC, researching ‘best practice’ approaches in similar agri-food sectors, creating the guidebook intervention framework, and prioritizing interventions specific to each agri-food case study. This methodology is detailed further below:

- a) **Refine list** of ITC’s sustainability categories for agri-food sector by:
 - (1) conducting interviews with Columbia University experts including Earth Institute faculty and other outside leaders in this field;
 - (2) researching sustainability problems in the agri-food sector; and
 - (3) developing comprehensive list of relevant sustainability interventions.
- b) **Research ‘best practices’ approach** in similar agri-food sectors to create methodology to evaluate potential success for how successful these new sustainability categories by
 - (1) identifying case studies for ‘best practices’ in similar agri-food sectors based on ITC’s suggestions and expert interviews; and
 - (2) distinguishing different types of benefits for business competitiveness, ie. reduced costs and increased productivity.
- c) **Create intervention framework** based on triple bottom line sustainable business model by:
 - (1) dividing sustainable categories within framework into social, environmental, and economic categories options and developing sub-categories with specific interventions; and
 - (2) the intervention framework allows for the creation of best practice recommendations for specific sustainability issues in the agri-food sector.
- d) **Prioritize interventions/methods** of greatest opportunity within the sustainability categories in the Zambian honey sector by:
 - (1) utilizing Pre-Assessment Tool to gather information on SMEs in terms of where they are in current sustainability interventions/standards; and
 - (2) prioritizing sustainability interventions in terms of cost and type of benefit received.

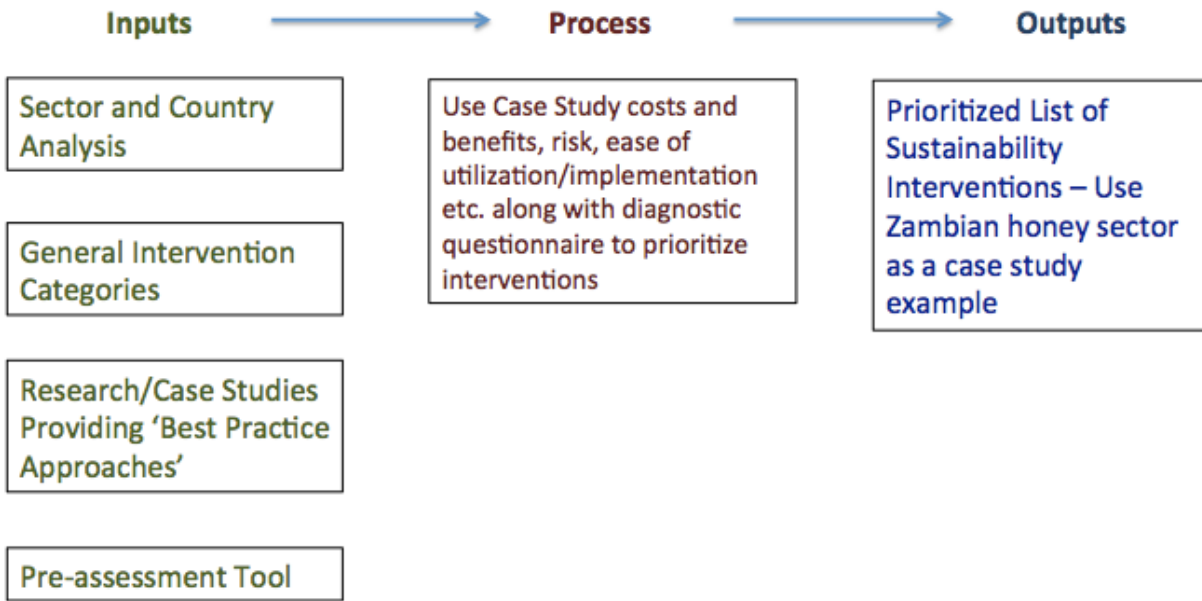


Figure 3: Guidebook Framework Methodology

Source: MPA-ESP IWC Workshop Research

Intervention Framework

Framework Description

The intervention framework is the key output of this guidebook and is meant to be used by ITC's Sustainability for Competitiveness (S4C) division as a tool to provide SMEs in Southern and Eastern Africa with sustainable interventions for business competitiveness. For SMEs, sustainable development is entwined with business competitiveness in an increasingly global market. As mentioned earlier, an estimated 70-75% of the agricultural production of East Africa is by smallholder farmers. Improving the capacity of this sector to perform competitively going into the future is integral towards sustainable economic growth. Expanding global operations through 'best practice' local agricultural interventions as well as conforming to international standards can boost productivity, along with providing important secondary markets to increase revenue.

In order to identify the intervention categories, the research team utilized a '*triple bottom standard*' that encompasses environmental, social and economic dimensions (IFC, 2013). Based on an initial sustainable intervention list provided by ITC, expert interviews, a literature review of 'best practice' approaches of sustainable agri-food interventions, and a review of ITC's Standards Map, the team then isolated sub-categories of the environmental, social and economic to develop specific sustainability interventions (Paracchini et al., 2014; ITC Standard Map, 2016; IFC, 2013; ITC Environmental Metrics). The ITC Standards Map was a valuable contributor to the analysis - providing "information on over 170 standards, codes of conduct, audit protocols addressing sustainability hotspots in global supply chains." Within the Standards Map, there are 63 standards related to agricultural products produced in Africa and exported to other countries and regions (ITC Standard Map, 2016). Among these 63 standards, the United States Department of Agriculture (USDA), Sustainable Agriculture Network - Rainforest Alliance, EU Organic Farming, Sustainability Assessment of Food and Agriculture systems (SAFA) were carefully considered and utilized as the most commonly recognized standards for the sustainable practices in the agricultural food sector.

Intervention Framework with 'Best Practice' Case Study Research

ENVIRONMENTAL CATEGORY	Sub-category	Proposed Sustainability Intervention (s)	Case Study	Benefits	Metrics	References
Materials	Raw Material Efficiency	Investment in efficient capital processing infrastructure	FAO Case Study:In Kenya, there was FAO introduction of bucket drip-irrigation kits. The kits are ideally suited for small vegetable plots and fruit trees. The "return on an investment of about US\$15 for one bucket drip-irrigation kit was some US\$20 per month" (FAO, 2002). Farmers in Kenya have currently bought over 10 000 kits (FAO, 2002). FAO calculations show that an "area under irrigation by one treadle pump in West Bengal, India, varies between 0.033 and 0.13 ha". These pumps have been successful in the African region as well, with farmers in the remote region of Sarh, Chad requesting more pumps after an effective pilot project (FAO, 2002).	- Improved production efficiency - improved adherence to international sustainability standards - Reduced use of raw materials - Fostering of green product and services industry through green procurement	Current efficiency and raw material usage requirements of processing infrastructure - Percentage of raw material usage and packaging materials coming from green procurement practices	1)Justin Yifu Lin. (1990). Hybrid Rice Innovation in China: A Study of Market Demand Induced Technological Innovation in A Centrally-Planned Economy. http://www.jstor.org/stable/2109517?seq=1&page_scan=1&h_content 2) Nderitu, K. M & Ngugi, K. (2014). Effects Of Green Procurement Practices On An Organization Performance In Manufacturing Industry: Case Study Of East African Breweries Limited. European Journal of Business Management, 2 (1), 347-352. http://www.wku.ac.ke/schools/business/images/stories/research/ldr_ngugi/EFFECT%20OF%20GREEN%20PROCUREMENT%20PRACTICES.pdf 3) Producing quality seeds means quality yields. (2016). Food and Agriculture Organization of the United Nations. Retrieved 7 April 2016, from http://www.fao.org/in-action/producing-quality-seeds/means-quality-yields/en/
		Recycling input materials				
	Green Procurement	Employee education in green procurement	Kenyan Breweries Case: In the Kenyan breweries sector, the introduction of green procurement practices has shown to lead to an increase of 29% in organizational performance			
		Purchasing of high quality input material	FAO Case Study: Adoption of high quality seedlings for maize and beans in Central America doubled yields.			
	Eco-Packaging	Usage of biodegradable products while receiving shipments from suppliers				
Water	Irrigation Management	Effective implementation of low-cost irrigation technologies	FAO Case Study:In Kenya, there was FAO introduction of bucket drip-irrigation kits. The kits are ideally suited for small vegetable plots and fruit trees. The "return on an investment of about US\$15 for one bucket drip-irrigation kit was some US\$20 per month" (FAO, 2002). Farmers in Kenya have currently bought over 10 000 kits (FAO, 2002). FAO calculations show that an "area under irrigation by one treadle pump in West Bengal, India, varies between 0.033 and 0.13 ha". These pumps have been successful in the African region as well, with farmers in the remote region of Sarh, Chad requesting more pumps after an effective pilot project (FAO, 2002).	- Reduced costs from water efficiency - Improved agricultural production efficiency by using water more effectively	-Irrigation area under treadle pump or bucket irrigation usage -Number of current institutional measures that regulate water withdrawal - Amount of water being used on a daily basis - Water withdrawn versus water actually required by crop (efficiency loss).	Modernizing Irrigation Water Management. (2003). FAO. http://www.fao.org/docrep/006/y4529e/y4529e09.htm
	Water Use Efficiency	Computerized soil-water sensors to trigger water applications				
		Rainwater capture				
		Institutional Regulations on Water Use				
Soil	Soil Conservation	Ensuring minimal soil erosion agriculture practices - such as analyzing crop rotation methods	SIDA Case Study: The soil conservation and agroforestry extension project (SCAFE). This project is funded by SIDA and covers three out of the nine provinces of Zambia. It addresses physical structures on smallholder farms. Recently, however, the programme has included soil fertility amelioration in its activities. These mainly concern organic matter management and general conservation farming approaches such as minimum tillage (MT).	- Greater soil productivity leading to increased farming yield - Reduced soil deterioration - Promoting long-term soil productivity from improved soil health and fertility - Providing farmer the option to switch crops more easily with more fertile land	- Current status of soil quality when compared to previous years, in terms of composition and agricultural yield - Fertilizer and biomass use efficiency	Place, Frank, et al. "Prospects for integrated soil fertility management using organic and inorganic inputs: evidence from smallholder African agricultural systems." Food policy 28.4 (2003): 369-378. Retrieved from, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1847071
	Soil Quality	Biomass transfer through manure, leaf litter, pruning, plant residues Zone-specific and climate-specific fertilizer recommendations				

Energy use/ Climate	Energy Efficiency	Implement energy conservation management		- Energy efficiency leading to immediate cost savings - Reduction in energy consumption leading to reduced GHG emissions outputs - Use of renewable energy resulting in diversion from fossil fuels and reducing GHG emissions	- Field irrigation rates across a field that match the soil and moisture conditions by using automatic regulation control systems based on Global Positioning Systems (GPS) - Current Insulation rates of refrigeration - Lifespan of current lighting system	R. Sims, A. Flammini, M. Puri, S. Bracco. Opportunities for Agri-Food Chain to Become Energy Smart (2015). Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a/i5250e.pdf
		Reduce energy used in irrigation				
		Reduce energy used for heating in food processing				
		Reduce energy loss from cooling and cold storage	Case study: Zero Energy Cool Chambers Project India: Installed low-cost, on-farm cooling technology that doesn't require electricity to operate, constructed with easy labor, use locally sourced materials. Reduced the temperature of the fresh produce by 100C -150C below ambient temperature while maintaining a high humidity of about 95%. Increased shelf-life of products for small farmers.			
		Reduce energy through efficient use of tractors; invest in energy-efficient tractors	Case Study: Motivo Multi-purpose Tractor: Use of tractor with large battery with wheels. Battery can be charged overnight and standard solar panel attachment allows farmers to charge during the day. Price is around USD 10,000 per unit (twice more than standard petroleum fuel-powered tractor). Although fuel savings offset the machinery cost, due to the expensive nature of the tractor, for small farmers entrepreneurs could purchase one and then rent it by the hour.			
		Reduce energy use in fertilizer application				
		Reduce energy lost through transport and distribution				
		Use energy efficient				
	Usage of Alternative Energy	Install solar PV, solar thermal, wind power or bioenergy for heat and power on the farm and at				
		Invest in anaerobic digestion plants to produce biogas that can be used to provide heat, power or transport				
Chemical Use	Pest Management	Adoption of integrated pest management practices	Ecuador Case Study: A case study examining IPM practices in Ecuador among potato farmers found that use of IPM reduced the number of pesticide applications from 12 in conventional plots to only 7 in IPM plots, leading to a decrease in active insecticide chemicals ranging from 40 to 75% and decreased production costs from \$104 per ton of conventional plot to \$80 for IPM plots. The study also found that reduced pesticide use led to fewer neurological effects and thus higher productivity of farmers.	- Greater yield from improved pest control - Improved production yield from cost savings - Reduced amounts of employee health-related accidents by reducing the use harmful chemicals - Conforming to international standards on pesticide usage, improving revenues by increasing the amount of export destinations	-Number of chemical-related illnesses or neurological effects among workers - amount of insecticide chemical used -Losses due to blight or rust diseases, or pest damage (will depend on crop/pest/fungus type) -Crop yield (control vs. treatment)	1) UTZ Certified Impact Report (2014). Retrieved from, https://utzcertified.org/attachments/article/26982894/utz-impact-report-web-1.pdf 2) Preventing Pesticide Poisonings in Ecuador. IDRC. Retrieved from http://www.idrc.ca/EN/Resources/Publications/Pages/ArticleDetails.aspx?PublicationID=522_3 Vietnam Coffee: A COSA Survey of UTZ Certified Farms. Retrieved from http://thecosa.org/wp-content/uploads/2015/05/Vietnam-Coffee-Assessment-of-UTZ-Certified-Baseline-COSA-Report.pdf
		Usage of personal protective equipment	Malawi Case Study: Utz training of certified tea farmers in Kenya and Malawi resulted in increased usage of personal protective equipment -- from 3% to 37% in Kenya and from 10% to 17% in Malawi. However, despite increased awareness and usage, barriers to widespread adoption remain due to the cost of purchasing the protective equipment and inconsistent use of equipment. An Utz study among certified and control cocoa farmers in Indonesia found that certified groups used breathing masks when spraying 99% of the time, compared to 76% among control groups, and that certified groups used eye protection 63% of the time when spraying, compared to 16% among control groups. The study also found that certified farmers used plastic or rubber gloves 27% more than control farmers when spraying agrochemicals.			
	Fertilizer Usage	Reduced use of chemical fertilizers	Vietnam Case Study: Utz training and certification of coffee farmers in Vietnam led to a decreased use of fertilizer inputs per hectare. Use of synthetic nitrogen decreased from 916 kgs/ha and use of cow manure decreased from 2025 cubic decimeters/ha to 682, while maintaining yields. Though these farmers were not found to receive higher prices for their crops, they were better able to market the coffee since buyers perceived it to be higher quality. While maintaining yields, the coffee farmers reduced inputs costs of fertilizers and biocides from \$1965 USD/ha to \$1264 USD/ha (fertilizer and pesticide input costs do not appear to have been recorded separately). It should be noted that this case study tracked this in conjunction with other interventions, such as record keeping and training for selective application of chemical inputs. In other case studies conducted by Utz, it was found that certified farmers used more fertilizer than control groups, but the added cost was made up for in additional yield.			
		Training on selective application of fertilizers for better efficiency				
		Increased application of fertilizers for increased crop yields				
					-Dosage per tree/hectare -Frequency of application -Total cost for fertilization application -Yield per hectare per kg of applied fertilizer (efficiency ratio)	

Waste / Effluents	Waste Reduction	Provide garbage bins for disposing waste, used gloves, and other material at the first entry point, as well as access points to segregated areas.	Canada Food Inspection Agency & Indiana State Department of Health Division of Consumer Protection's Food Protection Program: - Dispose of dead bees, bee products, debris, empty honey supers and other equipment that cannot be repaired by burning, burying, or sending to the municipal landfill sites. Place these materials in sealed garbage bags or tight containers. - Use garbage cans or bins with tight-fitting lids and that are lined inside with plastic bags to reduce odours and to help keep the cans or bins clean. - Provide garbage bins for disposing waste, used gloves, and other material at the first entry point from the apiary, as well as access points to segregated areas. - Dispose of garbage regularly.	- Improved hygiene and health benefits from the introduction of sanitary waste practices - Reduced cost from proper waste treatment, management, recycling and reuse - Compliance with waste regulations - Potential revenue from sales of recyclable waste	- Current waste disposal mechanisms and access points for removing waste - Depth of soil covered - Whether farmers are protected during the process - Distance of waste placed from crops	1) Canada Food Inspection Agency (2013). Honey Bee Producer Guide to the National Bee Farm-level Biosecurity Standard. Section 2: Operations Management. Retrieved from, http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/honey-bee-producer-guide/eng/1378990483360/1378990549687/chap-5 2) World Health Organization. Reuse of Sewage in Agriculture and Aquaculture. Fact Sheet 313. http://www.who.int/water_sanitation_health/hygiene/emergencies/fs313.pdf
		Implementation of closed loop				
	Water Contamination	Reuse of Sewage Water	WHO: Reuse of Sewage in Agriculture and Aquaculture - Effluent used for the irrigation of food crops, sports fields and public parks should have less than one viable nematode egg per litre and less than 1000 faecal coliforms per 100 millilitres	- Compliance with wastewater treatment regulations - Cost savings from water recycling and reuse - Improved water quality - Reduced water pollution	- Nematode Egg per Liter - Faecal coliforms per 100 milliliters	
Biodiversity	Sustainable Resource Management	Promoting genetic diversity of crops	Pisac Parque de la Papa: • Six Quechua communities • 12,000 ha • 600 potato varieties • Partnership with CIP	- Existence/heritage value - Adaptation to changing conditions or advancing to new frontiers - Breeding to add/blend valued traits - Community benefit	- The current situation of genetic diversity - The type of available and suitable crops to be planted - What impact will the introduction of new genetic type crops on the current crop?	Polfus, J. L., Hebblewhite, M., & Heinemeyer, K. (2011). Identifying indirect habitat loss and avoidance of human infrastructure by northern mountain woodland caribou. Biological Conservation, 144(11), 2637-2646. http://files.cfm.umn.edu/hebblewhite/BC_Polfus_Astin_CaribouRSF_2011.pdf
	Habitat Restoration	Avoidance of clearcutting and other activities that result in habitat degradation	Priorization of conservation efforts that the protection in areas that is a high quality habitat degraded and mostly adversely caused by human development.		- Estimate the Current situation of forest and biodiversity locally - Is the agriculture/food activity the main driver of the biodiversity/forest loss? If so, what are the main factors of the agriculture/food activity that cause the loss?	

SOCIAL CATEGORY	Sub-category	Proposed Sustainability Intervention (s)	Case Study	Benefits	Metrics	References
Human rights & labor rights	Fair Wages and Inclusive Hiring	Implement institutional reform, along with a country and sector specific living wage based on realistic cost of living.	Smeets et al: Fair wages in Short rotation coppice (SRC) production systems in Ukraine and South East Brazil. Under the loose set of criteria, at least minimum wage is paid in both countries. The strict set of criteria mandates that average wages are paid. This equates to an increase of wages by a factor 2.6 and 2.0 in Brazil and Ukraine, respectively. Overall, the impact on cost was higher in Brazil since labour costs are higher than in Ukraine. Final calculations revealed that production costs in Brazil increased by 24% and in Ukraine by 6% (Smeets and Faaij, 2009).	- Women empowerment - Elimination of child labor - Improved employee productivity - Introduction of fair wages, and regulatory compliance to reduce the risk of not conforming to international labor standard - Lower recruiting/training costs from improved labor conditions - Reduced risk from lower employee health and safety accidents - Improved buyer reputation - Community benefit	Wage of adult/child field worker -wage of adult supervisor -minimum wage -hours of work per week -ratio of wage to field worker wage -wage growth rate 2002-2015 -ratio labour costs to wages -General household level information -Quantitative and gender-disaggregated data on employment and working conditions in the agro-industry – including recall information on employment – and on contract-farming with the export industry. -average family size -average annual costs per child -land ownership -control and management of plots -livestock ownership -access to credit -membership of associations	1) Smeets, E. M., & Faaij, A. P. (2010). The impact of sustainability criteria on the costs and potentials of bioenergy production-Applied for case studies in Brazil and Ukraine. Biomass and Bioenergy, 34(3), 319-333. Retrieved from, http://www.biomassenergytrade.org/downloads/smeetsetal_ibicasesstudiesreport.pdf 2) Maertens, M., & Swinnen, J. F. (2012). Gender and modern supply chains in developing countries. The Journal of Development Studies, 48(10), 1412-1430. Retrieved from, https://ideas.repec.org/p/ijl/clicond/13109.html 3) Kearney, M., & Nagengast, C. (1989). Anthropological Perspectives on Transnational Communities in Rural California. Working Group Paper no. 3, Davis, CA: California Institute for Rural Studies. Retrieved from, http://www.cirsinc.org/publications/farm-labor/download/144/anthropological-perspectives-on-transnational-communities-in-rural-california 4) Allen, P., & Sachs, C. (2012). Women and food chains: The gendered politics of food. Taking food public: Redefining foodways in a changing world, 29-40. Retrieved from, http://www.ijaf.org/archives/15/allen_sachs.pdf
	Employee Health and Safety	Implement and enforce company policies that prohibit exploitation and sexual harassment of women.				
	Elimination of Forced Labor	Implement institutional reform, along with a country and sector specific living wage based on realistic cost of living.				
	Elimination of Child Labor	Compensate families for the loss of income due to elimination of child labour (applicable to cases where the child was helping the family with living expenses but loss job due to anti-child labour policies/laws)	Smeets et al: Child Labour & Education in Short rotation coppice (SRC) production systems in Ukraine and South East Brazil. The study looked at implementing a sustainability criteria in a loose sense and also in a strict sense and compared the two scenarios. From a social perspective, the study concluded if a sustainability criteria were applied in the loose sense, there would be no additional cost to the producers since the prevention of child labour is considered the responsibility of the parents, the government and society at large. Under a stricter criteria, parents would be compensated for the loss of family income and the costs of education to ensure that children do not work elsewhere (Smeets and Faaij, 2009). These costs are then added to regular labour costs. Key assumptions made in the cost benefit analysis are that hours of work for a child are the same as for adult labour, wage growth rate are same as for adult labour, and non-wage labour costs are zero (Smeets and Faaij, 2009). The specific numbers for a such a cost benefit analysis would vary based on the particular sector/industry and country.			
	Capacity Building	Implement national policies that provide specific funding for women to access capital, attain land rights.	Kearney et al: Gender Equality in agricultural production of beans, tomatoes and mango in Senegal. Women farmers face a number of issues in the agri-food sector: lack of access to capital, land, credit and knowledge (Allen and Sachs, 2012). Women as field workers are also			
Impact on local communities	Stakeholder Engagement (with farmers and women) and Cooperation with Nonprofits	Provide rural women with access to capital, land, credit and knowledge to become a part of smallholder contract-farming. One way of accomplishing this is through formation and leveraging of partnerships with major groups such as (UN Women, International Finance Corporation, Inter-American Development Bank, Bill and Melinda Gates Foundation, etc.) who can provide support and advocate on their behalf.	challenged by exploitation, sexual harassment, and overall lower wages and benefits than their male counterparts (Kearney and Nagengast, 1989). Maertens and Swinnen (2012) found that women are essential to agriculture and in development in poor countries. Five relevant gender issues investigated are: (1) gender bias in access to contracts; (2) gender bias in contract conditions; (3) changes in the time allocation of women; (4) changes in gender-specific cropping patterns and technology; and (5) changes in income and intra-household decision-making power over income. One important conclusion was that the modern supply chain was gendered but its growth is linked with reduced gender inequalities in rural areas.			
Product / customer health & safety	Regulatory Compliance	Conform to local and international standards pertaining to pesticide usage or sustainable harvesting, such as the FAO International Guidelines or foreign country-specific regulations.				

ECONOMIC CATEGORY	Sub-category	Proposed Sustainability Intervention (s)	Case Study	Benefits	Metrics	References
Supply chain Management Efficiency	Supply chain data management	Create process and source map to record and track the production (from raw materials to final product) and distribution system (from farmland to the market) agri-food product throughout the supply chain	Unilever Sustainable Palm Oil Study: "Illustrated palm oil process from raw materials to final product: - Created sourcing map to track the distribution of palm oil throughout the supply chain - Provided traceable data to manage the supply chain and reduce risks - Incorporated corporate social responsibility approach into the business model to encourage sustainable development"	- Faster processing time, higher product turnover from reduced lead times - Improved buyer reputation from supply chain sustainability and transparency - Identification of bottlenecks in production	- Current social responsibility reporting standards that are being used - Current data management being utilized for supply chain management - is the data timely, accurate and organized	Unilever. (2014). Sustainable Palm Oil Progress Report 2014. Retrieved from https://www.unilever.com/images/ulpl-unilever-palm-oil-report-nov14_scm244-474735_en.pdf
		Establish data management systems to increase the traceability and transparency of the supply chain				
Marketing	Eco- Labelling/Packaging/Design and Standard Certification	Certifications from labeling organizations (ISO, Fair Trade, Rainforest Alliance, etc)	Rishi Tea Case Study: - Packaging the Organic Iced Tea line "using paper manufactured with 100% renewable wind energy and 80% post-consumer waste that is elemental chlorine free (ECF), acid free, 100% recyclable and printed with soy ink" (Rishi Tea, 2016) - "Use completely biodegradable packaging cushions made from 100% recyclable material: the eco-friendly "Cell - O" air cushions by FP international are 99% air by volume; when deflated, less than 1% of the original volume remains; the cushion also requires less energy to produce and create fewer air and water pollutants and green house gas emissions than conventional paper products". (Rishi Tea, 2016) - "Using 100% Organic Certified cotton tote bags and organic cotton beanies" (Rishi Tea, 2016) - "Using fully compostable sample cups when serving tea at festivals, demonstrations and trade show; Cups were made by plant-based plastic and decompose in as little as 45 days when in a commercial composting facility" (Rishi Tea, 2016) -Created value added products (different artisan tea flavors)	- Potential increase in revenue from improved market competitiveness and increase in export - Improved transparency - Potential revenue increase from development of green product and technology	- Current eco-labels and certifications being utilized for export products - Current reporting standards, are these standards conforming to local or international guidelines	Rishi Tea. (2016). Rishi Tea Green Initiative. Retrieved April 6, 2016, from http://www.rishitea.com/green_initiatives
	Green product & technology development	Increased funding and allocation of pilot projects promoting the use of low-emission green technology in SME's				
	Sustainability Reporting (CSR)	Conforming to international reporting standards, such as FAO guidelines for international exports				

Figure 4: Intervention Framework

Source: MPA-ESP IWC Workshop Research

Framework Categories

The framework addresses environmental sustainability with seven sub-categories: materials, soil, water, waste effluents, energy use/climate, chemical use, and biodiversity. There are three sub-categories under the social sustainability area, i.e. human rights & labor rights, impact on local communities, and product /customer health & safety. The economic interventions include two subcategories: supply chain management efficiency and marketing. An example of categories can be referred to in Figure 5.

The sub-categories are then further divided into a list of agri-food sector sustainability interventions which were researched from FAO, ITC Standards Map, and peer-reviewed journals. For example, the ‘irrigation management’ sub-category underneath water has suggested interventions of implementing low-cost irrigation technologies that could potentially be more efficient with water use. The team has also researched ‘best practice’ case studies that identify the quantitative and qualitative benefits of each sustainability intervention. In the case of the irrigation management, the team used a FAO case study describing the benefits of small-scale drip-irrigation kits in Kenya.

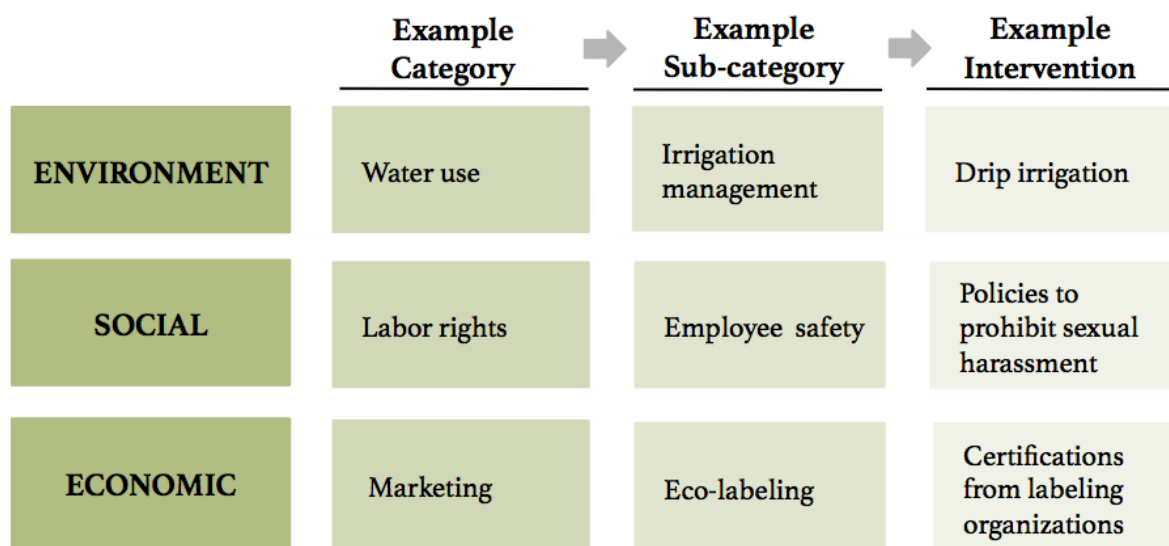


Figure 5: Sample Framework Categories

Source: MPA-ESP IWC Workshop Research

Framework Methodology

In developing the Intervention Framework, 63 standards from the ITC Standards Map were isolated and applied to the regional agri-food sector by selecting “Agriculture Products” produced in Africa. This list of standards, were then cross-referenced and compared criteria to identify standards relating to key sustainability issues in Environmental, Social, and Economic categories.

In Step 2 of the methodology, this isolated list of sustainability standards were used to refine the ITC’s list of sustainability intervention categories. The resulting sub-categories under Environment, Social, and Economic issues include more specific areas for sustainability intervention, such as energy use, labor rights, and supply chain management.

Step 3 of the methodology involved conducting research to identify case studies for ‘best practice’ agri-food sustainability intervention practices in other developing nations within the agri-food sector. Lastly, in Step 4 of the methodology, an intervention framework was created based on ‘triple bottom line’ approach. This framework looks at the different environmental, social, and economic challenges facing SMEs in the agri-food sector in southern and eastern Africa.

	Content	Research Method
1	Analyze Agri-food Sustainability Standards - Identify sustainability standards in agri-food sector - Cross-reference and compare sustainability criteria of the identified standards to isolate key sustainability issues	- ITC Standards Map - ITC sustainability intervention list
2	Establish Sustainability Intervention Categories Refine ITC’s sustainability intervention list and identify sub-categories based on results of ITC standards map analysis	
3	Conduct Best Practice Research Case study research of ‘best practice’ agri-food sector sustainability interventions	Literature review
4	Create Intervention Framework Based on ‘triple bottom line’ approach	

Figure 6. The Steps of Methodology

Source: MPA-ESP IWC Workshop Research

Intervention Prioritization

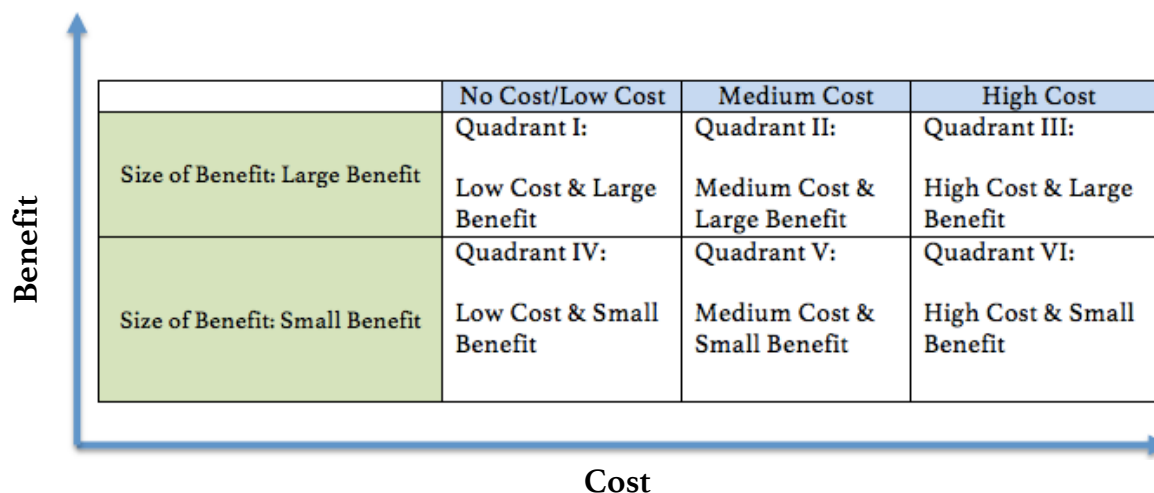


Table 1: Matrix for Prioritization

Source: Modified from Stephen Covey, *The Seven Habits of Highly Effective People*

Using the Pre-Assessment tool for SMEs, a measure of primary data can be obtained to determine the exact sustainability issues. Once the challenges are isolated, the guidebook framework can then be utilized to propose certain sustainability interventions. For our purposes, an intervention that has no or low costs can be easily implemented by the SME. This intervention will also utilize very little resources. Thus, it could be viewed as a short-term goal. The converse is true for an intervention that has high costs because it is difficult to implement. This would be defined as an intervention requiring a high degree of capital investment and resources to create. This intervention would be a long-term goal since an SME would need to amass a certain amount of capital to invest in it. A medium cost intervention is also a medium term goal. It requires a fair degree of capital and human resources to implement. Cost, here is a relative term depending on the SME. However, a range of low, medium and high cost would have to be linked to the annual revenue of a given SME. Our framework defines a low cost to be up to 3% of the annual revenue of the SME. A medium cost would be between 3 and 5% of the annual revenue of the SME and a high cost would be above 5% of the annual revenue of the SME.

With respect to size of the benefit, an intervention with a large benefit would improve the company in several ways. For example, maximizes the profit of the SMEs, reduces operating inefficiencies, improves value chain, enhances SME market share. It would also provide a large return on the initial investment of above 50% of what was spent. Whereas, an intervention that has a small benefit would provide the SME with very minimal return on investment. Here, the return of the investment would be less than twenty percent of what was spent. Size of benefit could also be interpreted on a varying scale of urgency. An intervention that has large benefit(s) would also be urgent for the company since it will be advantageous to them in a number of ways.

Therefore, an intervention that falls into Frame I is the most cost effective, with the largest benefit(s), is easily implementable and significantly improves SME sustainability and competitiveness. The graph attached to the prioritization matrix illustrates that for benefits to be large, costs must ultimately be as low as possible. See below a case study and practical example of how this prioritization tool can be used to prioritize interventions with the best business case for sustainability (Application of Framework to Case Studies section).

How the Intervention Framework Will Be Used

The intervention framework will be used by ITC's S4C Team in collaboration with the small and medium sized enterprises (SMEs) to generate 'best practice' approaches in the agri-food sector. The first step involves an SME completing a pre-assessment tool, which is a general questionnaire highlighting the sustainability challenges that the SME is facing. This tool will provide the sustainability challenges a SME is facing, allowing for interventions to be suggested by the guidebook framework. The next step is to use the cost/benefit matrix to lead the SME to best practice agri-food approaches in the specific sector.

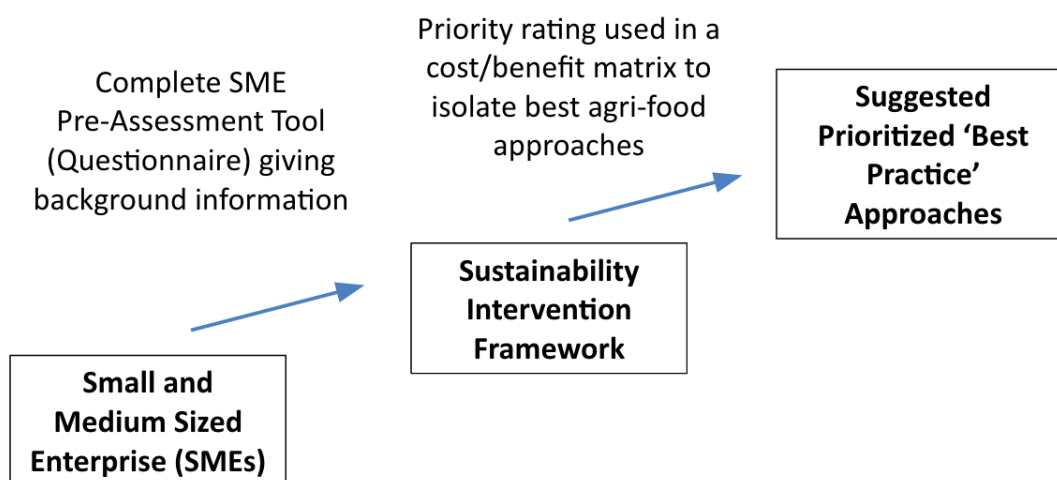


Figure 7. The Intervention Framework

Source: MPA-ESP IWC Workshop Research

ITC Preliminary Sustainability Assessment Tool for SMEs

Preliminary Sustainability Assessment is the first step in assessing the sustainability status of an organization. The preliminary assessment is conducted prior to the comprehensive on-site assessment and provides sustainability managers to understand the key issues of an organization based on the company's general information, production process and data. The assessment should be sent to the participating SME prior to the on-site visit. It is expected that not all of the information in the preliminary assessment will be filled out by the SME due to lack of information; however, it is highly recommended for the participating SME to complete the preliminary assessment as much as possible.

1. General Company Information

Company Name		CEO	
Address		Contact Person	Name, Title
Year of Registration			Email, Phone
Country of Operation		Industry type	
Annual production volume		Annual turnover	
No. of plantations / factories			

2. Product Information

Product Name	Yield/yr	Unit	Sales ratio (%)
Mango juice		m ³	
Dried mango			

3. Export Information

Product	Top 3 Exporting Countries		
	1	2	3
Dried mango	South Africa	UAE	

4. Company Organizational Chart

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5. Production Process Description / Flow Chart

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6. Production data

Production resources (input)

Category	Name or Use Description	Quantity / yr	Cost (\$)/ yr
Raw material	Seedling		
	Fertilizer		
Subsidiary material (chemical, oil, additive, etc.)	Pesticide		
Energy	Electricity		
	Diesel		
	Coal		
Water	Irrigation		
	Cleaning		

Emissions / effluents (output)

Category	Name or Use Description	Quantity / yr	Cost (\$)/ yr
Waste	Packaging		
	Product		
Wastewater	Pesticide		
Air contaminants			

Main facility or equipment used in production

Facility / Equipment	Use Description	Specifications	Installation year

7. Sustainability Interest (Check all relevant criteria)

Category	Activities	Check if relevant
Sustainability strategy	Vision, target, policy development	☐
Training & Education	Workshop, guidebook, etc.	☐
Green Procurement	Checklist, guideline	☐
Green Marketing	Sustainability brochure, report	☐
Certification	ISO 14001, Rainforest Alliance, etc.	☐
Raw material efficiency	Material Flow Analysis, Energy Audit, etc.	☐
Energy efficiency		☐
Wastewater reduction		☐
Waste reduction		☐
Reduction in air pollution		☐
GHGs emissions reduction	GHGs measurement, monitoring, etc.	☐
Regulatory compliance	Environmental regulations, health & safety regulation	☐
Eco-design	Product re-design, innovation	☐
Market research	Target country, consumer needs, etc.	☐
Green business	Green product development, etc.	☐

Example – Application of Framework

ITC provided the team with several documents and research pertaining to the Zambian honey sector, and the intervention framework created will be applied to this case study:

Case Study - Zambian Honey

Country Profile

Location	Southern Africa, landlocked
Population	15,066,266; with 40.9% urban population
GDP per capita	\$4,100 (2014 estimate)
Economy	<i>GDP composition:</i> agriculture (9.3%), industry (31.9%); Services (58.8%) <i>Labor force:</i> agriculture (85%), industry (6%), services (9%)
International agreements	Biodiversity, Climate Change, Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Wetlands
Climate	Tropical, modified by altitude, rainy season (October ~ April)
Natural hazards	Periodic drought, tropical storms (November ~ April)
Environmental issues	Air pollution, acid rain, soil erosion, chemical runoff into watersheds, deforestation, desertification, lack of adequate water treatment presents human health risks
Land use	31.7% agriculture production (4.8% arable land, 0% permanent crops, 26.9% permanent pasture); 66.3% forest; 2% other

Table 2 : Kenya country profile. Source: CIA Country Factbook, 2016.

Industry Overview

As one of the non-traditional exports, honey was selected by the Zambian government as one of the products with the great potential for growth in the regional and international markets. Currently, the supply of bee products in the world market decreased due to bee diseases such as Colony Collapse Disorder, forest fires, and extreme winters in certain parts of the world (Elizabeth Grossman, 2013). Meanwhile, due to market perception of the health and medicinal properties of honey, global the demand has been increased. The reduction in the global supply aligned with the fact that Zambia is 66.3% natural forest covered makes Zambia is able to meet the demand of pure and organic honey produced with no usage of pesticides or chemicals (ITC, 2014).

Strengthening the honey sector will diversify and enhance Zambia's economic growth and generate income for thousands of beekeepers, processors and traders while reducing poverty. It is an opportunity for the country to position itself strategically. Therefore, it is important for Zambia not only to increase volumes of production but also to meet local, regional, and international quality standards.

In 2008, official statistics estimated that Zambia produced 600 metric tons (MTs) of honey. However, it is estimated that Zambia has a 30,000 MTs per year production capacity. Honey production represents about 0.03% of Zambia's total exports and 0.03% of the global honey exports (ITC, 2014). The North Western Province is the major honey and beeswax production area, contributing around 90-95% of commercial domestic production and 100% of Zambia's honey exports. Approximately 20,000 Zambian beekeepers and 6,000 additional honey hunters worked on the honey production, and the earnings account for 25 per cent of their average household income (G. Mickels-Kokwe, 2006).

Globally, China is the most significant global honey producer, with 26% of the global market share. Other major global producers include Argentina, Mexico, Chile, and Turkey. Zambia's regional competitors include Ethiopia and Tanzania. Meanwhile, the European Union, United States, Japan, and the Middle East are the major global importers of honey. Eight main countries import honey from Zambia including the United Kingdom, Belgium, Norway, South Africa, Canada, Botswana, and Zimbabwe, and Nauru from 2009-2013 (ITC, 2014). In 2010, Zambia was the largest African supplier of honey to the EU, exporting 518 MTs. However, in 2011, Zambian supplies to the EU dropped to 67 MTs in 2011. Regionally, Zambia is the largest exporter of certified organic honey from Southern and Eastern Africa (ITC, 2014).

Honey Value Chain

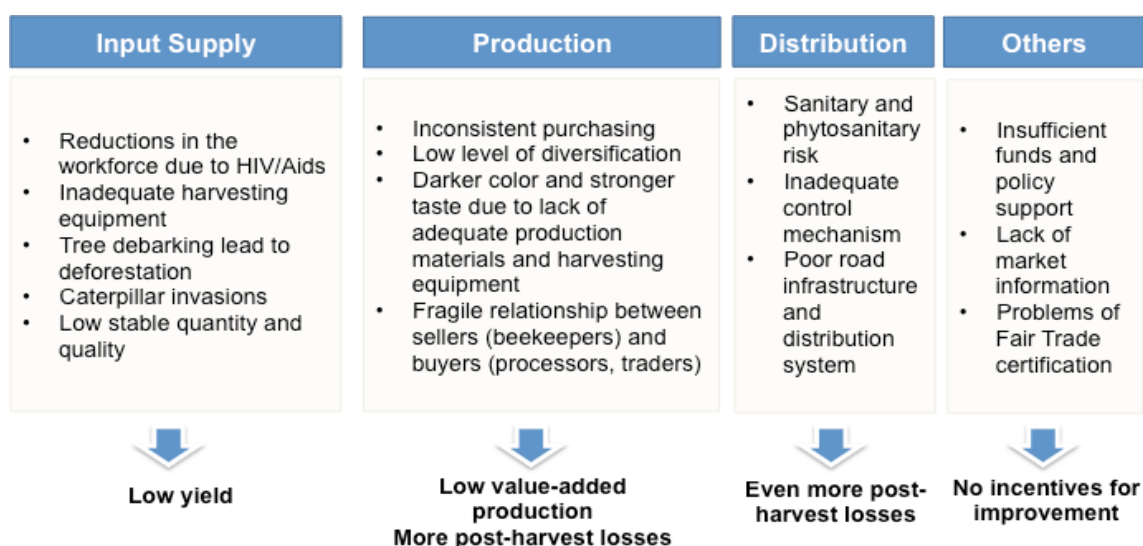


Figure 8. Honey value chain

Source: Zambia Road Map for Developing & Strengthening the Honey Sector, 2014.

Sustainability Issues

Threats to natural resources. Traditional Zambian beekeeping uses bark hives (Figure 9), which are typically created from cutting down trees that are also major nectar producers. This practice is harmful from an environmental standpoint as well as a business one, as bark hives produce a significantly smaller amount of honey at lower quality than more modern top frame hives (ITC, 2014). There are no regulations or policies that allocate land as beekeeping reserves to protect key honey production areas. Proximity of beekeeping to crops that use chemical pesticides and herbicides could threaten honey safety, quality, and the potential to market honey as organic. Potential industry uses of Zambian forests, for instance logging and mining, threaten sustainable forest management (ITC, 2014).



Figure 9. Bark hive Production

Source: Zambia Road Map for Developing & Strengthening the Honey Sector, 2014.

Barriers to branding opportunities. Zambian honey and bee products are not visible on the global market, due to bulk exporting to the EU, where the honey is re-processed, packaged, and shipped (ITC, 2014; Kommerskollegium National Board of Trade, 2009). This obscures promotion of Zambia as the country-of-origin and limits branding opportunities and traceability, as well as reducing value chain returns to beekeepers and processors in Zambia (KNBT, 2009).

Barriers to value-added products. Low honey quality and quantity limit market expansion. Implementation of standardized processing methods, attractive designs and packaging, and harvesting without smoking methods could improve honey quality and consistency (ITC,

2014; KNBT, 2009). Packaging honey in plastic risks leaking and exposure to heat, and plastic jars are associated with cheaper blends; however, there is no glass jar producer in Zambia, and packaging locally in glass leads to higher production costs and risk (KNBT, 2009). The honey sector in Zambia currently does not take advantage of higher-value differentiated bee products, such as royal jelly and a quality wax product (ITC, 2014).

Inadequate infrastructure. Transportation represents a significant cost in exporting honey from Zambia, since the country is landlocked, road infrastructure is poor, and fuel costs are high (KNBT, 2009).

Employment exclusion. Traditional beekeeping in Zambia uses bark hives, which limits the ability of women, culturally not allowed to climb tall trees, from a significant portion of beekeeping management. Furthermore, youth in Zambia, the majority of the population, are not widely involved in beekeeping and honey production (ITC, 2014).

Low level of sector coordination. Lack of integration among beekeepers limits adoption of best practices, effectiveness of training, and the ability to find and build relationships with reliable distributors (ITC, 2014).

SWOT Analysis

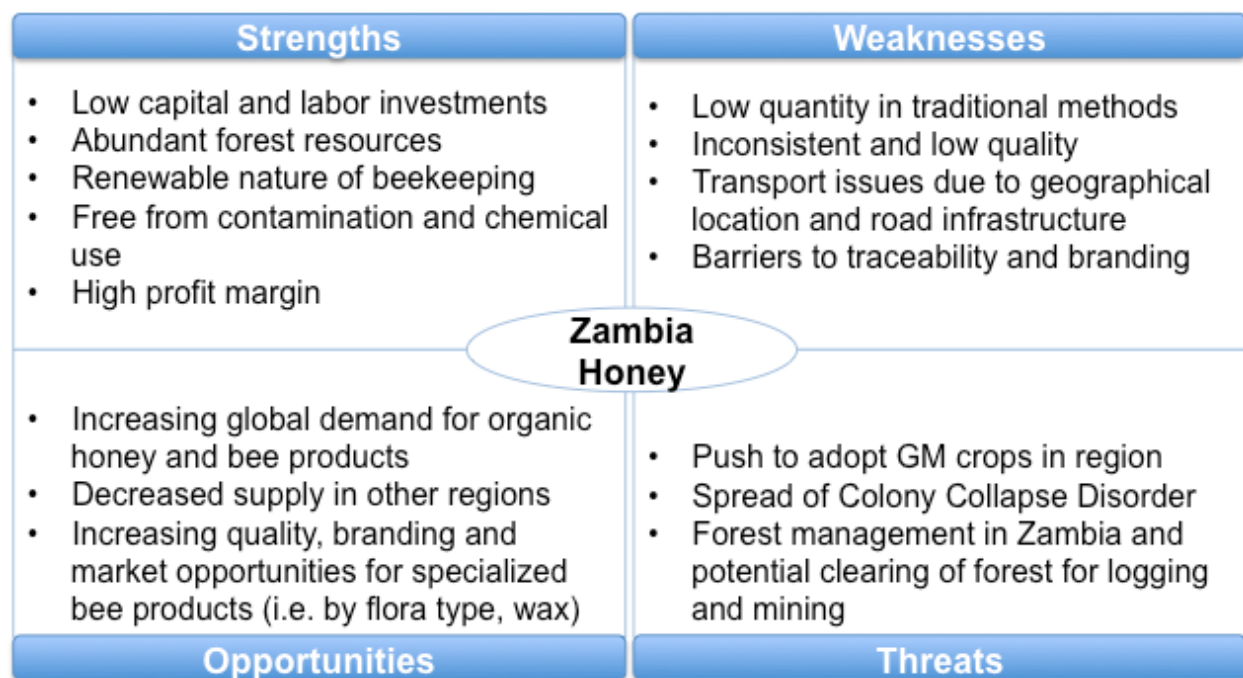


Figure 10. SWOT analysis of the honey industry in Zambia

Source: MPA-ESP IWC Workshop Research

Application of Framework to Case Studies

After developing the intervention framework, this was applied into analyzing the case study of Zambia Honey to develop and prioritize interventions to improve business competitiveness and increase environmental, social, and economic sustainability. Here is a specific example:

In the Zambian honey sector, there is potential for improved water usage regarding irrigating the pollinating trees used for honey-keeping. The intervention framework uses a case study from Kenya, the FAO introduced bucket drip-irrigation kits. The kits are ideally suited for small vegetable plots and fruit trees. The “return on an investment of about US\$15 for one bucket drip-irrigation kit was some US\$20 per month” (FAO, 2002). Farmers in Kenya have currently bought over 10 000 kits (FAO, 2002).

FAO calculations show that an “area under irrigation by one treadle pump in West Bengal, India, varies between 0.033 and 0.13 ha”. These pumps have been successful in the African region as well, with farmers in the remote region of Sarh, Chad requesting more pumps after an effective pilot project (FAO, 2002).

An intervention of bucket drip-irrigation kits would fall into Quadrant I because the African region is drought-prone and thus consistent irrigation of crops is a necessity. Hence, an intervention of purchasing bucket-irrigation kits for SME irrigation has a high priority at a low cost of \$15 but also has a large benefit with the return of investment being \$20 per kit. Further, this intervention fits into the prioritization framework because it is both important, urgent and easily implementable.

A further way to determine the interventions that are important and urgent are to rank them using a more streamlined self assessment from the standards map or B-Corporations that are more user friendly. The SME would complete the self assessment questionnaire, then the experts (ITC, TechnoServe, etc.) would create and rank interventions that they view as important and which are most urgent based on the self assessment. The intervention would then be given a weight by ITC based on best practices (link to intervention framework) and their self assessment. A final score would be awarded which combines the score and weight of the intervention.

Next Steps and Recommendations

The guidebook framework created in this report is the building block towards providing SMEs in the agri-food sector the sustainable interventions they need for enhanced international business competitiveness. The framework can also be advanced. - given the short, 12-week timeframe of the Program in Environmental Science and Policy workshop, this guidebook can have scope for further research. The following describes next steps and recommendations from the research team:

Sector Analysis: The sector analysis relies on secondary data and reports compiled by various industrial coalitions, multilateral organizations, and interest groups. There was no field level data obtained directly by the team personnel. Gathering primary data on the various subsectors within the eastern Africa agri-food sector would provide a more accurate and robust understanding of the problems and sustainability gaps within the sectors. Specifically, ITC can look at organizational data pertaining to input usage and conduct surveys with stakeholders throughout the supply chain to obtain a better understanding of the micro-level issues and areas of opportunity within the sectors. Isolating these issues will point to specific sustainability interventions to increase competitiveness.

Case Studies: Further research on case studies is required to have all the interventions available. We have sourced approximately 50% of the case studies for the intervention framework. This involves analyzing the framework general interventions and researching similar 'best practice' approaches used in cases for the developing world.

Pre-Assessment Tool for SMEs: The pre-assessment tool we created for isolating a specific SMEs sustainability challenges is a general guideline for gathering primary data, but a more detailed approach could involve looking at the ITC Standards Map Questionnaire for SMEs, which is a much lengthier document spanning 30+ pages of detailed questions.

Intervention Prioritization: The team has created a prioritization methodology involving the costs and benefits of specific interventions, but there was a lack of data regarding the exact quantitative impacts of interventions on a local level. Moving forward, isolating these costs and benefits for each intervention through pilot projects may be an approach to consider when suggesting micro-level interventions.

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