



**INVESTIGATION OF POLICY AND REGULATORY
REQUIREMENTS AND INTERVENTIONS FOR
REDUCING WASTE AND SPOILAGE IN AFRICA'S
FOOD SYSTEMS**

FINAL REPORT

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List of acronyms

| | |
|---------|---|
| AGRA | Alliance for a Green Revolution in Africa |
| APHLIS | African Postharvest Losses Information System |
| ATA | Ethiopian Agriculture Transformation Agency |
| AUC | African Union Commission |
| BoA | Ethiopian Bureau of Agriculture |
| CAADP | Comprehensive Africa Agriculture Development Program |
| CGIAR | Consultative Group on International Agricultural Research |
| CNCFTI | Tomato Industry Group of Senegal |
| CSA | Ethiopian Central Statistical Agency |
| DA | Ethiopian Development Agent (Government Extension Officer) |
| DADTCO | Dutch Agricultural Development and Trading Company |
| EAC | East African Community |
| ECX | Ethiopian Commodity Exchange |
| EDAIF | Ghana Export Development and Agricultural Investment Fund |
| EGTE | Ethiopian Grain Trade Enterprise |
| EIA | Ethiopian Investment Authority |
| EIAR | Ethiopian Institute of Agriculture Research |
| ESE | Ethiopian Seed Enterprise |
| FAO | Food and Agricultural Organization of the United Nations |
| FARA | Forum for Agriculture Research in Africa |
| GAP | Good Agricultural Practices |
| GCAP | Ghana Commercial Agriculture Project |
| GDP | Gross Domestic Product |
| GHG | Greenhouse Gas |
| GMOs | Genetically Modified Organisms |
| GPCs | Good Practice Centers |
| HQCF | High Quality Cassava Flour |
| IFAD | International Fund for Agriculture Development |
| IFPRI | International Food Policy Research Institute |
| IIAM | Mozambique Institute of Agricultural Research |
| INE | Mozambique National Institute of Statistics |
| MoA | Ministry of Agriculture |
| METASIP | Ghana Medium Term Agriculture Sector Investment Plan |
| MFIs | Micro Finance Institutions |
| MINAG | Mozambique Ministry of Agriculture |
| MSME | Micro, Small and Medium Enterprises |
| NAFCO | Ghana National Buffer Stock Company |
| NEEDS | Nigerian National Economic Empowerment Development Strategy |
| NGOs | Non-Governmental Organizations |
| NRCRI | National Roots Crops Research Institute |
| OECD | Organization of Economic Cooperation and Development |
| PACA | Partnership for Aflatoxin Control in Africa |
| PPP | Public Private Partnerships |
| PRONEA | Mozambique Program for Agricultural Extension |
| SADA | Savannah Accelerated Development Agency |
| SADC | Southern African Development Community |
| SAGCOT | Southern Agricultural Growth Corridor of Tanzania |
| SSA | Sub-Saharan Africa |
| TAFSIP | Tanzania Food Security Investment Plan |
| USAID | US Agency for International Development |
| UTP | Unfair Trading Practices |
| WRS | Warehouse Receipt System |
| WFP | World Food Program |

Executive Summary

INTRODUCTION

The Alliance for a Green Revolution in Africa (AGRA) and the Rockefeller Foundation have commissioned five studies to address food loss in Africa – a major challenge to food security and farmer livelihoods. This report focuses on the role of policy and regulation in reducing food loss, based on analyses from seven countries (*Ethiopia, Ghana, Kenya, Mozambique, Nigeria, Senegal, and Tanzania*) across a selection of crops (*beans, cassava, groundnut, maize, onion, sesame, teff and tomato*). To guide the analyses we defined policy broadly as ‘a course or principle of action that government can take’.

POLICY AS A TOOL TO REDUCE FOOD LOSS

Food loss is an outcome of economic choices made by farmers, traders, private companies and consumers along the value chain. Government policy can impact the costs and benefits of these choices and is therefore a key tool for reducing food loss. For example, through the use of increased tariffs on competing imports, the price incentives for private processors to source produce locally are enhanced. This in turn can provide a stable market to farmers, increasing their income and thereby increasing their economic incentive to invest in loss-reducing behavior. Using policy to enforce quality standards and grades is another example. A price premium on high quality produce will incentivize farmers to improve their production, harvesting and storage practices which will in turn alleviate losses. As buyers turn to farmers who are able to produce the right quality, farmers are assured of more stable and increased income allowing them to make more investments in loss-reducing practices.

We drew lessons on how policy approaches can influence smallholder farmer decision-making from analogous problem areas such as ‘climate change adaptation/mitigation’ and ‘conservation agriculture’. These fields provide useful guides for food loss policy as they also require farmers to adopt new practices in situations where financial, socio-cultural, and institutional barriers often hinder behavior change and innovation. An analysis of these areas highlighted the importance of addressing market failure and behavioral anomalies simultaneously. In the area of climate change adaptation ‘nudging’ has been used to influence farmer behavior. One example of ‘nudging’ is labelling ‘ecologically cooperative’ farmers which allows them to differentiate their produce and attract buyers and/or higher prices. Such an approach can complement other incentives to alter farmer behavior, as long as policy signals remain consistent. Many programs promoting conservation agriculture have been ineffective because of contradicting policy signals and perverse incentives from existing subsidy programs.

Policy interventions that benefit smallholder farmers may disadvantage others. Consumers would benefit from a reduction in food loss through lower prices and an increase in food availability. However, certain groups such as traders and private players in highly concentrated transport and processing industries benefit from the status quo and could resist policy changes to reduce food loss. Market informality, information asymmetry, and weak farmer bargaining power, creates clusters of power within each value chain. These clusters are likely to resist reforms as they tend to benefit from farmers’ lack of market information and their reliance on traders to sell their produce. This set-up however, drives farm-gate prices down, limits farmers’ ability to invest in storage and post-harvest technologies, and increases food loss.

Although identifying specific policy interventions that have been successful in reducing food loss is difficult due to limited measurement of losses and challenges in attribution, the experience of Rwanda provides a useful benchmark. Over the past five years, the country has reduced food loss (from 30 percent to 19 percent in the case of maize) through targeted investment in the post-harvest value chain. Policy actions taken by the Government include developing a National Post-Harvest Staple Crop Strategy, establishing a post-harvest handling and storage task force, and introducing incentives to promote private investment in innovation and processing (e.g. 100 percent write-offs on research and development costs). The recent harmonization of grain grades and standards across the East African Community, the development of credit enhancement vehicles to stimulate investment, the creation of a Strategic Grain Reserve, and the emergence of public private partnerships in infrastructure provision has also played an important role in reducing food loss. In addition, training and the dissemination of post-harvest technology among producers has been instrumental in changing farmer behavior.

ASSESSMENT OF POLICY FRAMEWORKS IN SELECTED COUNTRIES

Overlaying the above findings with the market dynamics of the selected crops and countries yields a useful framework of three guiding principles and seven core policy areas that can reduce food loss (Figure A). The principles are a tool to assess both what government can do to influence loss reducing behavior, as well as where it should intervene less. The policy areas include *necessary conditions* which at a minimum will encourage private business to invest, trade and innovate. Over and above these necessary conditions, there are additional *enabling actions* that governments can consider which would serve to more directly accelerate the reduction of food loss. We used this framework to assess key strengths and leverage points for each country with regard to food loss, and to identify policy gaps and implementation challenges.

Figure A: Guiding principles, core policy areas and necessary vs. enabling policy actions

| Guiding principles for governments to reduce food loss | | | | | | | |
|--|---|---|--|--|---|---|---|
| Systemic approach | | Ensure stability | | | Recognize limitations | | |
| Core policy and regulatory levers to reduce food loss | | | | | | | |
| | Leadership and strategy | Information for decision making | Research and development | Extension services | Infrastructure | Investment promotion | Demand stimulation |
| Necessary | <ul style="list-style-type: none"> Integrate loss reduction into an agriculture sector strategy | <ul style="list-style-type: none"> Monitor and evaluate policy interventions to reduce food loss | <ul style="list-style-type: none"> Establish IP policies and regulations to allow innovation to reduce loss | <ul style="list-style-type: none"> Encourage plurality of extension services to address loss | <ul style="list-style-type: none"> Develop road and energy infrastructure | <ul style="list-style-type: none"> Secure land tenure and property rights Ensure gradual roll back of direct intervention | <ul style="list-style-type: none"> n/a |
| Useful enablers | <ul style="list-style-type: none"> Develop a cross-sector post-harvest loss strategy Empower a unit with a mandate to address food loss | <ul style="list-style-type: none"> Use a standardized methodology to consistently measure and track food loss data across value chains | <ul style="list-style-type: none"> Partner with private sector on R&D into loss reducing interventions | <ul style="list-style-type: none"> Include food loss interventions in national extension curricula Promote farmer aggregation Provide training on business development services Train on quality, grades, weights and measures Subsidize loss reducing interventions in food-insecure communities | <ul style="list-style-type: none"> Develop public private partnerships for cold chain, warehouses and other physical market infrastructure | <ul style="list-style-type: none"> Increase availability of agri-finance through risk management products Implement food safety and quality standards Provide tax exemptions on equipment and other incentives Put in place an effective competition policy | <ul style="list-style-type: none"> Use targeted, time-bound and evidence based import tariffs Undertake institutional purchasing Promote secondary markets Implement local content policies Mandate use of local produce |

GUIDING PRINCIPLES

Systemic approach: Given the interconnected nature of the agriculture sector, solutions to food loss require a holistic value chain approach. Overall, the target countries abide by this principle through their agriculture transformation and delivery units, as well as their sector and value chain strategies. Only Ghana however has taken explicit steps to focus on, and coordinate loss reducing interventions by drafting a post-harvest loss strategy.

Ensure stability: Policy inconsistency is a disincentive to investment in food loss reducing measures. A core problem across all the countries we studied is the negative impact of ‘government surprises’ and ad hoc implementation of incentives and trade bans. This regulatory uncertainty hampers private sector trade and investment and reduces the ability of markets to absorb surpluses and counter losses. Maize in Kenya and Tanzania, and teff in Ethiopia are important food-security crops and are subject to a variety of government interventions including price adjustments (releasing reserves to force retail prices down), periodic export bans, and restrictions on trading/marketing channels. These interventions, while potentially valuable for food-security create a difficult investment environment and limit market opportunity for smallholder farmers leading to increased loss.

Recognize limitations: Across the target countries limited government resources and capacity is a key challenge. Governments should therefore only consider direct intervention in the event of market failure. When interventions are necessary, they should be based on robust evidence and the government must be well-positioned to act in terms of know-how and resources. When undertaken without these considerations, government actions can fail and/or stifle private sector innovation and investment. In Ghana for example, the Government’s Presidential Cassava Initiative which included the creation of Ayensu Starch Factory in 2003 to process cassava thereby alleviating loss, failed due to operational and financial difficulties resulting from an inadequate analysis of the market. The case of groundnuts in Senegal is another example of inefficient government involvement. Subsidies not only crowded out private sector investment in improved inputs that could serve to reduce loss, but also proved to be ineffective. Between 2001 and 2011, the amount spent on subsidies for groundnut increased dramatically. While the program saw some success in increasing the accessibility and availability of fertilizer the targeted boosts in production were not achieved.

CORE POLICY AND REGULATORY REQUIREMENTS

Provision of clear leadership and coordination on food loss issues: Given its complexities, tackling food loss requires leadership and the participation of all value chain actors. All seven countries met the ‘necessary’ conditions in this area. Their agriculture sector policies do mention food loss but tend to focus on key staple crops. Moreover, these policies are ambiguous and do not prioritize (by crop and stage of the value chain), areas where losses are the greatest. Additionally, policies that are in place suffer due to lack of resources for implementation. Although promising ‘enabling’ efforts were highlighted in Ghana with the drafting of a post-harvest loss strategy, and in Nigeria with comprehensive inclusion of post-harvest loss in the Agricultural Transformation Agenda, all seven countries exhibit limited leadership, coordination, and information flow in relation to food loss.

Provision of information for decision-making: A clear understanding of the scope and scale of the problem is needed to target and assess interventions. A few target countries have taken basic steps to measure and track post-harvest loss. East African countries in particular have benefited from

APHLIS efforts to measure post-harvest losses among certain staples. However, all seven countries quote broad ranges in terms of loss estimates and most do not have the ‘enabling’ condition of standardized measurement systems in place to develop evidence-based policy and evaluate performance to reduce post-harvest losses.

Research and development into improved varieties and post-harvest technologies: Agricultural research is critical to ensure farmers have access to appropriate varieties and technologies to protect against loss. At a minimum, the policy framework needs appropriate intellectual property (IP) regulations to allow private innovation. Post-harvest innovation efforts by public research institutes and development agencies in the selected countries are limited and tend to focus on staples rather than tradable crops such as tomato which incurs significant losses. Further, a lack of regulatory transparency hampers innovation and engagement in areas such as seed development and post-harvest technology. Examples of promising policy efforts include the Biosafety Act (2011) in Ghana to promote trials of *Bt* cowpea which is more resistant to loss, and commitments made by six of the seven governments under the G8 New Alliance Cooperation frameworks enabling the private sector to develop, commercialize, and use improved inputs.

Provision of extension services: Research alone is insufficient unless it is adequately disseminated to end-users. In addition to basic agronomic research which has typically focused on increasing productivity, there is a need for training in post-harvest handling, storage technologies, and quality standards. Farmers also need a better understanding of how to access markets and finance. Across the countries analyzed, resource-constrained extension networks pay inadequate attention to post-harvest issues, as well as training of farmers on business development and entrepreneurship. Nonetheless, certain initiatives such as targeted extension support and awareness campaigns in Ethiopia, as well as the promotion of private sector extension in Kenya have shown promising results. The Government of Ghana’s Good Practice Centers (GPCs) which serve as marketing points for cassava producers have also shown positive results in terms of raising quality standards, connecting farmers to processing technologies and buyers, and reducing losses in a financially sustainable way.

Provide transport, energy and other supporting infrastructure to key production areas: Significant food losses between farm and buyer result from a lack of appropriate infrastructure. This includes all-weather roads, weigh bridges, grain silos, cold chain facilities, and suitably located warehouses. Private sector investments in processing are also limited by infrastructure deficiencies such as access to water, high energy costs and variable energy supply. All seven governments meet the ‘necessary’ condition through their policy and strategy rhetoric on road and energy infrastructure, as well as actual investment in these areas. However, effective coordination between ministries and value chain actors is lacking. This has resulted in economically flawed policies and ‘white elephant’ investments in warehouses and other physical market infrastructure that does not directly improve market efficiency or reduce loss. In contrast, the Government of Kenya’s Horticulture Crops Development Authority (HCDA) provides a good example of loss reducing infrastructure interventions. Here, data-driven decision making and close partnerships with industry and farmers led to worthwhile investments in cold storage facilities and transport services.

Regulatory environment that catalyzes private sector activity: Private sector investment plays an important role in generating technological solutions to reduce food loss and in creating markets for smallholder farmers. A policy environment that is conducive to innovation and that provides the right incentives for private investment is therefore essential. Tax breaks (e.g. exemption from import duties on agro-processing equipment) have had some success in the seven countries studied, but challenges remain regarding awareness and the ambiguous nature of incentives. Private investment is also constrained by a lack of quality standards, land tenure constraints, and high capital costs along with the negative effects of monopolistic/oligopolistic behavior in the transportation and food processing sectors brought about by lack of a competition policy. In Ethiopia, the government has introduced a number of incentives (free land and the waiving of certain duties) to encourage the construction of sesame processing facilities. These incentives are complemented by a certification system for sesame cooperatives that encourages quality production and provides better market opportunities. In Kenya on the other hand, taxes which account for approximately 40 percent of the cost of grain handling equipment that can prevent losses is clearly counter-productive. All seven countries have committed to removing policy barriers to private investment under the G8 New Alliance Cooperation frameworks as a key step in incentivizing private sector engagement in agricultural production and processing. Further, AGRA support to policy nodes in Mozambique, Tanzania and Ghana, and other donor supported agri-finance and agri-business promotion efforts are also steps in the right direction.

Interventions to stimulate demand for key crops: Over and above the broad promotion of private sector investment, government can undertake deliberate policy interventions to alleviate food loss by absorbing surplus production and driving demand. These include local content policies requiring businesses to source produce locally, institutional purchasing (e.g. school, prison feeding or WFP's Purchase for Progress), creating strategic grain reserves to smooth price fluctuations and serve as a buyer of last resort, and/or using tariff barriers to influence market forces. In Nigeria for example, in order to increase domestic value addition of cassava (and reduce post-harvest losses in the process), the government mandated use of composite cassava flour in bread and increased tariffs on wheat flour imports. Anecdotal evidence suggests this stimulated private investment in several medium and large-scale processing units which sourced from smallholder farmers, further mitigating losses. However, the effectiveness of this initiative in stemming loss at scale has been limited by processors' inability to source required volumes. This underscores the need for complementary investment in inputs and extension and highlights the interconnected nature of all policy interventions.

The overarching implication of policy and regulatory limitations in the studied countries is that smallholder farmers along different value chains have insufficient knowledge and incentive to invest in loss reducing measures. Country performance against the core policy areas shows a diverse range of policy strengths and challenges. While some gains have been made in enabling research and development of improved varieties and post-harvest technologies, and implementing policies that promote private investment, consistently weak policy areas include: government intervention and red-tape hindering private investment, limited management of information on food loss to enable decision making, and the inability of extension services to effectively target loss reducing interventions.

Over and above country-specific policy requirements it is important to recognize broader international policy dynamics that also impact value chains and food loss. These include Unfair Trading Practices in supply chains, which lead to over-production and reduced income for producers, as well as overly restrictive marketing standards applied by the European Union for example, on all imported fruits and vegetables. In addition, products with residues of pesticides that are banned in the EU but not in Africa are likely to be left as waste.

STRATEGIC IMPLICATIONS AND OPPORTUNITIES BY COUNTRY

To inform AGRA and the Rockefeller Foundation’s strategic decision-making process, we identified ‘intervention types’ where support to government policy could help reduce food loss and positively impact smallholder farmers. While there are numerous areas where policy could be improved we focus on those where we see existing momentum and opportunity for the Rockefeller Foundation and AGRA (as grant-making institutions) to support interventions to reduce food loss in the target crops of interest. The main body of the report provides details on specific entry points by country as well as risks and challenges, but it is valuable to take a cross-country lens and distill where commonality and hotspots exist (Figure B).

Figure B: Overview of intervention opportunities

| Policy Area | Intervention type | Ethiopia | Ghana | Kenya | Mozambique | Nigeria | Senegal | Tanzania |
|---------------------------------|---|----------|-------|-------|------------|---------|---------|----------|
| Leadership and strategy | • Support the design and integration of a post-harvest loss management unit | | | | | | | ✓ |
| Information for decision making | • Support the measurement and monitoring of food loss to provide a basis for evidence based policy | ✓ | | | ✓ | | | |
| Research and development | • Support the research and development and dissemination of appropriate varieties to decrease on-farm losses and catalyze the processing industry | | ✓ | | ✓ | | | |
| Extension services | • Support the development of training modules on post-harvest management, quality standards, standardized units of weight and measure and marketing methods | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| Infrastructure | • Support a needs assessment for physical warehouse infrastructure and/or designated marketplaces, with weighing, grading and packaging facilities | | | ✓ | | | | ✓ |
| Investment promotion | • Support an assessment of agribusiness promotion policy requirements | | | | | | | |
| Demand stimulation | • Support a cost-benefit analysis of trade and tariff barriers to promote domestic value addition in certain value chains | | ✓ | | | ✓ | | |

Looking across the intervention types identified by country we see a cluster of opportunity in the extension services policy area. This includes support for the design, roll-out and training on guidelines and standards, units of weight and measure, as well support to the development of post-harvest training modules in extension curricula. These are policy interventions that can be instigated by government but delivered in partnership with private and non-state actors. In recognition of this recurring theme, we believe support to this area presents a policy window that could move the needle in terms of addressing food loss. Given the plethora of on-going efforts in the area of private investment promotion through the New Alliance, AGRA Policy Nodes and other donor supported agribusiness units and initiatives, we have not prioritized this as an intervention area. Nevertheless, there are country-specific opportunities presented in the report that identify other policy areas that the Rockefeller Foundation and AGRA could choose to address through their interventions.

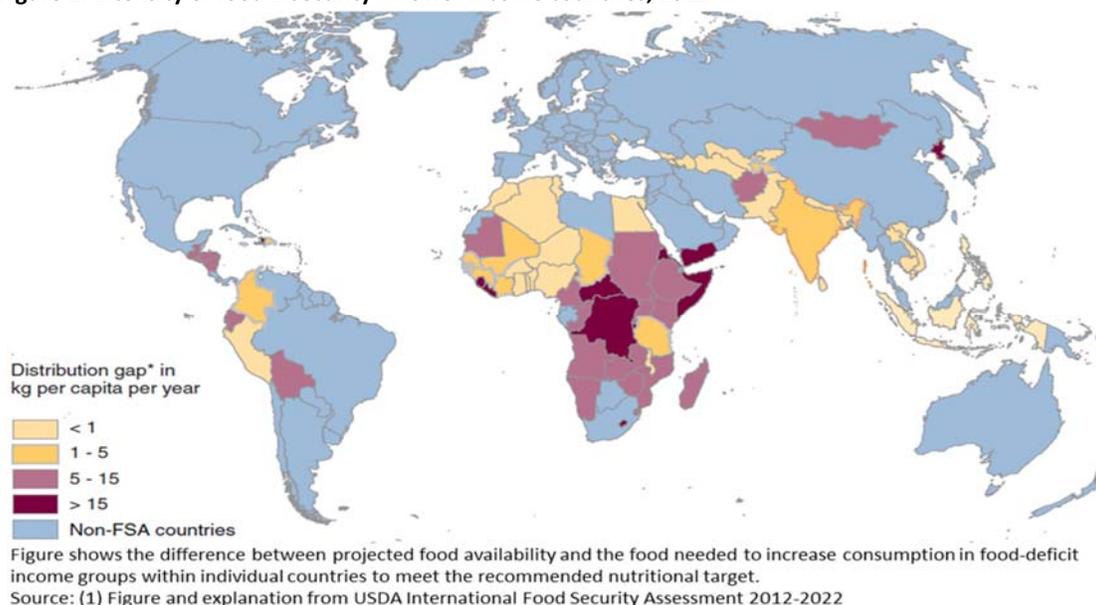
1. Introduction and context

FOOD LOSS IN AFRICA

Global food loss constitutes a major challenge to food security and farmer livelihoods across the world. Current global food loss reduces income by at least 15 percent for 470 million smallholder farmers and downstream value chain players, aggravating issues of food insecurity, price volatility, and inadequate yields.¹ These losses contribute to critical global food shortages, impacting the 1.2 billion people around the world who are food insecure.² Food losses in the value chain prior to consumption—which account for 90 percent of total losses in developing countries—negatively affect food availability and drive prices up.³ By volume, food crops (e.g., cereals, fruits and vegetables, roots and tubers, and pulses) account for the majority of losses, however, fruits and vegetables have the highest rate of loss, at an estimated 46 percent of total global production.⁴

The problem of food loss in Africa is particularly acute due to the severity of food insecurity. As shown in Figure 1 below, nearly 240 million people in Sub-Saharan Africa lack access to sufficient food, and the problems of hunger and food insecurity will continue to grow rapidly as the region's population is expected to more than double by 2050.⁵ Losses in grain value chains alone are estimated to be worth \$4 billion per year.⁶

Figure 1: Intensity of food insecurity in lower income countries, 2012



¹ Dalberg (2013) "Waste and Spoilage in the Food Chain," Decision Intelligence Document

² Calculation of 1.2 billion people comes from FAO food inadequacy indicators listing 22.5 percent of developing country population as food inadequate multiplied by 2011 population data provided by the World Bank World Development Indicators

³ FAO (2011) "Global Food Losses and Food Waste" <http://www.fao.org/docrep/014/mb060e/mb060e.pdf>

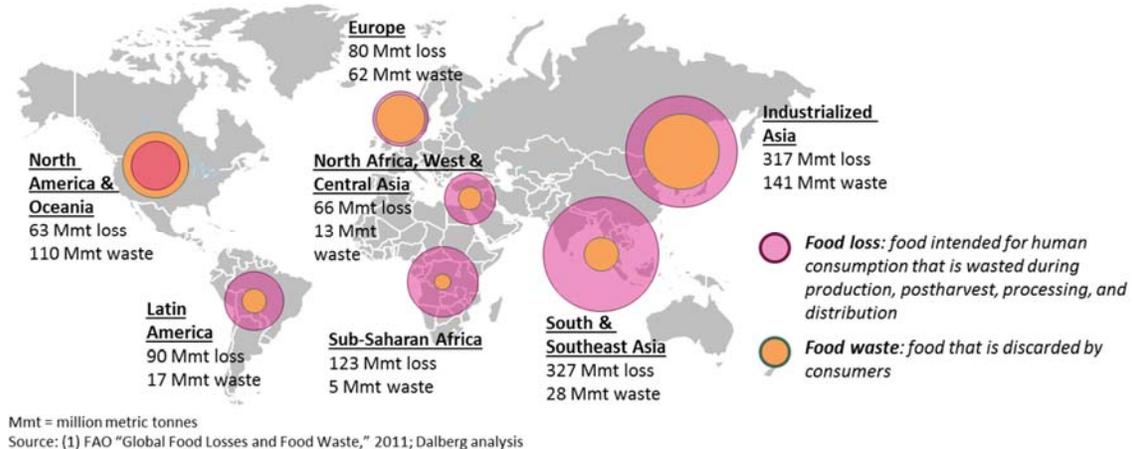
⁴ Ibid.

⁵ Bremner, Jason (2012), "Population and Food Security: Africa's Challenge," Population Reference Bureau, <http://www.prb.org/Publications/Reports/2012/population-food-security-africa-part1.aspx>

⁶ World Bank (2011) "Missing Food: The Case of Postharvest Grain Losses in Sub-Saharan Africa", http://siteresources.worldbank.org/INTARD/Resources/MissingFoods10_web.pdf

Figure 2 below illustrates how food losses in Sub-Saharan Africa are concentrated in upstream segments of the value chain where they are most harmful to producers, especially smallholder farmers. Losses prior to consumption directly impact farmers by reducing the quantity of produce they can sell, lowering the value of their goods, or affecting their margins. All these factors result directly in lost income for smallholder households, many of which already suffer from severe poverty.

Figure 2: Food waste and food loss around the world, millions of metric tons, 2011



STUDY OBJECTIVES

In the context of these challenges, AGRA and the Rockefeller Foundation seek to address the problem of food loss in Sub-Saharan Africa (SSA) through a new initiative. To design this initiative the organizations have commissioned five studies to inform their strategy and approach.⁷ Each study seeks to deepen the organizations' understanding of a specific component of the food loss problem.

This report focuses on the role of the public sector and the regulatory and policy requirements to reduce food loss in the value chain. Given that food loss is much greater than food waste in Africa, and the largest amount of losses occur at the early stages of the value chain, the report focuses on farmer rather than consumer behavior. The key questions to guide the study are summarized as follows⁸:

- What are successful models of proactive policy interventions to address food loss, and are there any national policy and regulatory frameworks in Africa that could serve as good benchmarks?
- Are there any examples of policy design and implementation from other problem domains in Africa that could serve as good analogues?

⁷ The other four studies are as follows: (i) Investigation of AGRA's In-House Stock of Knowledge on Reducing Food Waste and Spoilage in Africa; (ii) Investigation of the role of Innovative Finance in Creating Conditions of Scale for Waste and Spoilage Reducing Technologies and Initiatives in Africa; (iii) Investigation of Issues and Challenges Facing African Smallholder Farmers and Highest Potential Intervention Points in Reducing Waste and Spoilage in African Food Systems; and (iv) Investigation of Risks and Enhanced Opportunities for Greater Engagement with Wholesale and Retail Private Sector Investors in Reducing Food Waste and Spoilage in Africa

⁸ Synthesis of questions provided in the Terms of Reference but presented in the order they are addressed in the report

- From a political perspective, which groups benefit from extant loss outcomes, and which ones would stand to lose significantly from changes and therefore resist them?
- What are the core policy and regulatory requirements for reducing loss in the food value chain (particularly with regards to promoting private investment), and how do the target countries perform against these requirements (i.e. what are the policy framework strengths and gaps in each country)?

Throughout this report we use the term “loss” to cover both waste and spoilage along the food value chain.

This report aims to synthesize the findings of our investigation into challenges and opportunities to reduce food loss from a policy perspective. It seeks to capture the nuances and details of specific opportunities in the countries and crops of focus to provide AGRA and the Rockefeller Foundation with actionable information about current policy and regulatory frameworks and opportunities. To this end, the report is structured as follows:

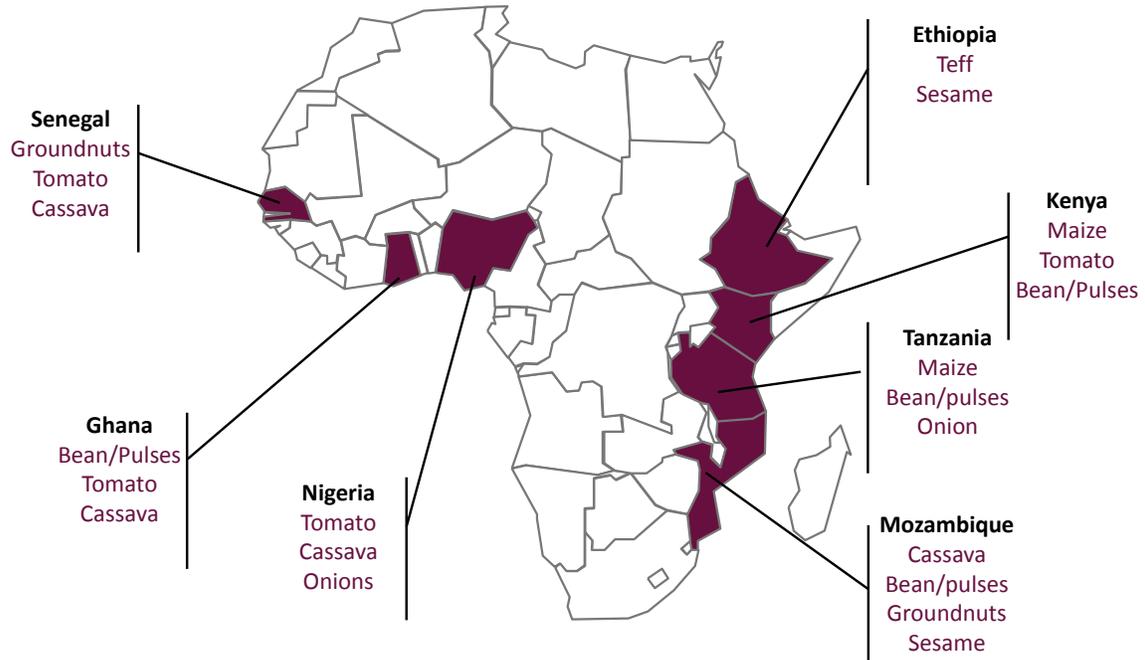
- **Section 2** provides a brief overview of our methodology and approach
- **Section 3** analyses the importance of policy as a tool to reduce food loss. This section examines the root causes of food loss and how policy can influence decision-making in this area. We draw on lessons from other problem analogues, use Rwanda’s policy framework as a benchmark, and also provide an analysis of the winners and losers from policy reform
- **Section 4** focuses on guiding principles and core policies to reduce food loss. It builds on Section 3 to summarize guiding principles and core policy areas that are needed to reduce food loss. Section 4 also contains an analysis of broader international policy dynamics that African governments need to take into account
- **Section 5** uses the principles and policy requirements presented in Section 4 to present a summary assessment of performance of the selected countries against the different policy areas. The supporting detail to this section is provided in Annex 1
- **Section 6** concludes with a presentation of strategic opportunities for intervention by country, and the potential risks and challenges
- **Annex 1** provides supporting information for each country. We present a summary of findings from the stakeholder interviews and literature review on how each country performs against the core policy areas highlighting both strengths and limitations
- **Annex 2** provides a list of stakeholders interviewed for the report.

2. Methodology, approach and definitions

STUDY SCOPE

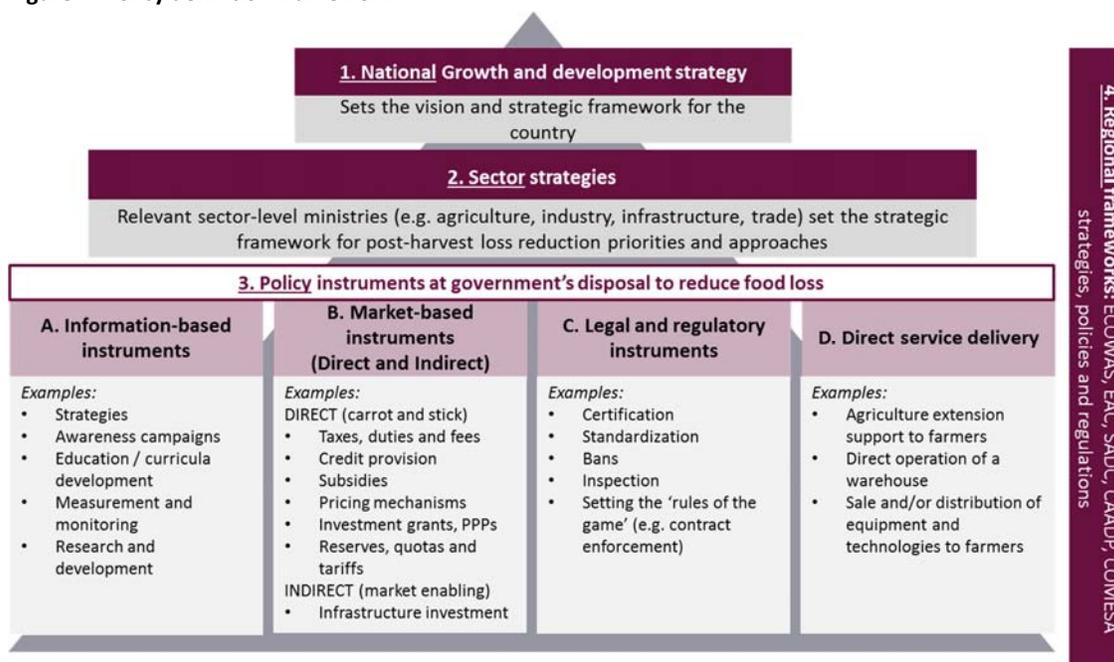
The study focused on a range of value chains across seven countries in East and West Africa, as shown in Figure 3. The crop selection is split across food security crops such as cassava, beans, teff and maize, and traded crops such as onion, groundnut, sesame and tomato.

Figure 3: Geographic and commodity focus of the study



To guide the analyses we defined policy broadly as ‘a course or principle of action that government can take’. Figure 4 presents a summary of the different instruments governments have at their disposal to reduce food loss ranging from regional or national sector strategies and policy framework documents through to market based instruments such as taxes, duties and tariffs and direct interventions such as warehouse construction or extension services to farmers.

Figure 4: Policy definition framework



RESEARCH SOURCES

The study made use of both primary and secondary research. Existing literature on both the global and regional problems of food loss and also country- and crop-specific papers and overviews were reviewed. Specific sources included: Food and Agriculture Organization of the United Nations (FAO) publications, International Food Policy Research (IFPRI) publications the African Journal of Agricultural Research, the World Bank Agribusiness Indicator reports, internal Dalberg resources, government websites and publications, AGRA reports, donor project documents, and other relevant papers and reports. The majority of primary research took the form of in-country stakeholder interviews in each of the seven target countries. In each country, interviews were conducted with a minimum of ~10-12 policy-makers, private companies, development partners and NGOs, and representatives from producer and other industry groups. Annex 2 presents a full list of stakeholders interviewed. It is important to note that due to the lack of consistent measurement of losses by crop and country there is an absence of quantitative information available to assess the direct impact of different interventions on food loss. Nevertheless we have focused on providing qualitative findings supported by quantitative data where possible.

INTERVIEW METHODOLOGY

In-country interviews were designed to test key hypotheses and understand a degree of detail not available in secondary research sources regarding specific constraints and opportunities in each value chain. The main purpose of the stakeholder interviews was to evaluate countries progress against the core policy areas and examine potential policy opportunities for reducing food loss. Within each category of stakeholder, there was a distinct set of questions that included, but were not limited to:

- *What types of policies and regulations have had the biggest impact on the selected value chains in terms of food loss reduction?*
- *What are successful examples of policy interventions to address food loss? What were the drivers for success?*
 - *Which groups benefitted most from these interventions and why?*
 - *Which groups benefitted least from these interventions and why?*
 - *What was the cost to government, how were these policies implemented and what has been the impact?*
- *What are the ideal policies to reduce post-harvest loss?*
 - *What are the types of government programs that can reduce losses: Are there post-harvest technology support such as extension training at different stages of the value chain?*
 - *What are the types of market-based interventions that can reduce loss: Are there market enabling interventions such as stock purchase, storage investment, or contract farming?*
 - *What legal and regulatory reforms have worked to incentivize loss: Has there been any regulatory reform such as introducing warehouse receipt systems, export bans, or reforms to improve the investment climate?*
- *What role do regulations play in creating incentives for reduction of loss along the value chain system?*

3. Policy as a tool to reduce food loss

The sub-sections that follow are based on a detailed review of the literature and provide the conceptual basis of how policy can be used to reduce food loss. In turn, we examine: 1) the complexity of issues driving food loss; 2) the role of the policy to influence behavior; 3) lessons from analogous problems on the use of policy to influence farmer decision making; 4) lessons from Rwanda’s policy framework which we use as a benchmark; and 5) an analysis of winners and losers in policy reform. Together these learnings allowed us to develop a framework of guiding principles and core policies to address food loss.

COMPLEXITY OF ISSUES DRIVING FOOD LOSS

Food loss occurs at many points along the value chain and is caused by both discrete and systemic problems. Some of the major causes are ineffective land and crop management during production, poor harvesting and handling, and poor quality storage infrastructure leading to increased pests, disease, and contamination of crops. Losses here can be both quantitative, through physical weight loss, and qualitative, through changes in edibility, nutritional content, calorie levels and consumer acceptability. Quantitative and qualitative losses both impact the farmer by increasing food insecurity and reducing the opportunity for income generation. A detailed scan of the literature reveals a menu of solutions to mitigate food loss. Particularly notable studies include, World Bank (2011) *Missing Foods*, FAO (2013) *Food Waste Tool Kit*, Hodges et al. (2011) *Post-Harvest Losses: Opportunities to Improve Resource Use*, FAO (2009) *On-farm Post-Harvest Management*, among many others. Figure 5 below highlights both the root causes of loss and solutions based on the literature.

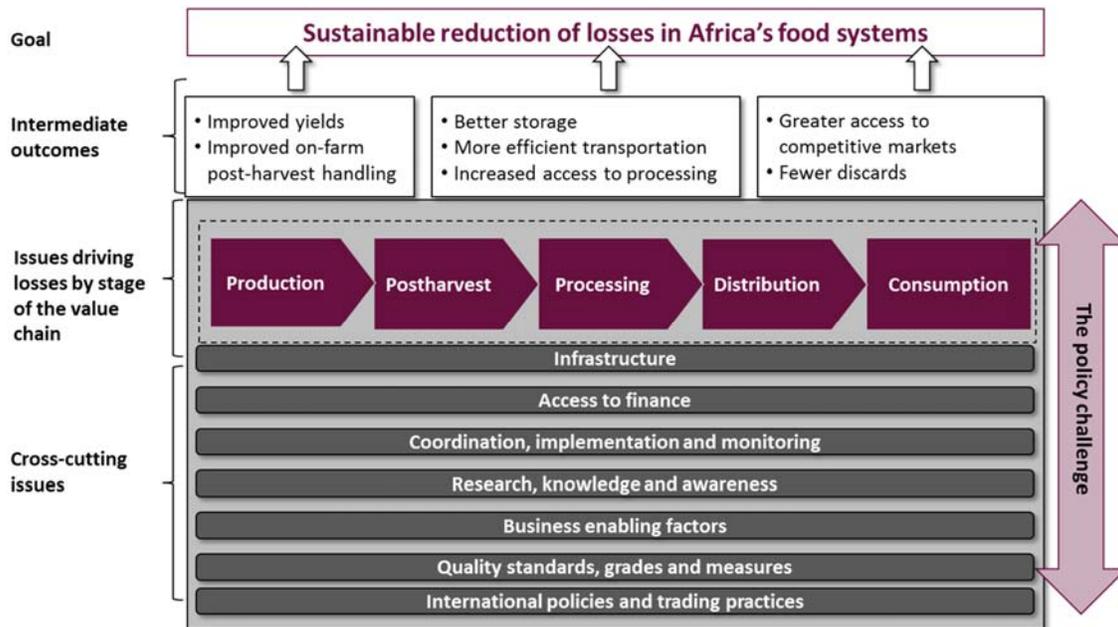
Figure 5: Root causes of loss and solutions

| Root causes | Solutions based on the literature |
|---|---|
| Poor land, inputs and crop management | <ul style="list-style-type: none"> Provide technical advice and affordable solutions to farmers (multiple studies stress the importance of varieties which have greater resistance to damage, pests, insects, rodents) |
| Poor storage and pre-storage processing, and a lack of market information leading to surplus production | <ul style="list-style-type: none"> Provide market information for farmers about projected demand at planting time Improve on-farm storage, processing and preservation facilities (traditional and modern equipment can be effectively used to significantly reduce losses) Implement mechanisms such as warehouse receipt systems and inventory credit to introduce liquidity into the supply chain and importantly provide credit, standards, quality control and storage facilities |
| Premature harvesting due to income and food needs | <ul style="list-style-type: none"> Increase access to credit facilities or advance payments from buyers (see above mechanisms) |
| Food loss due to inappropriate varieties, quality and contamination | <ul style="list-style-type: none"> Train farmers on quality and encourage farmers to supply crops with specific grades and standards to processors (related to inputs, production practices, harvesting, handling and storage) Promote secondary markets (e.g. animal feed) for rejected/spoilt produce |
| Poor storage, on-farm processing facilities, and lack of infrastructure | <ul style="list-style-type: none"> Provide technical advice and affordable technology solutions to farmers Invest in roads, energy and markets, as well as storage, cold chain facilities and transportation |

| Root causes | Solutions based on the literature |
|---|--|
| Lack of small, medium and large-scale processing facilities | <ul style="list-style-type: none"> • Develop contract linkages between processors and farmers • Create a better 'enabling environment' and investment climate, to stimulate the private sector to invest in the food industry and to work more closely with farmers to address supply issues |
| Inadequate market systems and unpredictable pricing | <ul style="list-style-type: none"> • Promote marketing cooperatives to provide a central point for assembling and storing/processing produce from small farmers and preparing commodities for transportation to markets • Develop farmer business management and entrepreneurial skills |
| Consumer discards | <ul style="list-style-type: none"> • Educate and raise awareness raising on the impacts of discards |

The challenge for governments is how, with limited resources and capacity, to provide the right policy and regulatory environment so that these solutions are delivered. Figure 6 presents an overview of the policy challenge illustrating how each of the issues and the needs and behaviors of the different actors cannot be viewed in isolation, and how a value chain-wide approach with consistent policies are key to success.

Figure 6: Complexity of issues driving food loss



USING POLICY TO INFLUENCE BEHAVIOR

Food loss is an outcome of economic choices made by farmers, traders, private companies and consumers along the value chain. Government policy can impact the costs and benefits of these choices and is therefore a key tool for reducing food loss. The overarching role of the public sector is to create the right policy setting to balance food security, poverty reduction and economic growth objectives. Government must create the enabling environment for business (including security, legal frameworks, infrastructure, research and development), and support smallholder-inclusive market

participation. The full development of food value chains then rests primarily on private agribusiness players who contribute to market creation, innovation and enhancement of quality standards.

The adoption of practices to reduce loss will always be limited if farmers do not see the economic return to good post-harvest management practices. Although reducing food loss can increase smallholders' incomes and improve their food security, changing common practices and nudging farmers to invest in technologies, and other practices is not an easy task. Smallholder farmers are particularly risk-averse and for a good reason – firstly, they are already in a high-risk business, namely agriculture, and secondly, they typically lack risk-coping mechanisms to dampen shocks of failed investments.

Understanding the incentives and behaviors of the different actors along the value chain is paramount to seeking policy and regulatory solutions to food loss. Farmers who are unable to access markets for their produce or who are forced to sell at low prices do not earn sufficient income to invest in appropriate equipment for their farms. Without these investments, on-farm losses continue to be a problem. External financing is also unavailable to the majority of farmers, and investing in upgrades is risky without proper market incentives. Policy can play a role in this regard. For example, through the use of increased tariffs on competing imports, the price incentives for private processors to source produce locally are enhanced. This in turn can provide a stable market to farmers, increasing their income and thereby increasing their economic incentive to invest in loss-reducing behavior. Using policy to enforce quality standards and grades is another example. A price premium on high quality produce will incentivize farmers to improve their production, harvesting and storage practices which will in turn alleviate losses. As buyers turn to farmers who are able to produce the right quality, farmers are assured of more stable and increased income allowing them to make more investments in loss-reducing practices.

LESSONS FROM ANALOGOUS PROBLEM AREAS

To enhance our understanding of how policy approaches can influence farmer decision making we examined lessons from 'climate change adaptation/mitigation' and 'conservation agriculture'. These fields provide useful analogues to guide food loss policy given that they also require farmers to adopt new practices in cases where financial, socio-cultural and institutional barriers often hinder behavior change, and innovation. We drew the following insights from an analysis of these areas⁹:

- **Different policy tools work differently for different farmers.** Smallholder farmers are a large and geographically dispersed group with heterogeneous interests. Each farm has its own set of characteristics based on variations in resource endowment (land size, assets, number of workers, etc.) and family circumstances. Thus, in order to deal with heterogeneity, it is important that policy recognizes that different tools work differently for different farmers.
- **Both market failure and behavioral anomalies need to be addressed:** Understanding technological change in farming requires an understanding of a wide range of factors. Market

⁹ OECD (2012) "Farmer Behavior, Agricultural Management and Climate Change"; Streck C, Burns D, and Guimaraes L. (2012) "Incentives and Benefits for Climate Change Mitigation for Smallholder Farmers" (CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) Report no. 7); FAO (2001) "The Economics of Conservation Agriculture"

based policy instruments have been designed on the assumption that farmers act rationally which is not always the case. Policy makers have to think about correcting for both market failure and behavioral anomalies simultaneously. In the case of greenhouse gas (GHG) mitigation, financial incentives are clearly important because new farming practices will not be adopted if they are not profitable. However, an agricultural sector that can contribute to GHG mitigation and adaptation to climate change is likely to require a combination of market-based instruments and other tools which can influence farmer behavior. An example of a 'nudge' approach to influence farmers to adopt climate-smart agriculture is to label 'ecologically cooperative' farmers. This allows them to differentiate their produce and attract buyers and/or higher prices¹⁰

- **Policy has its limitations and can even create negative impact:** In the case of conservation agriculture, policy has been an important determinant in explaining past adoption and non-adoption. Policy stances have sometimes been weak and ineffective in promoting conservation agriculture, and much of the successful diffusion of the technology has occurred not because of government, but because of support from private corporations, the formation and operation of farmers' groups and other non-governmental pathways.¹¹ Moreover, conflicting policies have often operated at cross-purposes, encouraging and discouraging conservation agriculture at the same time.
- **Policies and signaling must be consistent to be effective.** Many governments have introduced a variety of programs to encourage the adoption of conservation agriculture-type practices. With extension services, subsidies and taxes, these initiatives have achieved some important results. However, many of the programs promoting conservation agriculture throughout the world have been relatively ineffective because of contradictory signals and incentives from existing subsidy programs.¹² For example, policies designed to promote conservation agriculture have been undermined by other, typically richer, policy measures in support of erosive crops such as groundnuts and tobacco, or by weak or slow to respond research and extension efforts.¹³
- **Use of direct financial assistance where adoption is not profitable to the individual farmer but would provide substantial public benefits.** Financial assistance for the adoption of various conservation practices is well established in Europe and, to a lesser degree, North America. Assistance can take a variety of forms, such as tax credits on equipment, machine rentals, cost-sharing programs and direct subsidies.¹⁴ Assistance is most suitable to help overcome significant initial investments and transition costs, and in cases where adoption is unprofitable from the individual farm perspective.
- **Importance of education and awareness raising on the long-term benefits of behavior change and technology adoption.** Education plays a key role in motivating adoption for both climate mitigation and conservation agriculture techniques and requires tailored, credible, and

¹⁰ OECD (2012) "Farmer Behavior, Agricultural Management and Climate Change"

¹¹ FAO (2001) "The Economics of Conservation Agriculture"

¹² Ibid

¹³ Ibid

¹⁴ Ibid

appropriate information that is communicated through the proper channels. Extension services to provide information and assistance can be highly effective, especially in the case of new or emerging technologies, although public agents need not be the exclusive providers of such services.

- **Research and development as a long term strategy.** In the case of both conservation agriculture, and climate mitigation/adaptation, a less interventionist policy approach is to focus on research and development to enhance the benefits of adoption by improving performance or reducing costs. This approach relies on voluntary adoption and aims to increase the odds of this occurring by making the practice more attractive. However, research and development is a long-term policy strategy with an uncertain probability of success.

The above lessons contain important implications policy interventions to reduce food loss. On the one hand, it is not always safe to assume that farmers will invest in and adopt interventions on their own even if financial incentives are in place. On the other hand, a uniform policy prescription to fit many crops and locations is not realistic either, whether it consists of direct interventions or more indirect incentives stemming from research and development, or some mix of both. Designing successful policies to promote loss reduction is likely to start with a thorough understanding of farm-level conditions. This understanding needs to include attitudes to risk, and willingness to make tradeoffs between short and long term goals. The next step is to design holistic interventions that draw on a range of policy tools.

BENCHMARK POLICY AND REGULATORY FRAMEWORK

Although identifying specific policy interventions that have been successful in reducing food loss is difficult due to limited measurement of losses, and challenges in attribution, the experience of Rwanda provides a useful benchmark. The country has gradually reduced losses over the past five years through targeted investments and policy interventions. For example, a survey conducted in 2013 by the Government indicated a loss of 18.9 percent of maize production compared to 30 percent in 2009.¹⁵ In the same period, rice losses were reduced from 24.8 percent to 15.2 percent.¹⁶

The Government of Rwanda, with support from its development partners has developed a policy framework to reduce food loss that targets both macro- and micro-level interventions. This includes the development of a National Post-Harvest Staple Crop Strategy, the establishment of a post-harvest handling and storage task force, regulations and incentives to promote private investment in innovation and processing, harmonization of grain grades and standards across the East African Community, the development of different credit enhancement vehicles to stimulate investment (e.g. the Rural Investment Facility and the Agriculture Guarantee Facility¹⁷), public private partnerships in infrastructure provision (e.g. a fresh wholesale food market, and a juice concentrate facility), the creation of a Strategic Grain Reserve to absorb surplus, and the dissemination of post-harvest

¹⁵ 'Minagri registers reduction in post-harvest losses' (17 Feb 2013), <http://focus.rw/wp/2013/02/minagri-registers-reduction-in-post-harvest-losses/>

¹⁶ Ibid.

¹⁷ USAID (2010) "Assessment of post-harvest opportunities in Rwanda"

technology among producers. Box A details these policy interventions which can serve as a reference point for other countries.

Box A: Benchmark policy and regulatory framework – Example of Rwanda

Rwanda's **National Post-Harvest Staple Crop strategy** focuses on the following seven axes of intervention:¹⁸

- Make information available for public and private sector decision making (this includes strengthening data collection and market intelligence)
- Ensure efficient and equitable transport systems across staple crop producing areas (this addresses transport costs and 'soft' constraints between production and secondary aggregation points in high potential areas)
- Reduce staple crop post-harvest losses at producer and first aggregator level (this includes building capacity of the government's post-harvest team, and identifying and disseminating post-harvest technologies)
- Strengthen private enterprise in staple crop value chains (this includes empowering the private sector to support the delivery of staple foods to the market, transferring skills to all enterprises involved in moving staple grains into markets, and ensuring sufficient storage is available throughout the supply chain)
- Increase private sector post-harvest investment through increased access to financial services
- Enhance structured staple trade through raising awareness of crop grades and standards and improving market trade infrastructure
- Develop a transparent strategic grain reserve supporting food emergency needs and liberalized markets (this includes the development of the Rwanda Strategic Grain Reserve to function under sound principles and transparent management, and using it to support disadvantaged viable markets which will benefit from prioritized road improvements).

To lead and implement the strategy the '**post-harvest handling and storage task force**', was set up by the Government with support from development partners such as USAID, AfDB, JICA, World Bank and the Netherlands Corporation.¹⁹ The Ministry of Agriculture-led Post Harvest Task Force is the central mechanism for inter-agency planning, with individual agencies and ministries responsible for different aspects of post-harvest loss strategy implementation. The task force focuses on: training cooperatives in post-harvest best practices; distributing post-harvest tools and equipment; undertaking post-harvest loss surveys; constructing drying grounds, warehouses and installing metal silos; mobilizing the private sector to build storage facilities; developing the National Strategic Grain Reserve; and purchasing and distributing fertilizer and vouchers. Examples of results include:²⁰ Private sector construction of eight warehouses (65,400MT capacity), development of an animal feed plant; construction of 157 drying grounds, 42 warehouses and four metallic silos with a total storage capacity of 134,000MT; distribution of post-harvest technologies to farmers (including ~64,000 sheets, ~5,000 shellers and ~800 hermetic storage bags); training of ~134,000 farmers, as well as over 2,000 cell, district and sector agronomists on post-harvest best practices; and training of approximately 400 farmer's cooperatives on an annual basis.

To **catalyze private investment**, regulations have been implemented to simplify the processes of starting a business – the country is now ranked 9th globally in terms of ease of starting a business and 32nd overall.²¹ Other investment incentives include exemption from tax and duties on the import of machinery, raw materials and equipment; and exemption from duties on refrigerated trucks which can reduce losses of perishables. Further, all training and research expenses are considered deductible from taxable profits²² incentivizing private companies to invest in innovation which is key to reducing food loss. The East African Community has also recently gazetted into law (in December 2013) harmonized grades and standards for grains. Producers will be incentivized to meet quality standards in order to receive higher prices and long term contracts from governments and private firms which will serve to reduce loss. Additionally the standards are expected to improve food safety and hygiene (such as aflatoxin contamination) which is also a driver of losses.

¹⁸ Government of Rwanda (2011) "National Post-Harvest Staple Crop Strategy"

¹⁹ Rwanda Ministry of Agriculture (www.minagri.gov.rw)

²⁰ Ibid

²¹ World Bank (2014) "Doing Business Rankings" (out of 189 countries)

²² Rwanda Development Board (www.rdb.rw)

WINNERS AND LOSERS FROM POLICY REFORM

Although reducing food losses can increase food security and farmer incomes it is important for governments to understand the short and long term dynamics and the impact on different actors along the value chain. Policy interventions to reduce loss that benefit smallholder farmers may disadvantage others.

Market informality, weak farmer collectivity, information asymmetry, and the presence of powerful incumbents creates clusters of power within each value chain that will likely resist policy reform.

Although many actors would benefit from a reduction in post-harvest losses through an increase in volumes and increased food security there are some in the value chain that benefit from the current fragmented value chains where farmers lack market information and are reliant on traders to sell their produce. In Ghana for example the market queens effectively control tomato distribution networks.²³ Most farmers wait for the market queens to come to their fields and if these traders do not come, farmers leave the tomatoes to rot in the field in the absence of a local market. Interviews with stakeholders highlighted how market queens have also driven processors out of the market through price wars. Any policy initiatives that affect the current structure of tomato sector would likely be resisted by the market queens.²⁴

Policy reform to promote the use of standard weights and measures can reduce loss through limiting the re-bagging and over-packing of fragile produce in sacks and crates but traders will also likely resist.

In Tanzania for example, traders benefit from the status quo as they can reduce their transport costs by negotiating on the basis of numbers of sacks rather than actual weight. Similarly, they can reduce the amount they need to pay in fees (or “cess”) to local authorities as payment is based on the number of sacks instead of weight.

Other actors in the value chain such as transporters and processors benefit from a lack of competition, an ability to set high prices and rent-seeking behavior.

Policies to reduce food loss through increasing private sector activity, liberalizing trade, and efforts to increase smallholder farmer bargaining power (e.g. through improved storage, collective action and direct links to markets) would see oligopolies stand to lose both market share and profits. Nigeria’s cassava blending policy which seeks to promote domestic demand for cassava and reduce loss through increased market opportunity for farmers may fall victim to the interest of powerful flour mills. A recent press report²⁵ suggests that the Nigerian government may be planning to abandon its cassava blending policy, for several reasons, one of which is the impact on the profitability of many of the wheat importers and processors in the country.

In addition, policy reform that focuses on promoting private sector investment more broadly as a tool to reduce food loss, does have the potential to favor larger commercial farms at the expense of smallholder farmers if not handled carefully. While smallholders can benefit from being included

²³ Robinson and Kolavalli (2010), “The case of Tomato in Ghana”

²⁴ Section 6 presents options of intervening in Ghana’s tomato sector to reduce loss that the market queens would be less likely to resist

²⁵ This Day (1 April 2014) “Nigeria: [Federal Government] abandons cassava, wheat composite flour policy”

in formal value chains, support systems such as training and credit must also be provided for these benefits to be realized, and without them smallholder farmers may remain excluded.

Using the findings from the literature review and the analyses presented in this section, Section 4 presents guiding principles and policy requirements for governments to reduce food loss. These serve as the basis for the country assessments which make up the remainder of the report.

4. Core principles and policies to reduce food loss

Overlaying the above findings with the market dynamics of the selected crops and countries yields a useful framework of three guiding principles and seven core policy areas that can reduce food loss.

The principles are a tool to assess both what government can do to influence loss reducing behavior, as well as where it should intervene less. The policy areas outline *necessary* conditions to allow for loss reducing investments and behavior change, as well as *useful enabling* policies that can more directly accelerate the reduction of food loss. We used this framework to assess key strengths and leverage points for each country with regard to food loss, and to identify policy gaps and implementation challenges.

GUIDING PRINCIPLES

To address food loss, the policy framework needs to strike a balance between both direct government intervention and providing a consistent, supportive enabling environment for the private sector to flourish. **We identified three principles to guide the development and implementation of policy in this regard:**

- **Systemic approach:** Given the interconnected nature of the agriculture sector, solutions to food loss require a holistic value chain approach. A strategic approach is needed to promote coordination, collaboration and information flow across different actors in the value chain with complementary efforts to increase productivity and reduce loss. These should be tailored to reflect the heterogeneity of farmers across regions and value chains.
- **Ensure stability:** Policy inconsistency is a disincentive to investment in food loss reducing measures. Trade in staples continues to be affected by measures such as export and import bans, variable import tariffs and quotas, restrictive rules of origin and price controls. Often, these are decided upon without transparency and are poorly communicated. This creates uncertainty about market conditions and limits cross-border trade. Private investments in storage capacity, which would help to reduce food loss and allow farmers to sell when prices are most favorable, are undermined when policies that influence prices, such as export bans, are uncertain and lack transparency. Further, highly concentrated markets and cartel-like behavior in transport and processing sectors raise costs and present high barriers to entry for new players. As a result, private actors from farmer groups to large processors are reluctant (or unable) to make significant or long term investments.
- **Recognize limitations:** Limited government resources and capacity is a challenge across the seven countries. Governments should therefore only consider direct intervention in the event of market failure. When interventions are necessary, they should be based on robust evidence and the government must be well-positioned to act in terms of know-how and resources. When undertaken without these considerations, government actions can fail and/or stifle private sector innovation and investment.

CORE POLICY AREAS

Following on from these principles we identified seven core policy areas to reduce food loss as shown below in Figure 7.

Figure 7: Core policy areas

| Policy area | Why is this important? |
|--|---|
| 1. Provision of clear leadership, and coordination on food loss issues | Governance of the issue involves numerous government actors such as the ministerial bodies on agriculture, industry, trade, land, environment, energy and transport. Given the interdependence of responsibilities and the political challenges involved in tackling the challenges, there needs to be clear leadership and coordination on the issue. |
| 2. Provision of information for decision making | Without a clear understanding of the scope and scale of the problem, interventions cannot be targeted or meaningfully assessed. Accurate data is required to inform policy design and analyze the respective costs, benefits and impacts of policy interventions related to food loss. |
| 3. Research and development into improved varieties and post-harvest technologies | Research is critical to ensure farmers are using the most appropriate varieties and technologies to maximize the quality and quantity of the crops grown and respond to market demand. |
| 4. Provision of extension services | Research alone is insufficient unless it is adequately disseminated amongst end users. In addition to basic agronomic research which has typically focused on increasing productivity, there is a need for training in post-harvest handling, storage technologies, and quality standards. Farmers also need a better understanding of how to access markets and finance. |
| 5. Provide transport, energy and other supporting infrastructure to key production areas | Significant food losses between farm and buyer result from a lack of appropriate infrastructure including feeder roads, power, cold storage facilities, and warehouses. Private sector investments in processing are also limited by a lack of supporting infrastructure including high energy costs. |
| 6. Regulatory environment that catalyzes private sector activity | The private sector has a key role to play in reducing losses by investing along the value chain. This includes provision of seeds, technology and other inputs, through to warehouse construction, transport provision and processing or retail outlets. Through engagement with private buyers and processors, farmers can benefit from training, an increased awareness and use of grading and standards, as well as increased and more stable market access making it easier for them to access finance and adopt improved technologies that increase productivity and reduce losses. In this context government should seek to create an enabling environment to promote private sector investment. |
| 7. Interventions to stimulate demand for key crops | Over and above the broad promotion of private sector investment, government can undertake deliberate policy interventions to build markets for target crops. This includes local content policies requiring businesses to source produce locally, institutional purchasing (e.g. school or prison feeding), creating strategic grain reserves to smooth price fluctuations and serve as a buyer of last resort, or using tariff barriers to influence market forces. |

While delivery of the actual interventions rests primarily on private players (either alone or in partnership with the government), there are ways in which government can create the enabling environment for business, while supporting smallholder-inclusive market participation. We identified **necessary conditions** which at a minimum will encourage private business to invest, trade and innovate. Over and above these necessary conditions, there are additional **enabling actions** that governments can consider which would serve to more directly accelerate the reduction of food loss. These actions are presented in Figure 8 overleaf.

Figure 8: Core policy areas and necessary vs. enabling policy actions

| Core policy and regulatory levers to reduce food loss | | | | | | | |
|---|---|---|--|--|---|---|---|
| | Leadership and strategy | Information for decision making | Research and development | Extension services | Infrastructure | Investment promotion | Demand stimulation |
| Necessary | <ul style="list-style-type: none"> Integrate loss reduction into an agriculture sector strategy | <ul style="list-style-type: none"> Monitor and evaluate policy interventions to reduce food loss | <ul style="list-style-type: none"> Establish IP policies and regulations to allow innovation to reduce loss | <ul style="list-style-type: none"> Encourage plurality of extension services to address loss | <ul style="list-style-type: none"> Develop road and energy infrastructure | <ul style="list-style-type: none"> Secure land tenure and property rights Ensure gradual roll back of direct intervention | <ul style="list-style-type: none"> n/a |
| Useful enablers | <ul style="list-style-type: none"> Develop a cross-sector post-harvest loss strategy Empower a unit with a mandate to address food loss | <ul style="list-style-type: none"> Use a standardized methodology to consistently measure and track food loss data across value chains | <ul style="list-style-type: none"> Partner with private sector on R&D into loss reducing interventions | <ul style="list-style-type: none"> Include food loss interventions in national extension curricula Promote farmer aggregation Provide training on business development services Train on quality, grades, weights and measures Subsidize loss reducing interventions in food-insecure communities | <ul style="list-style-type: none"> Develop public private partnerships for cold chain, warehouses and other physical market infrastructure | <ul style="list-style-type: none"> Increase availability of agri-finance through risk management products Implement food safety and quality standards Provide tax exemptions on equipment and other incentives Put in place an effective competition policy | <ul style="list-style-type: none"> Use targeted, time-bound and evidence based import tariffs Undertake institutional purchasing Promote secondary markets Implement local content policies Mandate use of local produce |

BROADER INTERNATIONAL POLICY DYNAMICS

In addition to the country specific policy environments it is important to recognize broader international policy dynamics that also impact food loss in the different countries. Although these were not the focus of the study, this sub-section identifies some examples of these challenges and the role Africa's governments can play in addressing them.

Unfair Trading Practices (UTPs) in supply chains lead to over production, increased loss and reduced income for producers. Large international companies sometimes use ambiguous forecasts and agreements with producers and suppliers. These are normally non-contractual but have negative consequences if they are not met. Given the ambiguity in some of these agreements, this has resulted in producers and suppliers being left with unexpected volumes of perishable goods (often of a type not traditionally consumed locally). This transfer of risk to smallholders and small scale producers reduces levels, and security, of income so there is less opportunity for investment in innovation to reduce loss.

African governments can play a role through trade partnership discussions to lobby for a European Union (EU) level regulator to tackle UTPs, with a mandate that extends outside the EU. Additionally, governments can mandate that actors in the supply chain sourcing from their countries to abide by clear, written and timely contracts. Finally, retailers, suppliers, producers and governments can work towards agreement on appropriate levels of forward commitments on crop purchase, so that risks of over production are transferred upwards, to actors that are better placed to find secondary markets for surplus supply. As a positive step in this area, the Government of Ghana has recently announced that it intends to establish a Ghana International Trade Commission (GITC) to address elements such as unfair trading practices.²⁶

General marketing standards applied by the EU to all imported fruit and vegetables, in addition to private standards imposed by global retailers, exacerbate losses. Retailers impose a set of 'quality standards' – which may be based on size, weight or shape, color, freshness or appearance. Products may be rejected against these standards at different points in the supply chain and, where secondary markets (local or global) cannot be accessed in time, there is a high risk of food being wasted or spoiled.

African governments can intervene directly to ensure that quality standards do not act as a significant barrier for smallholder farmers to access global supply chains. Governments need to invest more in supporting producers, especially smallholders, to understand and meet reasonable quality standards and access secondary markets for lower grade products, through investment in skills, infrastructure and improved communication. Priority needs to be accorded to: the establishment of standardized laboratory facilities, better enforcement of food safety testing, and the strengthening of industry self-regulation, through the reinforcement of industry associations.

²⁶ allAfrica (26 February 2014) "Ghana: Govt to establish international trade commission – President" (<http://allafrica.com/stories/201402261343.html>)

Pesticide residues detected on products leads to rejections and loss. Where residues of pesticides that are banned in the EU but not in Africa are detected on products at the point of export (through government monitoring) they are removed from the supply chain and are likely to be left as waste. The Kenya Horticulture Competiveness Project for example recently noted that fresh vegetable exports decreased between May and July 2013 by 1.9 percent in value and 15.8 percent in volume compared to a similar period in 2012, and attributed this to the application of more stringent food safety standard requirements on agrochemical residues by the EU.²⁷

Investment by African governments and retailers in improved communications with producers and suppliers can ensure that the list of pesticides banned in Europe is well known and that all residues are removed effectively before point of export. The Kenyan Plant Health Inspectorate Service (KEPHIS) has started gathering data on chemical residues on fresh produce in a bid to ease farmers' access to the EU market.²⁸ In parallel, a farmer training program has been launched with EU support to improve pesticide use in Kenya and ensure compliance with EU regulations.²⁹

²⁷ Business Daily Africa (22 January 2014), "Kephis targets study in pushing for fresh produce exports to Europe"

²⁸ Ibid.

²⁹ The Star (22 January 2014), "Kenya: Farmers to be trained on improving export returns"

5. Country assessments

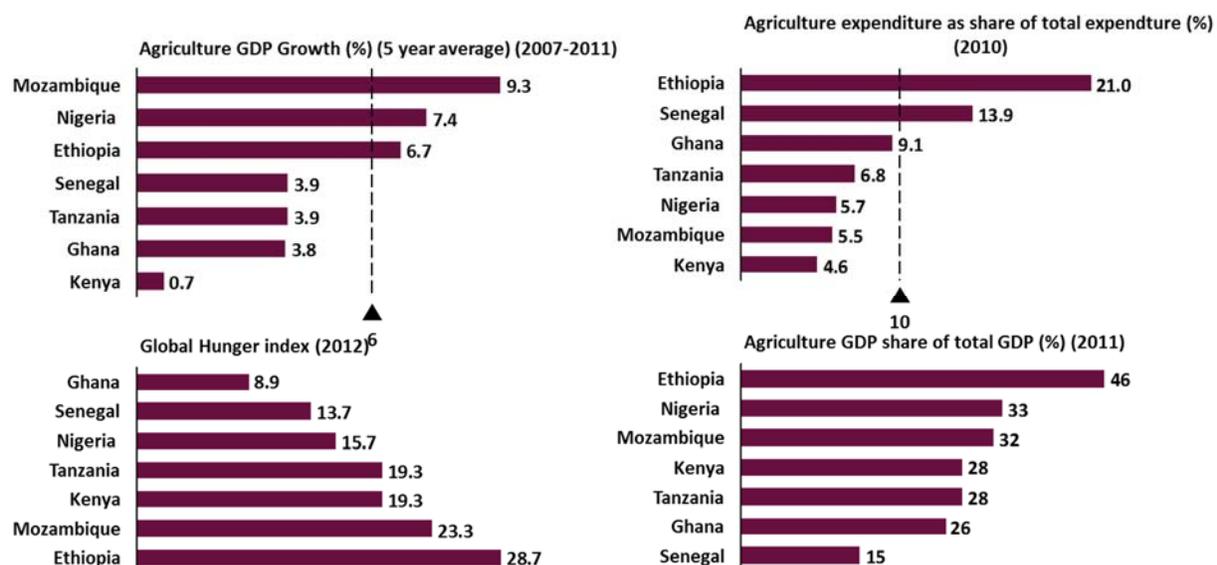
Through stakeholder interviews and data collection we assessed each focus country against the core requirements to identify which policies have been successful, which are missing or flawed, and which are poorly implemented. An overview of agriculture indicators for each country is presented followed by a summary of the findings. Detailed information for each country is provided in Annex 1.

OVERVIEW OF AGRICULTURE INDICATORS

All seven countries have committed to a policy focus on agriculture through the Comprehensive Africa Agriculture Development Program (CAADP) process. CAADP is a framework to create institutional and policy transformation in the agriculture sector, and seeks to increase public investment in agriculture to a minimum of 10 percent of national budgets and increase agriculture growth to an annual rate 6 percent. In relation to food loss, Pillar 2: 'Market Access' focuses on improving local infrastructure so that farmers have better connections to markets by addressing transportation, storage, packing and handling systems, retail facilities and information technology.

Agriculture indicators vary across the target countries. Figure 9 provides an overview of progress in terms of agriculture development. Agriculture spending is particularly high in Ethiopia, Senegal and Ghana and agriculture GDP growth is notably very high in Mozambique, Nigeria and Ethiopia. Further, given the high hunger and malnutrition levels in Ethiopia and Mozambique, these levels of spending and growth are arguably warranted.

Figure 9: Country agriculture indicators³⁰



³⁰ Data from the IFPRI ReSAKSS map tool (2011), IMF 2012, AUC 2008. Agriculture GDP share of total GDP data for Nigeria is 2008. IFPRI's Global Hunger Index is a multidimensional statistic used to measure hunger on undernourishment, child underweight and child

Figure 10 and Figure 11 assess the countries progress in terms of creating an enabling business environment (using the World Bank’s Doing Business index ranking as an indicator) as well as the state of their national infrastructure (using the World Bank’s Logistics Performance Index ranking as an indicator).³¹ Although these rankings are just one limited tool for assessing how countries compare it is useful from a macro, cross-country perspective to note that Ghana performs consistently well across all rankings compared to the other countries. Kenya and Nigeria rank highest in terms of obtaining credit and Senegal provides the most conducive environment in terms of trading across borders. Mozambique however, faces challenges with the lowest rankings on infrastructure quality and getting credit.

Figure 10: Country Doing Business Index rankings³²

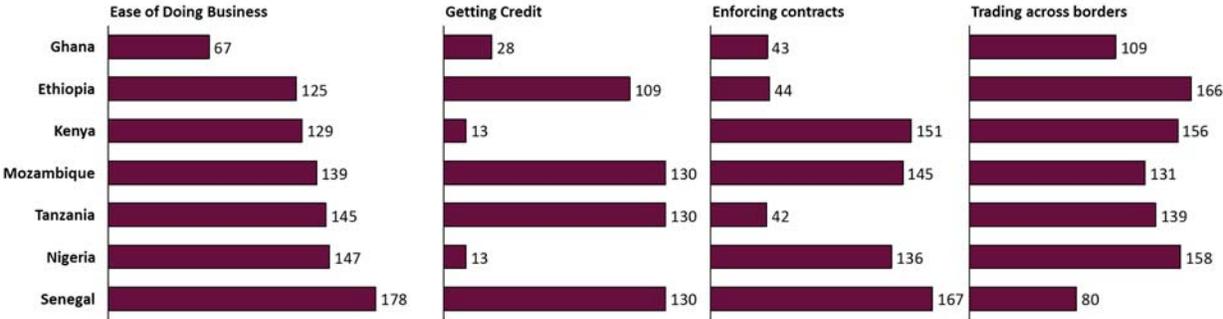
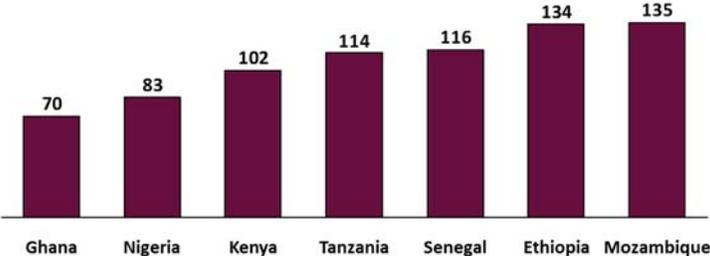


Figure 11: Country Logistics Performance Index rankings³³



To complement these rankings, the following sub-sections provide deeper qualitative analysis on the policy frameworks in each country. We used the guiding principles and seven core policy areas as the basis by which to assess each country on the strengths of its policy framework to reduce food loss, as well as key gaps and implementation challenges.³⁴ Overarching insights are complimented by examples from across the countries/crops. To focus the report on cross-country learnings, only a selection of country-specific findings are presented in the following sub-sections. Supporting information for each country is presented in Annex 1.

³¹ For all rankings the lower the score the better the performance
³² World Bank (2014) Doing Business Index (www.doingbusiness.org)
³³ World Bank (2014) Logistics Performance Index (lpi.worldbank.org)
³⁴ All findings cited in the following sub-sections are summarized from Annex 1 and drawn from in-person interviews or the literature review conducted by the Dalberg team. Please see Annex 2 for a full list of stakeholders interviewed.

KEY LEARNINGS AGAINST GUIDING PRINCIPLES

PRINCIPLE 1: SYSTEMIC APPROACH

Overall, the target countries abide by this principle through their agriculture transformation and delivery units, as well as their sector and value chain strategies. Only Ghana however has taken explicit steps to focus on, and coordinate, loss reducing interventions by drafting a post-harvest loss strategy.

In Ethiopia, for example, the Agriculture Transformation Agency (ATA) provides a platform to address agriculture sector challenges (including food loss) in a holistic fashion. The recently established Agriculture Delivery Division within Tanzania's Presidential Delivery Bureau, will also act as a central working group to support the delivery and coordination of agriculture issues, and there is conceivable scope for post-harvest losses to be prioritized as part of its mission. Ghana's government however, with support from the African Union and FAO is currently in the process of developing a post-harvest loss strategy to guide systemic interventions and ensure that different crops and regions are targeted appropriately.

PRINCIPLE 2: ENSURE STABILITY

A core problem across all the countries we studied is the negative impact of 'government surprises' and ad hoc implementation of incentives and trade bans. This regulatory uncertainty hampers private sector trade and investment and reduces the ability of markets to absorb surpluses and counter losses. In response to food security concerns, the Ethiopian government has frequently placed export bans on staple crops, including teff. Given high food prices, challenges of regional importation, and an already large domestic demand for processed and unprocessed teff, the government's strategy of banning raw teff export is viewed by some stakeholders as not necessarily a bad decision. Processed teff (normally in the form of injera) is allowed to be exported incentivizing producers and processors to sell to the growing international market for the 'superfood'. In Tanzania, in response to food security threats, the Government has often used bans of cross-border trade in staple foods as a policy tool.³⁵ These bans actually lead to increased price volatility, causing uncertainties in the value chain. This dissuades farmers and other private sector actors to make long term investments in agricultural production, storage, warehousing and transport. We understand from the stakeholder interviews however that the government has recently announced the withdrawal of all bans on maize and other staple foods as part of a series of reforms. In Mozambique, sudden and non-transparent foreign exchange controls have discouraged investments in the agriculture sector, and private firms are wary of the government intervening without warning or consultation. Further, incentives for investment are considered to be ad-hoc and not transparent, and tax exemptions for agribusinesses are rarely applied in practice.

PRINCIPLE 3: RECOGNIZE LIMITATIONS

Examples of government action across the countries highlighted how government can both stifle private sector innovation and investment and/or fail through direct intervention. In Ghana, the Government's Presidential Cassava Initiative (which included the creation of Ayensu Starch Factory in 2003 to catalyze cassava processing and domestic demand) failed due to operational and financial difficulties resulting

³⁵ Tanzania Markets Policy Action Node (2013) "Impact of tariff and non-tariff trade barriers for staple foods on the livelihood of small scale farmers"

from inadequate analysis of the market. More recently Ghana's National Buffer Stock Company (NAFCO) (focused on grains) has suffered huge financial challenges and been unable to invest in sufficient storage facilities limiting the actual effectiveness of the policy. In Tanzania, despite the 2003 Seeds Act encouraging private commercial seed production, improved seed adoption remains low (27 percent of cropped area for maize) due to remaining policy hurdles around securing public foundation seeds and certifying new varieties (delays of up to three years were mentioned by interviewees).³⁶ Additional policy reform is needed to remove these administrative constraints and allow the private sector to innovate, as insufficient availability of improved seed varieties and research in the country contributes to crop losses.³⁷ The case of groundnuts in Senegal is another example of inefficient government involvement. Up until 2004, the state effectively controlled the entire value chain, reaping much of the value added as long as world prices were sufficiently higher than the price floors guaranteed to farmers.³⁸ Private agro-processors (including the monopoly-holding company, Lesieur) also enjoyed a near monopoly on the vegetable oil market, depriving the sector of competition that would have ensured continued investment in productivity-enhancing and loss reducing technologies and strengthened competitiveness. Furthermore, government subsidies in groundnut not only crowded out private sector investment in improved inputs that could serve to reduce loss, but also proved to be ineffective. Between 2001 and 2011, the amount spent on agricultural subsidies increased by a factor of 484 with the majority aimed at groundnuts.³⁹ While the program saw some success in increasing the accessibility and availability of fertilizer the targeted boosts in production were not achieved.⁴⁰

KEY LEARNINGS AGAINST CORE POLICY AREAS

PROVISION OF CLEAR LEADERSHIP, AND COORDINATION ON FOOD LOSS ISSUES

All seven countries met the 'necessary' conditions in this area. Their agriculture sector policies mention food loss but tend to focus on key staple crops. Moreover, these policies are ambiguous and do not prioritize (by crop and stage of the value chain), areas where losses are the greatest. Additionally, policies that are in place suffer due to a lack of resources for implementation. Although promising 'enabling' efforts were highlighted in Ghana with the drafting of a post-harvest loss strategy, and in Nigeria with comprehensive inclusion of post-harvest loss in the Agricultural Transformation Agenda, all seven countries exhibit limited leadership, coordination, and information flow in relation to food loss.

In Ghana, food loss reduction is on the national agenda with a range of positive government-led initiatives underway. The Medium Term Agriculture Sector Investment Plan (METASIP) has set targets and activities to reduce post-harvest losses along certain value chains. The Ghana Market and Trade Policy Action Node (supported by AGRA) has commissioned a study on 'Promoting Investment in Agro-processing, Value Addition and Post-Harvest Facilities', and the African Union and the FAO are supporting the government to develop a post-harvest loss strategy which includes concrete investment options. A post-harvest

³⁶ World Bank (2012) "Tanzania Agribusiness Indicators"

³⁷ Tanzania National Horticulture Development Plan (2012); Stakeholder interviews

³⁸ FAO (2013) "Rebuilding West Africa's food potential: policies and market incentives for smallholder-inclusive food value chains"

³⁹ Gro Intelligence (May 2014), "Agricultural Subsidies Series: Senegal"

⁴⁰ Ibid

management unit sits within the Agricultural Engineering Services Division of the ministry but faces severe financial and human resource constraints limiting its impact.

In Ethiopia, policy efforts to reduce teff losses are guided through the value chain strategy. Under the teff strategy, strategic direction and attention has been given to reducing loss through the development and testing of post-harvest and handling technologies and increasing market access. Stakeholders did however express a need for a post-harvest cross-sector strategy and a unit within the existing institutional architecture to support its delivery and coordination.

A review of the Nigerian policy landscape for cassava, onion and tomato shows that in general, post-harvest loss issues are well recognized at the sector strategy level through the Agricultural Transformation Agenda. The policy document prescribes improvement in post-harvest handling techniques and cold chain infrastructure as potential solutions to constraints in the agriculture value chain, but does not elaborate on implementation. Cassava has a Transformation Action Plan, with a value chain approach that focuses on interventions to stimulate demand for processed products. The tomato value chain has also been the focus of government attention through a Transformation Action Plan, the National Tomato Working Group and a recent workshop by the Central Bank on 'Partnering to Build a Competitive Tomato Industry in Nigeria'. While none of these initiatives on their own constitutes coordination and strategy for loss reduction, together they form a conducive environment for building a loss reduction program in the tomato or cassava sectors.

In Mozambique, according to stakeholder interviews, value chain policies such as the cassava sub-sector strategy (2008-2012) have not been effectively implemented, and sesame and groundnut do not have sub-sector strategies, leading to scattered investments and policy efforts in these value chains. In Tanzania, the Markets Policy Action Node (TM-PAN) has identified that the country would benefit from a post-harvest loss-specific policy or cross-sector strategic document that drives solutions to post-harvest issues across state agencies and partners. Progress is yet to be made in this regard.

PROVISION OF INFORMATION FOR DECISION MAKING

A few target countries have taken basic steps to measure and track post-harvest loss. East African countries in particular have benefited from APHLIS efforts to measure post-harvest losses among certain staples. However, all seven countries quote broad ranges in terms of loss estimates and most do not have the 'enabling' condition of standardized measurement systems in place to develop evidence-based policy and evaluate performance on post-harvest loss.

In Mozambique, the Swiss Development Agency is currently supporting government efforts to measure post-harvest losses, and in Ghana, a post-harvest loss baseline survey was undertaken in 2008 to obtain accurate data on the scale of the problem. Resource limitations however have prevented this exercise from being repeated. In Kenya, numerous pilots of market price information tools have been trialed with different providers, but despite relatively high access to ICT, post-harvest losses of key food security crops and high-value crops such as tomato are not regularly measured. Baseline estimates on general loss figures in Nigeria are a first step towards effective data gathering on loss levels, but there is scope for

improved information management to support decision making. Much more attention has been given to cassava and tomato, as opposed to onion, where huge losses warrant action.

RESEARCH AND DEVELOPMENT INTO IMPROVED VARIETIES AND POST-HARVEST TECHNOLOGIES

Post-harvest innovation efforts by resource constrained public research and development agencies are limited and the focus tends to be on staples rather than crops such as tomato that incur significant losses. Regulations also hinder the ability for the private sector to innovate and engage in relevant areas such as varietal development. Examples of promising policy efforts include the Biosafety Act (2011) in Ghana to promote trials of *Bt* cowpea, and the commitments made by six of the seven governments under the New Alliance framework to enable the private sector to develop, commercialize, and use improved inputs.

Ghana's parliament passed The Biosafety Act of 2011 (Act 831) to legalize importation and research into genetically modified organisms (GMOs) and trials of *Bt* cowpea are now underway. *Bt* cowpea has the potential to control losses from pest infestation of cowpea by developing pest-resistant varieties. Ghana's New Alliance framework commits to developing regulations to implement the new seed law that can pave the way for private sector led innovation around more resistant varieties as well as suitable varieties for processing and meeting consumer demand. Despite these efforts challenges remain. Seed supply is constrained by inadequate production of both breeder and foundation seed. The research centers are under-funded and under-staffed, and although the new seed law has seen the import of hybrid maize seed it is yet to affect the tomato, cassava and cowpea value chains. The draft post-harvest loss strategy highlights how Ghana needs a national seed strategy/breeding program for tomato to address the fact that the common variety of tomato has a high water content and a short shelf-life resulting in increased losses.

To reduce cassava loss, Nigeria's National Root Crops Research Institute (NRCRI) has set up demonstration villages, developed specific varieties, and prototyped small-scale processing units. However, these efforts are yet to be widely disseminated. According to stakeholders in Kenya, significantly more research needs to be done on aflatoxin to address losses in the maize sector. Government needs to develop guidelines and simple scalable technology to deal with problem. The other side of the problem is the need to identify and promote productive uses of already-contaminated maize.

In Mozambique although disease-resistant seeds are available that can mitigate loss smallholder farmer access is limited. Within research stations, there is inadequate production of breeder and foundation seed and certified seed is reported to be as much as five times the cost of grain which makes adoption prohibitive for smallholder farmers.⁴¹ Sesame seed is also not supported by the research system and therefore lacks any varietal development. The government, in partnership with WFP among others, has made effort to promote low cost storage technologies. It is piloting the "Gorongosa" silos made with local

⁴¹ Analysis by the World Bank provides indicative examples of the challenges faced in the selected crops – the current supply of maize and rice certified seed would only cover 5.7 percent and 10.7 percent of the crops planted area. World Bank (2012) "Agribusiness Indicators: Mozambique".

and sustainable materials but according to stakeholders, farmers do not trust the technology and the cost is prohibitive at approximately \$100 per silo.

PROVISION OF EXTENSION SERVICES

Resource-constrained extension networks pay inadequate attention to post-harvest issues, as well as training of farmers on business development and entrepreneurship. Nonetheless, certain initiatives such as targeted extension support and awareness campaigns in Ethiopia, and the Government of Ghana’s Good Practice Centers (GPCs) have shown positive results.

In Ethiopia, teff row planting recommendations (planting along narrow rows), which reduce food loss by reducing the seeding rate and spacing the seed to improve plant growth, have been rolled out across the country. Targeted extension support and awareness campaigns have spurred relatively high rates of adoption and have subsequently improved teff yields, increasing the supply for marketable surplus. The ATA and MoA have piloted mechanized post-harvest technologies such as teff threshers and teff row planters to improve farm-level efficiencies, reduce the labor requirements and post-harvest loss. Based on stakeholder interviews, despite a dense network to provide access to farmers, training in marketing and value addition is highly limited in the public extension system and is provided through cooperatives who lack technical post-harvest expertise. In sesame, the extension scope is limited to seeds and agronomy, preventing advancement in mechanized approaches and post-harvest and storage training.

In Ghana, post-harvest related extension activities focus more on cassava rather than tomato and beans. The ministry’s Agriculture Engineering Services Department procures machinery for crop harvesting and processing and makes it available to farmers to help them minimize on-farm losses. These efforts by the government to directly procure and disseminate equipment have proven to be problematic, with stakeholders raising concerns about mechanical breakdowns, poor after-sale services, unavailability of spare parts, and political interference in distribution. Government’s involvement in the agriculture machinery market also crowds out the private sector. Ghana provides an interesting case of a public-private partnership in the provision of extension. The IFAD/government-supported, privately-led Root and Tuber Improvement and Marketing Program (RTIMP) offers services to cassava producers and processors to enhance post-production stages. The RTIMP works with cassava producer groups and focuses on productivity-enhancing activities, such as multiplying and distributing improved planting material, and financial analysis of chain activities. The program also supervises a network of small plots in which participating farmers grow improved varieties, and the GPCs to process cassava using standardized equipment. A noteworthy feature of the program is that farmers are required to pay for all training services they receive. Another criterion of success is pre-screening for producer groups to ascertain readiness before enrolment. To ensure sustainability of the program, a business advisory committee focuses on self-financing options as part of an exit strategy when the government and donor funding support ends.⁴²

⁴² FAO (2013) “Rebuilding West Africa’s food potential: policies and market incentives for smallholder-inclusive food value chains”

In Mozambique, based on stakeholder interviews, limited post-harvest training for staple crops is provided to farmers. For cash crops, such as sesame, farmers are reliant on support from the few private companies who engage in direct sourcing.

PROVIDE TRANSPORT, ENERGY AND OTHER SUPPORTING INFRASTRUCTURE TO KEY PRODUCTION AREAS

All seven governments meet the ‘necessary’ condition through their policy and strategy rhetoric on road and energy infrastructure, as well as actual investment in these areas. However, effective coordination between ministries and value chain actors is missing. This has resulted in economically flawed policies and ‘white elephant’ investments in warehouses and other physical market infrastructure that does not directly improve market efficiency or reduce loss.

Since its introduction, the Ethiopian Commodity Exchange (ECX) has setup regional storage hubs to provide storage for traders and cooperatives to stock tradable commodities such as sesame and coffee. Based on discussions with sesame stakeholders, ECX warehouses lack adequate storage infrastructure to meet high-value market requirements. Further, the ECX infrastructure does not support staple crop storage, as they are not included on the exchange, and therefore, many farmers cannot directly benefit from the ECX market infrastructure.

In Tanzania, many rural areas are still not connected to market opportunities, and those that are often become impassable in inclement weather.⁴³ More than 50 percent of the road sector budget is financed by external donors, and directed largely towards national (trunk and regional) roads. Financing for local roads seems to get much less attention with less than 1 percent of the total budget allocated for 2011/12.⁴⁴ Based on discussions with stakeholders, existing government warehouses are in states of serious disrepair, and improvements are needed to meet high-value market requirements.

In Mozambique, Government has invested in metallic silos for grain across the country. According to interviews, there are reported to be more than 40 silos with an overall capacity of 40,000 MT but many silos are not strategically located and lie empty with the Ministry of Industry and Commerce struggling to manage them. Despite efforts by actors such as AGRA and IKURU, warehouse receipt systems and inventory credit systems are yet to be fully utilized by farmers and banks in Mozambique. More specifically, the legal and regulatory framework is underdeveloped with banks hesitant to accept warehouse receipts as collateral.

In Kenya, the problem is not so much storage capacity but accessibility. The Horticulture Crop Development Authority (HCDA) compliments private sector-led investments in cold chain infrastructure. Here, data-driven decision making and close partnerships with industry and farmers has led to efficient investments in cold storage facilities and transport services. The National Cereals Produce Board (NCPB), a parastatal which buys and stores maize as a strategic food reserve, also owns warehouses in multiple parts of the country. It is understood however from the different interviews that many of their

⁴³ The Rural Access Index GIS data plots only 24 percent of people living within 2km of a road

⁴⁴ World Bank (2012) “Tanzania Agribusiness Indicators”

warehouses suffer from inappropriate locations, poor management and smallholders' mistrust. Ensuring adequate storage for staples proximate to farmers is an important factor to improve their ability to reduce loss.

In Ghana, the Government has partnered with the World Bank and USAID on the Ghana Commercial Agriculture Project (GCAP). The project focuses on strengthening infrastructure to promote agricultural investment in the Accra Plain and Savannah Accelerated Development Agency (SADA) zone. The GCAP is a new program so success is yet to be measured but it does have a promising matching grants program to address infrastructure constraints for agri-business investors such as energy access or inadequate feeder roads. One limitation of the GCAP program with regards to this study's crops of interest is that it only focuses on specific areas and crops in line with USAID's Feed the Future program (rice, maize, soybeans). There is also a new IFAD program in partnership with the government that is currently awaiting authorization – the Ghana Agriculture Sector Investment Program (GASIP) – that aims to leverage private investments in commercial infrastructure and facilities and finance essential public infrastructure such as farm tracks and access roads. Despite these efforts, private sector interviewees repeatedly highlighted how rural and feeder roads that are important for produce transportation and reducing loss are typically in poor operating condition.

REGULATORY ENVIRONMENT THAT CATALYZES PRIVATE SECTOR ACTIVITY

Through engagement with private buyers and processors, farmers can benefit from technical assistance, as well as increased and more stable market access enabling them to access finance and invest in loss reducing technologies. Governments should therefore seek to incentivize private sector investment in agribusiness.

Tax breaks (e.g. exemption from import duties on agro-processing equipment) have had some success in the seven countries studied, but challenges remain regarding awareness and the ambiguous nature of incentives. Private investment is also constrained by a lack of quality standards, land tenure constraints, and high capital costs along with the negative effects of monopolistic/oligopolistic behavior in the transportation and food processing sectors brought about by lack of a competition policy. Evidence of the push to incentivize private sector companies to invest in agriculture production and processing can be seen in G8 New Alliance Cooperation frameworks to remove key policy barriers to private investment (six of seven focus countries).

In Ghana, investment promotion policies do provide tax rebates for firms in free zones and tax exemption on importation duty of agro-processing equipment. Interviews with private players highlighted how legislation put in place by government to reduce excise on products made with local raw materials has been a large boost. AGRA has also initiated a review of agri-business policies and contract laws in Ghana, and the Export Development and Agriculture Investment Fund (EDAIF) has recently been expanded to include support to private agribusiness. However, despite incentives being in place, knowledge of existing incentives among firms appears to be low based on a recent survey.⁴⁵ Access to land and capital also

⁴⁵ [DRAFT] Jatoo and Asante (2014) "Promoting Investment in Agro-processing, Value Addition and Post-Harvest Facilities"

remain as key challenge for investments in agribusiness. This is exacerbated by the lack of competition policy which results in concentrated markets in inputs, transportation and food processing and monopolistic/oligopolistic behavior driving up costs for farmers and creating high barriers to entry for private investors.

Senegal's tomato processing sector has seen success largely due to effective coordination through a committee of processors, financial institutions and farmers. This committee sets prices and provides a cooperation platform among key stakeholders. This transparent channel of communications and market regulation simplifies the relationships between processors and farmer organizations. Financial institutions also participate on the committee, enabling farmers to use supply contracts to get input credit. On-farm productivity has improved, transaction costs and product loss has been reduced and producer prices of fresh tomatoes have increased. The Government of Senegal has also put in place a range of policies and interventions to regulate and increase the supply of capital to the agriculture sector. The Investment Code defines tax incentives to promote productive investment in agriculture and investment in rural areas.

In Ethiopia, in response to the large volume of sesame exported as raw product, the government has introduced a number of incentives to encourage the construction of processing facilities. These incentives include free land for processing facilities, and the waiving of associated import and export duties. This has spurred a number of projects and investments in the value chain. The government has also introduced a certification system for sesame cooperatives that encourages quality and better market opportunities. Despite the incentives the environment for value addition in Ethiopia remains challenging, especially due to government involvement in various aspects of the market (restrictions on foreign ownership and investment, restrictions on land ownership, and government support for various state-run businesses that makes it difficult to mobilize private investment). Interviews with stakeholders also indicated that incentives for investment are considered to be granted in an ad-hoc manner and lack transparency.

Lack of a standard unit of weight and measure can lead to traders taking advantage of farmers and the continuous re-packaging of produce which leads to losses, especially of perishables. In Tanzania the policy framework covering standards, weights and measures was viewed to be strong on paper.⁴⁶ But, the Tanzania Markets Policy Action Node identified key regulatory environment gaps such as the lack of a self-regulatory mechanism, and insufficient market infrastructure close to smallholder farmers. Further, even though statutes exist, enforcement is inadequate because institutions such as the Weights and Measures Agency and the Tanzania Bureau of Standards lack resources (both budgetary and human) to adequately execute their mandate of enforcing adherence to official standards, weights and measures.⁴⁷

⁴⁶ Relevant legislation includes the National Trade Policy 2003, the Standards Act of 2009, the Cereals and Other Produce Act of 2009 and the amendments to the Weights and Measures Act of 1982. Implementing agencies include the Tanzania Bureau of Standards and the Weights and Measures Agency.

⁴⁷ Tanzania Markets Policy Action Node (2013) "Assessment of adherence to recommended weights and measures in grain value chain and implication on transaction costs"

In Kenya, refrigerated trucks have been exempted from import duties which does impact losses of perishables such as tomato. On the other hand, taxes which account for approximately 40 percent of the cost of grain handling equipment such as threshers, cleaners and moisture meters that can prevent losses is clearly counter-productive. To promote investment in Nigeria's tomato industry, special processing zones have been introduced to promote value addition and reduce losses. These zones seek to incentivize private sector agribusinesses to set up processing plants in zones of high food production using attractive fiscal, investment and infrastructure policies.

INTERVENTIONS TO STIMULATE DEMAND FOR KEY CROPS

Some governments have targeted specific value chains with a comprehensive set of policy measures that show indications of being effective in reducing losses. Such policies however need to be made through close dialogue with industry associations and based on market research as can also have negative unintended consequences.

In Nigeria, one avenue to reduce cassava losses has been through specific policy action mandating the use of high quality cassava flour (HQCF) in baked goods and increasing tariffs on the import of wheat flour. This policy however has been beset with challenges. A recent survey by The National Association of Nigerian Traders (NANTS) highlighted that the shortage of cassava for industrial use (80 percent of cassava is used for direct consumption) and technical difficulties in ensuring the required quality of cassava flour are hindering the policy's success.⁴⁸ Another demand stimulating effort by the government is the promotion of private sector driven marketing corporations for major crops to stabilize prices received by farmers and absorb surplus production that may otherwise go to waste.

The ECX in Ethiopia provides a guaranteed market for sesame, with 90 percent of sesame being exported in raw form through the exchange. The inclusion of sesame on the ECX has led to increased price information and marketing options for farmers which has provided farmers with an incentive to improve the quantity and quality of their produce contributing to a reduction in losses.

Although onion in Senegal is not a focus crop for this study it does present a noteworthy example of government using trade policy tool in a more sophisticated manner to stimulate local demand and address loss. The government has implemented seasonal import restrictions, linked import licenses allocations to the promotion of local production and supported these actions by investment in post-harvest infrastructure, with the building of a large warehouse in the Dagana Region. This will allow producers to store their production and sell it during the low season leading to a decrease in loss and an increase in farmer incomes.⁴⁹

⁴⁸ Agritrade (17 February 2014) "Nigerian traders survey the challenges involved in the cassava bread initiative"

⁴⁹ Agence de Presse Sénégalaise (5 February 2013) "Senegal: *Gel des importations d'oignons du 10 février au 31 août*"

SUMMARY OF COUNTRY ASSESSMENTS

Country performance against the core policy areas shows a diverse range of policy successes and challenges. While some gains have been made in enabling research and development of improved varieties and post-harvest technologies, and implementing policies that promote private investment, consistently weak policy areas are government intervention and red-tape hindering private investment, limited management of information on food loss to enable decision making, and the inability of extension services to effectively target loss reducing interventions.

6. Strategic implications and opportunities

SUMMARY OF INTERVENTIONS

Each country presents different entry points in the policy sphere to reduce food loss and positively impact smallholder farmers. To inform AGRA and the Rockefeller Foundation’s strategic decision making process we identified ‘intervention types’ where support to government policy could be effective. While there are numerous areas where policy could be improved we focus on those where we see existing momentum and opportunity for the Rockefeller Foundation and AGRA (as grant-making institutions) to support interventions to reduce food loss in the target crops of interest. The remainder of the section provides details on the specific entry points that we recommend by country, Figure 12 however presents a cross-country overview to distill where commonality and hotspots exist.

Figure 12: Overview of how intervention opportunities map by country

| Policy Area | Intervention type | Ethiopia | Ghana | Kenya | Mozambique | Nigeria | Senegal | Tanzania |
|---------------------------------|---|----------|-------|-------|------------|---------|---------|----------|
| Leadership and strategy | • Support the design and integration of a post-harvest loss management unit | | | | | | | ✓ |
| Information for decision making | • Support the measurement and monitoring of food loss to provide a basis for evidence based policy | ✓ | | | ✓ | | | |
| Research and development | • Support the research and development and dissemination of appropriate varieties to decrease on-farm losses and catalyze the processing industry | | ✓ | | ✓ | | | |
| Extension services | • Support the development of training modules on post-harvest management, quality standards, standardized units of weight and measure and marketing methods | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| Infrastructure | • Support a needs assessment for physical warehouse infrastructure and/or designated marketplaces, with weighing, grading and packaging facilities | | | ✓ | | | | ✓ |
| Investment promotion | • Support an assessment of agribusiness promotion policy requirements | | | | | | | |
| Demand stimulation | • Support a cost-benefit analysis of trade and tariff barriers to promote domestic value addition in certain value chains | | ✓ | | | ✓ | | |

Looking across the intervention types, and the different country needs we see a cluster of opportunity in the extension services policy area. This includes support for the design, roll-out and training on guidelines and standards, units of weight and measure, as well support to the development of post-harvest training modules in extension curricula. These are policy interventions that can be instigated by government but delivered in partnership with private and non-state actors. In recognition of this recurring theme, we believe support to this area presents a policy window that could move the needle in terms of addressing food loss. Given the plethora of on-going efforts in the area of private investment promotion through the New Alliance, AGRA Policy Nodes and other donor supported agri-business units and initiatives, we have not prioritized this as an intervention area. Nevertheless, there are country-specific opportunities presented in the remainder of report that identify other policy areas the Foundation and AGRA could choose to address through their interventions.

ETHIOPIA (TEFF, SESAME)

OVERVIEW OF LOSSES AND AREAS FOR IMPACT

Teff, a major staple in both rural and urban areas, incurs post-harvest losses of approximately 10-15 percent.⁵⁰ Losses in teff are noticeably lower than for other crops such as maize, due to teff's greater resistance to damage and pests in storage. On the other hand, on-farm processing losses, especially in threshing, are relatively high (due in part to unavailability of improved equipment), so government extension and technology delivery efforts may be more promising near-term routes to reduce losses. Sesame, a major export cash crop, incurs post-harvest losses of around 25-30 percent.⁵¹ Very little processing and value addition occurs domestically, and a significant portion of the losses occur on-farm due to poor handling and storage practices. This also suggests extension services as an area where impact could be significant. Training can be delivered not only through government, but also through the private sector as sesame traders begin to experiment with value addition.

Opportunities lie in scaling up extension services to increase the use of post-harvest technology, and in incentivizing private companies to invest in these areas in the teff and sesame value chains. To be able to assess the impact of these types of interventions and ensure they are appropriately tailored and targeted there is also a need to accurately measure and monitor food loss to allow for evidence based policy. Benefits of a strong data-driven evidence base will enable effective allocation of limited funds to target areas where losses are greatest, such as on-farm processing challenges faced by smallholder farmers.

INTERVENTION OPPORTUNITIES

Support the development of training modules on post-harvest threshing, storage, quality and marketing methods for use by private providers and the extension and cooperative system. Ethiopia has a strong farmer to extension officer ratio with an estimated 467 farmers for every Development Agent (DA).⁵² Despite a dense network to provide access to farmers, implementation of post-harvest extension packages has been limited. Providing farmer advisory services on post-harvest practices and market training can fill a large void in the current support given to smallholder farmers. The first step is to refine the current Development Agent (DA) extension manual's post-harvest recommendations and ensure that the recommendations are farmer-relevant and provide up-to-date guidance on post-harvest techniques related to teff and sesame – such as row-planting, threshing, handling, storage, quality standards and marketing methods. To ensure the post-harvest module meets the needs of the market and supports the users, the recommendations should be tested through consultations with traders and teff and sesame processors.

Risk and challenges: A focus on training in loss reducing practices cannot be viewed in isolation. There is a risk that farmers will be faced with increased supply and unable to access markets for their produce

⁵⁰ 2013 data from the African Postharvest Losses Information System (APHLIS) www.aphlis.net

⁵¹ Estimates based on FAO data on sub-Saharan Africa average (FAO 2011 "Global Food Losses and Food Waste"). In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

⁵² IFPRI (2010) "In-Depth Assessment of Public Agricultural Extension System of Ethiopia and Recommendations for Improvement"

driving down prices and potentially increasing loss. Therefore any training package would need to be coupled with access to finance, increased storage capacity and developing links with potential buyers and processors. USAID/Ethiopia's Feed the Future Agribusiness and Market Development project, and WFP's Purchase for Progress are both in the process of constructing storage capacity and can serve as potential partners in this regard.

There is also the risk that farmers will be resistant to the changes in production, harvest, and post-harvest behaviours. This resistance is a natural consequence of near-subsistence farmers' inherent risk aversion. Alongside intensive investment in farmer education (carried out over multiple seasons with gradual shifts in behaviour), there is also need for strong and visible commitments by participating private buyers to provide a consistent market for produce.

Support partners such as the Agricultural Transformation Agency (ATA), the Ministry of Agriculture (MoA), and the Central Statistics Agency (CSA) to accurately measure and monitor food loss across target value chains and provide a basis for evidence based policy. Data related to postharvest losses in Ethiopia, for all crops, is scattered and a challenge to locate. In the course of the interviews, stakeholders emphasized the need for accurate measurement of the issue before any changes in the policy framework should be considered. To date, only limited post-harvest loss surveys and analysis have been undertaken. Through a combination of field surveys and qualitative assessments of the bottlenecks in the sector, the data-driven approach of the ATA provides an attractive platform to analyze the impact of post-harvest interventions (as well as the implications of actions such as the teff export ban on food loss) to generate evidence based policies. The CSA also undertakes a country-wide crop production study that provides an optimal entry point to examine post-harvest losses across selected crops.

Risks and challenges: Data systems and the supporting infrastructure to collect and utilize monitoring data can be costly and may require technical assistance to setup. Given the indirect nature of monitoring on improving smallholders livelihoods this intervention will not generate immediate impact and is reliant on appropriate follow-on interventions and/or policy shifts.

GHANA (TOMATO, CASSAVA, BEAN)

OVERVIEW OF LOSSES AND AREAS FOR IMPACT

Tomato incurs losses of approximately 30-50 percent, of which the majority happen immediately post-harvest.⁵³ Seasonal gluts and a lack of buyers combined with poor handling and transporting methods are the key drivers of loss. Poor handling of tomatoes is often a result of farmers and traders not using a standard unit of weight and measure which leads to continuous re-packaging of produce damaging the fragile fruit. Due to limited market information and lack of knowledge on standards for weights and measures, farmers find themselves in a weak negotiating position. Traders take advantage of this situation and pay low prices for densely packed volumes of produce. If policy could address this issue it would not only increase farmers' bargaining power and incomes but also alleviate the loss issue by preventing the continuous re-bagging of produce across crops (not only tomato).

In addition, the fact that Ghana relies on imports of concentrate to meet its high levels of demand for tomato paste despite large volumes of local production suggests that there is a high-impact opportunity for policy to incentivize local processing to both reduce imports and help alleviate losses. Previous direct government interventions that have included the establishment of a number of tomato processing factories have failed, and the private sector has been wary to engage given that the tomatoes of the right quality and quantity for commercial agro-processing are not being grown. Addressing the varietal constraints and catalyzing private investment in processing could significantly reduce losses greatly benefitting Ghana's tomato farmers.

Cassava constitutes 22 percent of Ghana's agricultural GDP and is one of the country's main staple crops, but the cost of annual losses is currently estimated at almost \$400 million.⁵⁴ Losses mainly occur in the field before harvesting and during harvesting (caused by pests attack, diseases, weather and delays in harvesting), but also in postharvest storage, transit, and processing. Interventions that have shown promise in reducing losses include those where farmers are directly linked with processors for their cassava. DADTCO, for example use mobile processing units to collect fresh cassava from farmers and immediately process it into more stable forms to protect against loss. As mentioned earlier in the report, the small-scale processing technologies and linkages to buyers provided by the Good Practice Centers have also shown promising results. This suggests that a policy intervention that can further incentivize demand for processed cassava has high potential for impact. Increasing market demand for processed cassava can directly address the issue of high perishability and provide lucrative opportunity for companies such as DADTCO to process farmer's produce on-farm and reduce losses and sell on to companies, or for companies to integrate smallholder farmers into their supply chains directly.

⁵³ Estimates based on FAO data on sub-Saharan Africa average (FAO 2011 "Global Food Losses and Food Waste"). In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

⁵⁴ Gratitude (2013) "Value chain analysis and levels/causes of post-harvest losses for cassava in Ghana". In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

While many farmers grow beans and pulses in rotation with staple crops for their nitrogen-fixing properties, formal market activity is relatively limited at present. Pests and poor storage are the most important driver of losses so policy attention that both trains farmers on low-cost pesticide technologies (e.g. the use of neem seed extract) and facilitates access to hermetic storage bags could be beneficial. PolyTank (a joint Indian-Ghanaian company) had been manufacturing Purdue Improved Cowpea Storage (PICS) bags locally but has been constrained by petroleum price fluctuations as well as low quantities demanded due to changes in production volumes as a result of rainfall.⁵⁵ This presents an opportunity for government to waive duties on raw materials to lower or stabilize the production costs of the bags. However, given the significantly lower production volumes of beans (30,000 MT in 2012) in Ghana compared to cassava (14 million MT in 2012) and tomato (321,000 MT in 2012), the suggested interventions focus on the latter two crops.⁵⁶

INTERVENTION OPPORTUNITIES

Support the research and development of an appropriate tomato variety for processing and Ghana's agro-climatic conditions. A critical element to encourage processing is to identify improved varieties that can be grown in Ghana's agro-ecological conditions in the necessary volumes to be able to make tomato paste. For processing to be viable it needs to have year-round reliable supply that does not have to compete with the market for fresh produce. There is therefore strategic opportunity to support the Government (in partnership with private sector actors) to invest in research and seed breeding to respond to market needs. Under the Netherlands Embassy GhanaVeg program, a R&D Co-Innovation Support Fund has been set up to provide applied research for companies to address specific agronomic or technical bottlenecks in the vegetable sector in partnership with public research institutes that could provide a key leverage point for this intervention.

Risks and challenges: Varietal development is a longer term intervention and would need to be undertaken in close partnership with potential private players looking to engage in direct sourcing for processing once the varieties were available and disseminated amongst farmers. As long as imported paste remains cheaper there is little incentive for companies to engage with farmers even if they are producing the right varieties. Therefore, in parallel, a temporary increase in tariffs on imported paste could complement the efforts but would need to be approached with caution and due consideration. Until domestic production capacity of appropriate varieties has increased, Ghana will, in the short to medium term, still need to rely on imported bulk tomato paste to meet a considerable share of market demand, and any increase in price would be passed on to the consumer.

Entrenched interests and the structure of the tomato market also poses a risk. In Ghana, tomato trading is highly complex and dominated by a class of traders known as "market queens." These women control prices and quantity of tomatoes on the market and operate a quasi-cartel. The introduction of a processing-only variety however will help avoid dual marketing problems and competition with the market queens in the local fresh variety.

⁵⁵ Coulibaly, Alessandro, et al, (2012) "Purdue Improved Cowpea Storage (PICS) Supply Chain Study"

⁵⁶ FAOSTAT; Dalberg analysis

Support the policy design, roll out and enforcement of standard units of weight and measure. In 2013 the Ministry of Trade and Industry was due to issue a directive on the use of weighing-scales for trading activities but based on the interviews and research undertaken this is yet to happen. There is currently a great deal of chaos and uncertainty created by the lack of standard measurement. In the absence of any weights and measures, traders use this to their advantage to exploit farmers with lots of re-bagging and changing of quantities which can lead to damage and losses of perishables in particular. Introducing standard units of weight and measure, and training farmers on the benefits of their use can seek to address this.

Risks and challenges: A risk related to enforcing a standard unit of measure is that of translating policy into practice. Implementing standard weights and measures takes more than developing the policy and will require a comprehensive behavior change campaign. As mentioned above, entrenched interests and the structure of the tomato market also poses a risk. Traders will also likely resist this move so will also need to be involved in the behavior change campaign.

Undertake a cost-benefit analysis of specific policies to promote the manufacturing and domestic use of high quality cassava flour (HQCF). In recognition of the potential that processing can play in addressing losses in the cassava value chain there is scope for Government to build on its current efforts when it comes to promoting agribusiness. Specifically, we see opportunity for Government to consider limiting wheat flour imports through increased tariffs, and promoting the use of HQCF in bread through composite cassava flour requirements. Learning from the Nigeria experience, it is important that a rigorous cost-benefit analysis is done prior to policy implementation. Expanding the use of cassava flour in food products will require the development of an efficient and well-integrated production and marketing system, in order to assure a steady supply of cassava products of high-quality standards at appropriate prices. A memo on promoting HQCF has been suggested in the Ghana Cabinet but nothing has yet moved past discussion. The planned Ghana International Trade Commission⁵⁷ however could provide an optimal platform to deliver this intervention and analyze the details of how the specific policy could be structured.

Risks and challenges: When it comes to processing incentives, it is important to remember that one of the key constraints to private companies is the quality, quantity and stability of supply. Therefore incentives on their own will likely not yield the desired results, but packaged with investment in infrastructure and extension support to farmers and improved inputs could be an effective tool. Millers and bakers will also need to be supported in securing appropriate technology and be trained on its use. Attempts to develop the HQCF market could also prove politically unpopular due to the high profile failure of the previous government sponsored cassava processing initiative. Further, the varieties desired by processors are different than the varieties usually sold in local markets or retained for own use so it's important to ensure that promoting flour for processing does not lead to food insecurity.

⁵⁷ *allAfrica* (26 February 2014) "Ghana: Govt to establish international trade commission – President"
(<http://allafrica.com/stories/201402261343.html>)

KENYA (MAIZE, BEAN, TOMATO)

OVERVIEW OF LOSSES AND AREAS FOR IMPACT

Maize is the dominant staple in Kenya, with 97 percent of production originating from smallholder farmers. The crop incurs post-harvest losses in the region of 30 percent which are mainly driven by ineffective drying, storage, and handling techniques leading to mycotoxins (especially aflatoxin) contamination.⁵⁸ This leads to rejections of farmers produce resulting in waste and a loss in income.⁵⁹ There is therefore a need for training and enforcement of standards in the maize value chain, as well as increased accessibility to post-harvest technologies and storage capacity to incentivize farmers to invest in appropriate techniques and improve quality. Kenya Bureau of Standards and the East African Standards harmonization process have established quality standards resulting in a mandatory maize grading system but these specifications are only implemented in the formal maize marketing channels. The bulk of maize in Kenya is sold through “informal channels”, where quality control systems are rarely used leading not only to waste at later stages of the value chain but also causing health concerns. Warehouse receipt systems promote quality production and post-harvest management by transparently standardizing grades and requirements for farmers to adhere to. Promoting their use can incentivize farmers to comply with standards, provide storage and increase access to finance to allow for investment in post-harvest technologies.

Beans, often intercropped with maize, are another important staple in Kenya and it is estimated that losses are around 20-30 percent.⁶⁰ Losses mainly occur due to ineffective handling, threshing (processing) and storage and this causes high impurity, poor quality and disease. The interventions suggested above to support both standards and warehousing for maize would also alleviate losses incurred by bean farmers.

Smallholder farmers are the main producers of tomatoes in Kenya. Local demand for tomatoes is high and all domestic produce is absorbed in the country. Losses are primarily caused by low quality storage, transportation and handling. There have however been promising policy efforts in this area. Through its horticulture policy (2012) the government has taken note of post-harvest issues and outlines deliberate efforts towards investing in this area (e.g. through infrastructure, agro-processing and packaging technologies) to increase produce shelf life, and reduce losses. Further, alongside the private sector, the HCDA has invested in cold storage facilities which are operated at subsidized rates, and refrigerated trucks have been exempted from import duties to incentivize their use in the transportation of perishables such as tomato.

⁵⁸ Website of National Cereals Produce Board, Kenya

⁵⁹ It was recently reported that the National Cereals and Produce Board (NCPB) depots rejected more deliveries than the previous season due to late rains raising the maize moisture content. Farmers affected had to sell to traders at prices up to 33% below the NCPB price and incurred both physical and economic losses. *Business Daily Africa*, ‘Farmers hit as NCPB rejects maize’, 6 January 2014

⁶⁰ Estimates based on FAO data on sub-Saharan Africa average (FAO 2011 “Global Food Losses and Food Waste”). In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

INTERVENTION OPPORTUNITIES

Support training on guidelines and standards to prevent aflatoxin-contamination. Kenya is highly susceptible to aflatoxin and providing guidelines on aflatoxin prevention, such as improving storage practices to reduce pests that spread the disease, is an important factor in reducing contamination.⁶¹ Guidelines and products that prevent aflatoxin contamination can be delivered through extension services and working with farmer associations to ensure broad reach. Given the trade of food across the region, a regional approach is also required with institutions such as the East African community (EAC) and the Partnership for Aflatoxin Control in Africa (PACA) present potential partnership opportunities.

Risks and challenges: A major risk is that the stringent enforcement of guidelines will mean some farmers who do not conform have no market for their product impacting livelihoods and actually leading to increased losses. In this regard, opportunities to direct contaminated maize into other markets such as ethanol production should also be examined.

Support the design of the supporting regulatory and physical infrastructure to implement the warehouse receipt system bill. A revised warehouse receipt bill is currently in parliament and once passed into law⁶² attention needs to turn to support its implementation. For maize and bean smallholder farmers, the warehouse receipt importantly acts as collateral to access finance and lower the cost of finance. This financing can be used by farmers to engage in better post-harvest practices. The receipt system also standardizes grades and trading, reducing transaction costs, and protecting against misuse on weights and quality. Based on interviews, one of the biggest bottlenecks preventing the use of warehouse receipts is the lack of appropriately sized warehouses in close proximity to smallholder farmers.⁶³ To increase access, there is a need to utilize both government financing in partnership with investment from private sector agribusiness firms to construct smaller warehouses closer to farmers. Incentives to promote private investment could include free or subsidized land for warehouses as well as tax exemptions on construction and grain handling equipment, e.g. threshers, cleaners, and moisture meters. To ensure warehouses are actually used, there is also need to design a behavior change campaign in parallel to explain the system and the standards required to obtain a warehouse receipt as well as the benefits of doing so. This will help to build trust with farmers who are typically wary of communal storage.

Risks and challenges: Poor management of warehouses and incorrect following of grades and standards could lead to a breakdown of the trading/exchange system with banks refusing to accept receipts. Insufficient support and training provided to farmers to meet the standards and understand the financial complexities of the receipt system will also lead to mistrust and low adoption. Several stakeholders noted that trust issues (stemming from a perception of previous poor performance of government warehousing)

⁶¹ The outbreak that occurred in 2010 had the highest levels of aflatoxin-B1 serum ever recorded in the world and surveys indicate that large parts of the country have aflatoxin exposure, in particular the Eastern Province - CGIAR, (2013), "Aflatoxin: Finding Solutions for Improved Food Safety. Aflatoxicosis: Evidence from Kenya."

⁶² According to interviews, the bill is currently in Parliament and is awaiting approval.

⁶³ Interviewed stakeholders indicated that large 1000 MT capacity warehouses are of less useful than smaller more dispersed 50-100 MT warehouses.

limits farmers' willingness to use them, making private-sector operators a more promising choice. However, maize has historically been quite politicized, with at times unfavorable regulation for the private sector. Government needs to refrain from unpredictable policy changes and direct intervention in the sector to promote private sector investment.

MOZAMBIQUE (CASSAVA, BEANS, SESAME, GROUNDNUT)

OVERVIEW OF LOSSES AND AREAS FOR IMPACT

Cassava, a major staple and food security crop that is cultivated by over 90 percent of farmers.⁶⁴ Losses in both quality and quantity are driven by pre-harvest issues, such as diseases and ill-suited varieties, and post-harvest issues, such as ineffective storage and poor handling in the face of its high perishability. Beans, primarily butter, dry and pigeon varieties, are produced by smallholder farmers and incur losses of approximately 28 percent.⁶⁵ Losses occur at the production and post-harvest stages of on-farm processing, handling and storage. Sesame, a relatively new crop to Mozambique, is produced by approximately 300,000 smallholder farmers and incurs high losses of approximately 30 percent.⁶⁶ A significant portion of the loss occurs at the production and post-harvest stages of on-farm processing and handling, and poor sanitation practices when stored. Groundnut is a highly important cash crop and is grown by over 1.5 million smallholder farmers and it is estimated that it incurs losses of up to 30 percent.⁶⁷ Low quality of seeds, ineffective storage and drying practices leads to high-levels of loss.

Interviews with the different stakeholders along the four value chains repeatedly raised the issue of farmer use of non-improved varieties as a key driver of food loss. Although IIAM breeding work has focused on cassava and varieties that are resistant to brown streak disease and the mosaic virus, sesame is a relatively new crop to Mozambique, and is currently not supported by the research system and therefore lacks any varietal development. Many farmers are not accustomed to cultivating it, thus poor agronomic techniques are commonplace and there is a high rate of shattering and impurities. When it comes to groundnut and bean, despite assistance from AGRA to develop a seed regulatory framework, there are challenges to ensure widespread release of certified varieties that can be accessed by smallholder farmers. Within research stations, there is inadequate production of breeder and foundation seed and the certified seed is reported to be as much as five times the cost of grain which makes adoption prohibitive for smallholder farmers.⁶⁸ Certification is also identified as too time consuming and bureaucratic by the private sector. Policy interventions that support research and delivery efforts aimed at identifying and multiplying improved seeds that facilitate processing and limit risks have potential to positively impact smallholder farmers through reduced loss to disease and drought, as well as reduced

⁶⁴ FAO data; Dalberg analysis

⁶⁵ Estimates based on FAO data on sub-Saharan Africa average (FAO 2011 "Global Food Losses and Food Waste"). In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Analysis by the World Bank provides indicative examples of the challenges faced in the selected crops – the current supply of maize and rice certified seed would only cover 5.7% and 10.7% of the crops planted area. World Bank (2012) "Agribusiness Indicators: Mozambique".

loss through increased access to markets if they produce the varieties that private sector processors require.

Across all the crops, data on losses is virtually non-existent and there is no organized system for collecting, analyzing and disseminating the information. Development partners supporting the agriculture sector believe that there is significant value in ensuring better post-harvest loss data but government currently lacks the resources to do so effectively. Mozambique has the potential to reduce losses and increase the value of both its staple food security and high-value export crops but it will need accurate information to ensure interventions are efficiently designed to mitigate losses. Opportunities for impact therefore lie in supporting government tracking of food loss and monitoring of efforts to address the issue. This has the potential to positively impact smallholder farmers by focusing and coordinating government efforts to reduce post-harvest losses. Coupled with effective messaging, robust data can elevate the food loss issue and enable effective allocation of limited funds to target areas where losses are greatest.

INTERVENTION OPPORTUNITIES

Support MINAG to develop a system to accurately measure and monitor food loss across target value chains and provide a basis for evidence based policy. Availability of data, both qualitative and quantitative, to inform government ministries is essential. There is opportunity to build on Michigan State University's and FAOs partnership with MINAG and the National Institute of Statistics (INE) to develop post-harvest measurement instruments. The Swiss Development Cooperation presents a potential partner in this effort.

Risks and challenges: Data systems and the supporting infrastructure to collect and utilize monitoring data can be costly and may require technical assistance to setup. Given the indirect nature of monitoring on improving smallholders livelihoods this intervention may be hard to sell to policymakers.

Support the production and dissemination of improved disease-resistant varieties of sesame and bean seed for smallholder farmers in partnership with the private sector. Studies on food loss in Mozambique stress the importance of varieties which have greater resistance to damage, pests, insects and rodents. Improved seed also increases the yield and quality of the crop, resulting in greater likelihood of marketability and value addition. Based on interviews with stakeholders, despite seed policy regulation being developed, improved seed availability is still low in Mozambique and underlies the significant post-harvest losses in the target crops. It is estimated that 90 percent of seed in Mozambique is farmer saved-seed and informally exchanged.⁶⁹ The funding for seed research and development provided by the Beira Corridor initiative, utilizing public and private sector resources, provides a good platform to aggressively scale the effort for crops such as groundnut and cassava. In addition, IIAM and MINAG should seek to scale-up research and development of foundation and certified seed and work with private sector producers to scale availability. However, increasing access to improved varieties requires not just research and development but a delivery mechanism. Seed multiplication and distribution should be incorporated into commercially-viable models and handled by private sector participants to ensure maximum

⁶⁹ ISSD (2012), "Mozambique Seed Sector Assessment"

incentives for widespread distribution and adoption. Large companies already conduct field days, have demonstration plots and marketing systems, and this needs to be scaled to reach more smallholder farmers.

Risks and challenges: The relative high costs of improved seed may negatively impact farmers if they do not see the subsequent higher return when they market their produce. While saved seed is lower in yield and quality, it represents much lower cost and investment risk for the farmer.

NIGERIA (CASSAVA, TOMATO, ONION)

OVERVIEW OF LOSSES AND AREAS FOR IMPACT

Cassava is the dominant crop in Nigeria, with 54 million tons produced in 2012², largely originating from smallholder farmers primarily for subsistence and local market food uses. Losses are estimated in the region of 30 percent.⁷⁰ Government has already focused a lot of policy attention on the development of the cassava sector, and in particular in the promotion of HQCF. These interventions are yet to significantly impact loss as processing uptake has been limited by quality and stability of supply. The logistical challenges of sourcing directly from smallholders suggests higher impact could be achieved through additional training and support to farmers in partnership with the private sector. This would require training and access to higher-starch, high yield varieties for processing, as well as disseminating best practices in planting and harvesting, and aggregating produce to develop direct relationships with processors. Recognizing the current political sensitivity of the cassava sector we recommend a wait and see approach.⁷¹

Tomato losses are estimated at 50 percent⁷² and are driven by poor storage, handling and transport techniques. Like Ghana, Nigeria is also a major importer of tomato paste, despite its large levels of domestic production. In recognition of the sector's potential, a tomato value chain action plan has been developed to guide government's policy interventions. Again, this situation suggests that the promotion of domestic processing could have a high impact on the losses in the tomato sector. One way of doing this is through the temporary use of increased tariffs on imports of tomato concentrate. Competition from imported paste erodes the business case for local processing which has the potential to provide a stable market for tomatoes (reducing seasonal losses from unsold gluts). Increased processing, and associated changes in farmer incentives and behavior, would reduce losses from storing unprocessed tomato.

Unlike cassava and tomato, onion has received less attention in terms of targeted policy actions. Onion losses are also estimated at up to 50 percent⁷³, and like tomato are driven by poor storage, handling and

⁷⁰ FAO (2013-2017) "Country Programming Framework" Overall estimate for roots and tubers. In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

⁷¹ A recent press report suggests that the Nigerian government may be planning to abandon its cassava blending policy, for several reasons, one of which is the impact on the profitability of many of the wheat importers and processors in the country.

⁷² FAO (2013-2017) "Country Programming Framework" Overall estimate for fruits and vegetables. In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

⁷³ Ibid

transport techniques. Trade is still highly traditional with most produce being sourced from large open-air markets after being transported from the growing regions by informal traders and brokers. Introducing reusable plastic crates instead of large woven baskets reduces tomato transit losses, while proper drying, sorting and standardized weight bags for onions reduces spoiling and increases farmer incomes. These proposed changes to the packing and transport process directly correspond to major loss points, holding significant potential to address the issue.

INTERVENTION OPPORTUNITIES

Undertake a cost-benefit analysis of the implementation of increased import tariffs on tomato paste.

Processing presents a great opportunity to reduce post-harvest losses and increase farmer incomes by providing a large domestic market and consistent demand for their tomatoes, but this opportunity is not being fully exploited due to price competition of imported paste and concentrate, unsuitable varieties and seasonality of local supply. Temporarily raising import barriers would support the localization of processed content and utilization of currently wasted gluts in supply. Although as mentioned above with Ghana, it is important to understand the nature of the gluts, and if the varieties can be used for processing. Changing the price incentives for processors encourages farmer engagement, and in turn assures farmers of a stable demand that makes the economic case for loss-reducing behavior changes. In developing this type of policy, Nigeria could draw lessons from the experience of Senegal and Namibia and incentivize importers to build domestic supply in parallel. In Senegal, the government has introduced stringent import restrictions on onion but combined these with import authorizations to importers who commit to promoting the marketing of local production. The linking of import license allocations to the promotion of local production has also been successful in Namibia where it forms part of a wider scheme, which includes a restricted-access market information database for producers, retailers and traders. By 2011, this scheme had seen the share of locally produced Namibian fruit and vegetables increase to 37.5 percent of national commercial consumption from a mere 7 percent when the scheme was launched in 2004.⁷⁴

Risks and challenges: Consumers would bear the cost of increased import prices if producers are unable to adequately substitute local produce. Similarly, to the case of Ghana above, problems securing appropriate variety, quality and quantity for processing plants could reduce impact and would therefore also need to be addressed in parallel.

Support the policy design, roll out and enforcement of standards on appropriate methods for transportation of tomato and onion.

Horticultural products are especially susceptible to losses from poor transport practices. Tomatoes bruise and spoil due to rough handling and overcrowding, and onions rot due to improper drying and long transport times. There are currently no standards enforced stipulating the mode and method of fruit packing and transport, and farmers typically default to what appears to them to be the most economic methods in the short term, within constrained production budgets i.e. packing in low quality containers and paying informal transporters to move goods on poorly maintained vehicles.⁷⁵ While jurisdiction over the road-worthiness of transport vehicles falls under the administration

⁷⁴ Agritrade (2011) "Executive Brief Update 2011: Fruit and Vegetable Sector"

⁷⁵ Idah et. Al (2007) "Fruits and Vegetables Handling and Transport in Nigeria"

agencies established by state governments, tightening enforcement on vehicle quality may not have the highest impact on loss reduction. Breakdowns and delays are a secondary cause of loss, and increased enforcement could limit the affordable options available to farmers, precipitating even more losses from delays and non-availability of transport. A more effective and realistic intervention would be to trial and perhaps subsidize the rollout of improved packing and transport materials such as reusable plastic crates for tomatoes, and standardized weight bags for onions.

Risks and challenges: Farmers are resistant to change especially where it requires initial investment that does not match their current selling practices. Informal transporters may be crippled/stifled by standards enforcement and therefore resist policy reform.

SENEGAL (CASSAVA, GROUNDNUT, TOMATO)

OVERVIEW OF LOSSES AND AREAS FOR IMPACT

Cassava is produced in Senegal at a much smaller scale than in Ghana or Nigeria. Losses in cassava can be as much as 45 percent of the total crop.⁷⁶ Losses in both quality and quantity are driven by pre-harvest issues, such as diseases and post-harvest issues due to a lack of processing. Groundnut is the main cash crop in Senegal providing a vital source of income for smallholder farmers. Across SSA, post-harvest losses of groundnut can be as high as 30 percent.⁷⁷ Low quality of seeds, ineffective storage and drying practices and a lack of on-farm processing leads to high-levels of loss. Tomato is another important export crop in Senegal. Tomato losses in the form of weight and water loss are primarily caused by low quality storage, transportation and handling.

In terms of its policy efforts, the government has targeted the private sector as critical in improving efficiency across the value chains. Over the last decade, the government has invested significantly in the Senegal River Valley through policies aimed at enhancing road infrastructure, packaging and logistics and irrigation facilities, and developing specialized post-harvest storage and logistics infrastructure. Under its G8 New Alliance commitment, the Government has also committed to improve and accelerate reforms to encourage the private sector to invest in the agricultural sector. While these policy efforts are positive steps, interviews with the different agri-business stakeholders raised the issues of a lack of access to finance as well as farmer use of non-improved varieties as key drivers of food loss in both the groundnut and tomato sectors. With regards to increasing access to finance, certain policy steps by Government and its development partners are underway. The recently created National Bank for Economic Development (BNDE) provides long-term finance to SMEs that commercial banks would otherwise view as too high risk to lend to. The French Development Agency (AFD) has also established a credit guarantee line with several financial institutions in Senegal (SGBS, BICIS, Bank of Africa, Alios Finance) to facilitate access to credit. To ensure farmers are using improved varieties that increase both quality and market access as a loss reducing measure requires additional effort. The company SOCAS provides extension support to farmers'

⁷⁶ Estimates based on FAO data on sub-Saharan Africa average (FAO 2011 "Global Food Losses and Food Waste"). In recognition of the scarcity of reliable data on losses by crop/country these estimates are provided with caution.

⁷⁷ Ibid.

on the correct varieties and standards demanded but this support only covers a small number of tomato producers in Senegal.⁷⁸ This suggests that targeted efforts to support farmers more broadly in terms of knowledge, and access to appropriate varieties has the potential to generate impact alongside the other ongoing government activities.

INTERVENTION OPPORTUNITIES

Support the development of a training and awareness raising package to introduce tomato and groundnut farmers to the varieties and standards demanded by processing and export firms. With growing urbanization and increased demand for tomato-based products, there is potential to increase incomes for smallholder producers through reducing loss and further developing the value chain. Currently demand for tomato from the processing industry consistently outstrips supply. This is due to inappropriate varieties and insufficient quantities. One of the main challenges to increasing the supply of raw tomatoes to agri-processors is limited farmer capacity to consistently produce high yields and the right varieties to meet the processing industry demands. The first step to reach farmers who currently are not connected to existing producers is through information campaigns on varieties and standards. Groundnut is less developed than tomato in terms of value chain sourcing and farmers lack basic information on the requirements for groundnut processing. Operationalizing and mass marketing of the Senegal Agriculture Research Institute's (ISRA) post-harvest technologies for tomato and groundnut can ensure that farmers understand what post-harvest technologies to engage in to ensure quality and standards needed to market to agri-processors.

Risks and challenges: Farmers may be unwilling or hesitant to adopt processor-appropriate varieties. These varieties are usually less appealing for sale as fresh produce, and thus farmers would have to trust that they will be able to sell to a processor at a fair price. Processors will need to build strong relationships with farmers and farmer groups, and they may find it necessary at the outset to support production through provision of seeds and other inputs. This implies that government efforts in this area need to be undertaken in close partnership with industry players. An example model of public-private provision of extension that could be leveraged is that used by ETG in Tanzania. Government extension agents are given a transportation allowance and have their salaries subsidized in exchange for serving ETG-aligned smallholders. This is undertaken on a temporary basis, until it can be demonstrated to farmers and market participants that technical assistance is a worthwhile investment.

TANZANIA (MAIZE, BEAN, ONION)

OVERVIEW OF LOSSES AND AREAS FOR IMPACT

Losses in the maize, bean and onion value chains occur largely during harvest and post-harvest storage stages of the value chain, with secondary losses in transport and processing. A recent study by the Tanzania Markets Policy Action Node (TM-PAN)⁷⁹ on post-harvest losses in Tanzania provides a

⁷⁸ Seas of Change "Case study 8: National Forum on the Industrial Tomato Value Chain in Senegal"

⁷⁹ Ibid.

comprehensive summary of the key challenges which were reaffirmed during the stakeholder interviews. These include: a lack of comprehensive data on losses; issues related to storage (warehouse construction and management and local storage at household level) and processing (availability of equipment, quality control); limited knowledge and information among farmers on harvesting practices and post-harvest management; logistical issues including road infrastructure; and constraints concerning weights, measures and standards. Public sector efforts to address the weights and measures constraints, and rural road infrastructure are currently underway.⁸⁰

Building on these efforts, we identified two policy intervention opportunities that could address the above challenges enabling farmers to reduce loss and increase incomes. The first concerns a tiered warehousing system that accounts for village level dynamics and economies. The second takes a broader approach. The range of challenges across the crops suggests that more emphasis should be given to a holistic approach of dealing with loss, and TM-PAN recommends developing a comprehensive post-harvest loss strategy. In this regard, opportunities lie in strengthening cross-sector mechanisms to deliver coordinated policies to reduce post-harvest loss, and the location of the recently created Agriculture Delivery Division (ADD) within the Presidential Delivery Bureau (PDB) provides a potential entry point.

INTERVENTION OPPORTUNITIES

Support the analysis and design of a tiered warehousing system to respond to market dynamics and farmer needs. Currently, Tanzania has approximately 1,260 warehouses to cover its ~11,000 villages.⁸¹ Many of these warehouses are not used due to their poor condition or mismanagement. Given the poor state of roads, the scarcity and high cost of transport, and an average distance from farm to warehouse of 15 km, the time that farmers have to travel in order to store their produce is also a major obstacle.⁸² Further, governance over the current warehouse system is outlined in a somewhat confusing way in terms of national-level policy, leading to highly inconsistent and incomplete downstream implementation.⁸³ These factors contribute to the reluctance by farmers to use warehouses and therefore continue using home storage which drives losses in quality and quantity.

Rather than replicating the narrow investment focus of previous programs, this intervention should carefully address the wider, systemic bottlenecks that typically hinder the success of warehousing interventions. A lesson from the failure of previous government investments in warehousing is that the core capacity gap is not the physical ‘hardware’ of warehouse storage capacity, but rather the critical ‘software’ of establishing effective market linkages and production incentives for smallholder farmers. Rather than focus on capacity, the site selection of warehouses is critical. Data driven decisions should be

⁸⁰ Government is currently implementing (2011-2016) the Marketing Infrastructure Value Addition and Rural Finance Program (MIVARFP) - funded by AfDB, IFAD and AGRA; and the TM-PAN has taken the lead on addressing weights and measures constraints

⁸¹ TM-PAN (2013) “Post-harvest losses in Tanzania: Challenges and options for mitigation”

⁸² Ibid

⁸³ Linked to the existence of the five Agriculture Sector Lead Ministries (ASLMs), MAFC does not actually hold oversight over the warehouse system. Instead, once commodities leave the farm-gate, these items come under the purview of the Ministry of Industry and Trade (MIT). A parastatal Warehouse Licensing Board linked to MIT has formal jurisdiction over any interventions involving warehouse receipt systems

made based on time-to-market measurements, and the relative warehouse location is as important, if not more important, than local factors specific to each facility (e.g. warehouse physical condition, presence of local production surpluses). Therefore, to complement efforts to upgrade existing infrastructure, analysis to determine optimal warehouse location is required.

Risks and challenges: Risk aversion and trust issues on the part of farmers, reluctance to make large capital expenditures on the part of private firms, and management and standards capacity of operators are challenges that must be overcome for the system to be effective. Further, parallel and historical investments have been made in maize warehousing, without achieving major impact on intended outcomes of productivity, income, or poverty reduction. This implies that additional constraints need to be addressed in parallel such as investments in rural road infrastructure, efforts to increase productivity and behavior change campaigns. To catalyze private investment in warehousing, general disincentives to private investment such as government intervention in the maize value chain also need to be overcome.

Support the design and integration of a post-harvest loss policy coordination unit in the Agriculture Delivery Division: A cross-sector coordinating unit mandated to address loss is a useful enabler in the core policy requirements for addressing loss. Tanzania has the benefit of a suitably aligned and resourced independent delivery unit that is well placed to assume this role. The mandate of the recently established Agriculture Delivery Division (ADD) within the Presidential Delivery Bureau (PDB) as the “nerve center for evidence-based policy formulation” makes it a promising candidate to address food loss from a policy perspective. Providing a mechanism to coordinate the necessary policy and regulatory requirements to reduce post-harvest loss will be critical to achieving effective reform. ADD already enjoys strong political and financial support from development partners such as UNDP and Gates Foundation. Its central location, and independent unit status is ideal for coordinating a range of activities across government agencies and with a strong data-driven evidence base will enable effective allocation of limited funds to target areas where losses are greatest.

Risks and challenges: There is a risk that negative farmer and business perception of government intervention (which was raised by stakeholders repeatedly in interviews) will limit the effectiveness of government led initiatives. The ADD is also a new initiative which is yet to be tested. Data systems and the supporting infrastructure to collect and utilize loss monitoring data can be costly and may require additional technical assistance to setup. As a newly established unit, capacity to take on coordinating responsibility may be low. But designation as the lead agency for these efforts could shape additional recruiting and structuring as appropriate. Another limitation is its initial focus on the maize and rice value chains which have significantly different dynamics to the other crops of interest such as onion.

CONCLUSION AND NEXT STEPS

The research and analysis draws attention to areas where policy and government action can be leveraged to reduce food loss, as well as limitations and gaps in the policy framework that need to be addressed. Based on these findings we presented high-level opportunities across the seven countries where support to government policy could be effective in reducing food loss and positively impact smallholder farmers.

Rather than being prescriptive, this report is intended to serve as a reference point for AGRA and the Rockefeller Foundation to guide their strategic decision making, future investment, research, and advocacy work. Designing successful policies to promote loss reduction must start with a thorough understanding of farm-level conditions. This understanding needs to include attitudes to risk, and willingness to make tradeoffs between short and long term goals. The next step is to design interventions that draw on the range of policy areas and tools presented in this report to ensure a holistic value chain approach. The framework of three guiding principles and seven core policy areas can be applied to other countries and crops to examine the robustness of a particular policy framework when it comes to addressing the food loss issue. Lastly, in devising appropriate policies relating to food loss the importance of analysis and information for decision making should not be underestimated. To date, the ability for researchers and governments to determine how policy impacts loss is compounded by the lack of measurement and monitoring of the problem. Developing indicators that can more clearly show the benefits of reduced loss is a critical first step in the design of any intervention.

Annex 1. Supporting country-level information⁸⁴

ETHIOPIA

TABLE 1: OVERVIEW OF RELEVANT STRATEGIES

| Strategy | Objectives relevant to food loss |
|--|--|
| Growth and Transformation Plan 2011-2015 | <ul style="list-style-type: none"> • Sustainable increase in agricultural productivity and this entails: <ul style="list-style-type: none"> ○ 3% annual reduction in post-harvest losses by commodity ○ Reduced dependence on commercial imports of staple food products • Accelerate agricultural commercialization: <ul style="list-style-type: none"> ○ Private agribusiness investment increased and increased value addition in rural areas ○ Reduced transaction costs in input and output supply chains |
| National Teff Working Strategy 2013-2017 | <p>Objectives include:</p> <ul style="list-style-type: none"> • Create awareness of post-harvest loss, develop, test and introduce new post-harvest and handling techniques. • Increase market access by linking smallholders to direct selling, create warehouse receipt system and improve teff market transparency |
| National Sesame Working Strategy Under development | <ul style="list-style-type: none"> • Approval process ongoing |
| G8 New Alliance Cooperation Framework | <ul style="list-style-type: none"> • Aims to attract and mobilize national and international private investment to stimulate and support the agricultural sector |

⁸⁴ All findings cited in the Annex are drawn from in-person interviews or the literature review conducted by the Dalberg team. Please see Annex 2 for a full list of stakeholders interviewed.

TABLE 2: ASSESSMENT OF ETHIOPIA AGAINST CORE POLICY AREAS

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|--|---|
| <p>Clear leadership and cross-ministry coordination on post-harvest issues</p> | <ul style="list-style-type: none"> • The Agriculture Growth and Transformation Plan (AGTP) is the priority framework for the government to support the agriculture sector and includes post-harvest loss objectives. These objectives are also supported in the CAADP investment plan. • The Ministry of Agriculture, with support from the ATA, provides strong leadership and coordination and drives the execution of policies and programs in public extension, value chain / sub-sector initiatives and market-building activities related to reducing post-harvest loss. • Policy efforts to reduce teff and sesame loss are articulated in value-chain strategies. The sesame strategy is currently in draft, but through the teff strategy, strategic direction and attention has been given to reducing loss including developing and testing new post-harvest and handling technologies and increasing market access. | <ul style="list-style-type: none"> • Although post-harvest loss is included in the AGTP the focus of the policy directives, particularly in high priority Woredas⁸⁵, places emphasis on increasing farmer production through fertilizer access rather than post-harvest storage, marketing and value addition. • Despite sesame’s strategic importance for foreign exchange earnings and value addition, the sub-sector strategy has been under development for over a year. This is partly due to it being perceived primarily as a private sector led-value chain and therefore low levels of government resources have been allocated. • Some stakeholders expressed the need for a cross-sector strategic document that drives solutions to post-harvest issues and a unit or working group to support the delivery and coordination of post-harvest issues that reports to the Transformation Council. |
| <p>Information for decision-making</p> | <ul style="list-style-type: none"> • The data-driven approach of the ATA provides an attractive platform to analyse the impact of post-harvest loss reducing policies. • Further, in every production season, the Central Statistics Agency (CSA) produces a country-wide crop production study that provides another good platform to examine post-harvest loss across selected crops. | <ul style="list-style-type: none"> • Based on stakeholder interviews, at the research level, very little has been developed in terms of Ethiopian-specific post-harvest loss surveys and analysis. At the regional level, there is limited use of post-harvest data with the emphasis of reporting focused on production and yield related indicators. |
| <p>Research and development into improved varieties and post-harvest technologies</p> | <ul style="list-style-type: none"> • The ATA and MoA have piloted mechanized post-harvest technologies such as teff threshers and teff row planters to improve farm-level efficiencies, reduce the labor requirements and post-harvest loss. Targeted extension support and awareness campaigns have spurred relatively high rates of adoption and have subsequently improved teff yields increasing the marketable surplus. • Government has released improved varieties of teff, such as <i>Quncho</i> teff, which has improved yields and lower seeding rates for farmers. | <ul style="list-style-type: none"> • The current use of post-harvest technologies such as threshers and teff row planters is limited due to financing constraints and a lack of leasing models. • Current sesame seed varieties used by farmers have suboptimal agronomic and market attributes. Improved seed varieties have not been adequately developed across time agro-ecologies, and according to interviewees, only six out of 18 varieties are currently released for growing regions. |

⁸⁵ Woredas are the administrative body and the order for administrative goes in order of Region/State, District, Zone, Woreda, Kebele.

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|---|---|
| Provide extension services beyond agronomics | <ul style="list-style-type: none"> • Ethiopia has one of the strongest farmer to extension officer ratios in the world with an estimated 467 farmers for every Development Agent (DA) which is ~5 times the ratio in Tanzania⁸⁶. • The extension package provided by DAs includes technology packages on major crops and postharvest technologies, including teff and sesame. This provides farmers with some, though limited, high-level post-harvest instructions for the crops. • The MoA has provided direct support to particular cooperatives who are engaged in out-grower schemes with sesame processors. | <ul style="list-style-type: none"> • Based on stakeholder interviews, despite a dense network to provide access to farmers, implementation of post-harvest extension packages has been limited. This is due to a lack of capacity amongst DAs and the lack of user-friendly extension materials. • Training in marketing and value addition is highly limited in the public extension system and is provided through cooperatives who lack technical post-harvest expertise. • According to stakeholders in sesame, the scope of extension services is limited to seeds and agronomy, preventing advancement in mechanized approaches and post-harvest and storage training. |
| Provide transport, energy and other supporting infrastructure to key production areas | <ul style="list-style-type: none"> • Compared to other sub-Saharan African countries, Ethiopia has a relatively dense and well maintained primary road network. • The government is investing heavily in energy generation projects which aim to generate 10,000 MW of capacity by 2018, which will provide a means to increase electricity access for the population. • Since its introduction, the Ethiopian Commodity Exchange (ECX) has setup regional storage hubs to provide storage for traders and cooperatives to stock tradable commodities such as sesame. • USAID/Government of Ethiopia's Feed the Future Program through the Agribusiness and Market Development project are constructing four sesame warehouses with a capacity of 5,000 MT and plan to construct an additional seven maize warehouses of 5,000 MT. The total current and planned warehouse capacity from USAID assistance is 55,000 MT, a major contribution for reducing postharvest losses of select products such as wheat, maize, sesame and chick pea. • A government partner, the World Food Program, is aiming to work with ~1,000 primary cooperatives. This project will build improved storage for cooperatives and seek to promote standards through training and other infrastructure support. | <ul style="list-style-type: none"> • According to IFPRI⁸⁷ and other stakeholders, despite relatively good primary road coverage, the country has poorly connected feeder and secondary roads. This means that many rural areas are still not connected to market opportunities. • Compared to neighboring countries, electricity connectivity remains very low, particularly in rural areas and according to firms interviewed, the high cost of electricity is an impediment to expansion of processing facilities. • Based on discussions with sesame stakeholders, ECX warehouses lack adequate storage infrastructure to meet high-value market requirements. Further, the ECX infrastructure does not support staple crop storage, as they are not included on the exchange. Therefore, most crops do not directly benefit from the ECX market infrastructure. • Limited financial resources at the regional government level to implement local projects has impeded infrastructure development. |

⁸⁶ IFPRI (2010) "In-Depth Assessment of Public Agricultural Extension System of Ethiopia and Recommendations for Improvement"

⁸⁷ IFPRI (2012) "Economic Benefits and Returns to Rural Feeder Roads: Evidence from a Quasi- Experimental Setting in Ethiopia"

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|--|--|
| Improving the regulatory environment to increase private sector investment in target value chains | <ul style="list-style-type: none"> • Reform of the Ethiopian Investment Authority (EIA) is underway to create an institution that becomes an effective one-stop shop for both domestic and international private sector investment. • Tax exemptions on the importation of sesame value addition equipment, such as sesame hulling machines, are provided to investors. Government partners such as USAID also provide up to 75% of total financing for storage and processing centers. This has spurred a number of projects and investments in the value chain. • The Government has also provided tax exemptions for injera (teff) processing equipment. | <ul style="list-style-type: none"> • According to stakeholders, financial regulation hampers investment in the value chain and in particular in post-harvest technologies. Access to finance is a central challenge for private sector development. For sesame and teff, cooperatives are unable to meet farmers' funding needs limiting access to capital and investment in loss reducing efforts. • A coherent transparent agribusiness investment policy to engage domestic and international actors is lacking. Incentives for investment are considered to be ad-hoc and not transparent and obtaining finance still impedes access to equipment. |
| Interventions to stimulate demand for selected crops | <ul style="list-style-type: none"> • The ECX provides a guaranteed market for sesame, with 90% of Ethiopian sesame being exported in raw form through the ECX. This provides significant investment in the sesame value chain. Inclusion of sesame on the ECX has led to increased price information and marketing options for farmers which provides them with an incentive to improve the quantity and quality of their produce. • In response to food security concerns, the government has frequently placed export bans on staple crops, including teff. Given high food prices, challenges of regional importation, and an already large domestic demand for processed and unprocessed teff, the government's strategy of banning raw teff may not necessarily be a bad decision, although traders may disagree. Processed teff (normally in the form of injera) is allowed to be exported incentivizing producers and processors to sell to the growing international market. | <ul style="list-style-type: none"> • Given the challenges in sesame value addition (farmer aggregation, quality control, manufacturing costs, etc.), exporters and sesame investors are more inclined to continue to export the product raw. This does not incentivize value addition which can serve to reduce loss. • There is a lack of transparency on government policies used to stimulate demand. For example, government buying of grain through the Ethiopian Grain Trading Enterprise (EGTE) is not always communicated to private sector players which creates uncertainty and hampers investment. |

GHANA

TABLE 3: OVERVIEW OF RELEVANT STRATEGIES

| Strategy | Objectives relevant to food loss |
|--|--|
| Food and Agriculture Sector Development Policy (FASDEP II) 2011-2015 | <ul style="list-style-type: none"> • Focuses on priority staple crops of maize, cassava, rice, yam and cowpea • Focuses on: Food security and emergency preparedness; Increased growth in incomes; Increased competitiveness and enhanced integration into domestic and international markets; Sustainable management of land and environment; Science and technology applied in food and agriculture development; Improved institutional coordination |
| Medium Term Agriculture Sector Investment Plan (METASIP) / CAADP Investment Plan 2011-2015 | <ul style="list-style-type: none"> • Includes a comprehensive set of activities to reduce post-harvest losses along the value chain, as well as efforts to improve domestic and international marketing |
| G8 New Alliance Cooperation Framework | <ul style="list-style-type: none"> • Aims to attract and mobilize national and international private investment to stimulate and support the agricultural sector |
| Post-Harvest Loss Strategy Under development | <ul style="list-style-type: none"> • Preparation supported by African Union Commission and the Food and Agriculture Organization (FAO) under their joint Postharvest Loss Reduction project • Focus crops are: maize, cassava, yam, rice, pineapple, mangoes, tomatoes and fish |

TABLE 4: ASSESSMENT OF GHANA AGAINST CORE POLICY AREAS

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|---|---|
| <p>Clear leadership and cross-ministry coordination on post-harvest issues</p> | <p>Post-harvest loss reduction sits on the national agenda with a range of positive government-led initiatives and interventions underway:</p> <ul style="list-style-type: none"> • The METASIP has set targets and activities to reduce post-harvest losses along the maize, rice, sorghum, cassava, yam, and fish value chains by 30%, 35%, 20%, 40%, 50% and 30% respectively by 2015. Similarly, postharvest losses of mango, plantain, tomato, pineapple, papaya and citrus are expected to be reduced by between 25% and 50% by 2015. • The Ghana Market and Trade Policy Action Node (supported by AGRA) has commissioned a study on Promoting Investment in Agro-processing, Value Addition and Post-Harvest Facilities as part of broader efforts to support the creation of an enabling environment and incentive system to promote investment in agribusinesses and agro-processing in order to increase value addition and reduce post-harvest losses. • The African Union Commission (AUC) and the FAO under their joint Postharvest Loss Reduction project are currently extending assistance to Ghana to develop a post-harvest loss strategy which includes concrete investment options for the country in the area of postharvest loss reduction. • A USAID Policy project has recently begun to support policy coordination and development in the ministry of agriculture and embedded a Policy Advisor. • In addition, under the G8 New Alliance Framework the government has committed to several policy reforms which can serve to reduce food loss through increased private sector investment. | <ul style="list-style-type: none"> • Although the Agricultural Engineering Services Division includes a post-harvest management unit responsible for providing equipment and machinery to farmers to assist with post production activities it faces severe financial and human resource constraints. • The post-harvest loss strategy is under development but is yet to be accompanied by implementation resources. |
| <p>Information for decision-making</p> | <ul style="list-style-type: none"> • A post-harvest loss baseline survey was undertaken in 2008 to obtain data on the scale of the problem. Ministry staff were also trained in a pilot exercise in 2011 on how to undertake the survey. • IFPRI's Ghana Strategic Support Program (GSSP) currently supports the government to do an annual Ghana Agricultural Production Survey (GAPS). • The mFarms platform is a growing database of agricultural and market information that could be leveraged for information. Similarly, eSoko is another market information service provider that has capabilities in tracking grain prices and volumes around the country | <ul style="list-style-type: none"> • Resource limitations have prevented post-harvest surveys from being repeated in order to provide reliable and up to date information on the scale and location of the problem and instead periodic external evaluations have been proposed. |

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|---|
| Research and development into improved varieties and post-harvest technologies | <ul style="list-style-type: none"> • In order to further promote innovation, parliament passed a national seed law in 2010 (the Plants and Fertilizer Act), which allows for an increased private sector role in producing seeds for a number of grains. Building on this, the New Alliance framework seeks to establish policy that enables the private sector to develop, commercialize, and use improved inputs. This includes developing regulations to implement the new seed law. • Parliament recently passed The Biosafety Act of 2011 (Act 831) to legalize importation and research into GMOs, and trials of <i>Bt</i> cowpea are underway which has the potential to control pest infestation of cowpea by developing pest-resistant varieties. • The four research institutions under the Council for Scientific Research do conduct research to assist in the reduction of postharvest loss. In the area of cassava for example, FRI has produced prototype equipment for small-scale gari processing. | <ul style="list-style-type: none"> • Seed supply is constrained by inadequate production of both breeder and foundation seed. The research centers are responsible for introducing new varieties, but they are under-funded and under-staffed. The new seed law has seen the import of hybrid maize seed but is yet to affect the tomato, cassava and cowpea value chains. • Tomato growers in Ghana are constrained by the absence of a national strategy that provides farmers with a reliable source of appropriate seeds and technical support. The common variety of tomato has a high water content and a short shelf-life resulting in increased losses through physical damage and a lack of processing potential. |
| Provide extension services beyond agronomics | <p>Post-harvest related extension activities have typically focused more on cassava rather than tomato and beans:</p> <ul style="list-style-type: none"> • The ministry's Agriculture Engineering Services Department procures machinery for crop harvesting and processing and makes it available to farmers. • The Roots and Tubers Improvement and Marketing Program (RTIMP) between the government and IFAD has four major components of which two feed directly into post-harvest issues – support to increased commodity chain linkages, and upgrading of small-scale root and tuber processing, business and marketing skills. The RTIMP program has shown success with its Good Practices Centers (GPCs) (hubs which link small-scale producers and processors with buyers, provide technology transfer for processors, and provide business development training). | <ul style="list-style-type: none"> • Extension services are inadequate with a current ratio of approximately 1 officer to 3000 farmers. There is also an embargo on the recruitment of new officers. • Efforts by the government to directly procure and disseminate equipment/machinery have proven to be problematic in implementation, with stakeholders raising concerns about mechanical breakdowns, poor after-sale services, unavailability of spare parts, and political interference in distribution. Government's involvement in the agriculture machinery market also crowds out the private sector. • Ghana's tomato farmers receive little technical support⁸⁸. There are no breeding programs and tomato does not appear to be a crop that receives attention in the agricultural extension system. |

⁸⁸ Robinson & Kolavalli (IFPRI), 2010 "The Case of Tomato in Ghana: Productivity"

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|---|
| <p>Provide transport, energy and other supporting infrastructure to key production areas</p> | <ul style="list-style-type: none"> • The Government has partnered with the World Bank and USAID on the Ghana Commercial Agriculture Project (GCAP). The program focuses on strengthening investment promotion infrastructure, facilitating secure access to land; and securing PPPs and small-holder linkages in the Accra Plain and SADA zone. The GCAP is a new program so success is yet to be measured but it does have a promising matching grants program to address investors' infrastructure binding constraints. • There is also a new IFAD program in partnership with the government that is currently awaiting authorization – the Ghana Agriculture Sector Investment Program (GASIP) that aims to leverage private investments in commercial infrastructure and facilities and finance essential public infrastructure such as farm tracks and access roads. • The African Development Bank has financed projects within the post-harvest value chain including the construction of feeder roads, farm tracks, rice mills, pack houses, warehouses with driers and presently is funding the construction of ten grain warehouses through the Northern Rural Growth Project. | <ul style="list-style-type: none"> • Though Ghana's transport sector is relatively well developed, private sector interviewees highlighted how rural and feeder roads that are important for produce transportation are often in poor operating condition. • Previous efforts by the government to construct warehouses and pack houses have been unsuccessful due to a lack of investment in human resources to allow for the efficient operation of the facilities. • One limitation of the GCAP program with regards to this study's crops of interest (cassava, tomato and bean) is that it only focuses on specific areas and crops in line with USAID Feed the Future program (rice, maize, soybeans). |

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|---|--|
| Improving the regulatory environment to increase private sector investment in target value chains | <ul style="list-style-type: none"> • Ghana’s investment promotion policies do provide for tax rebates for firms in free zones and tax exemption on importation duty of agro-processing equipment. Interviews with private players highlighted how legislation put in place by government to reduce excise on products made with local raw materials has been a large boost. • The Export Development and Agriculture Investment Fund (EDAIF) has recently been expanded to include support to private agribusiness, and AGRA has initiated a review of agri-business policies and contract laws in Ghana. • The Ghana Standards Authority has the mandate to promote metrology, standards and grades and is receiving support from GiZ on transportation standards which is important for reducing losses of perishable crops. • The Standards Authority is also certifying some of the Good Practice Centers (GPCs) which sets standards and protocols with respect to cleanliness, packaging, sanitation, storage for cassava allowing farmers to benefit from higher prices. • The IFAD/Government GASIP aims at providing supplementary financing for scaling up investments in private sector-led value chain development. Specific value chains include cassava, maize, yam, sorghum and fruits and vegetables. • Of particular relevance to the tomato sector, GhanaVeg (an initiative from the Netherlands Embassy) plans to support the vegetable sector through: a Vegetable Business Platform; a Business Opportunities Fund; a R&D Co-Innovation Fund and Consultancy Fund; and a high-level Public-Private Dialogue. | <ul style="list-style-type: none"> • Despite incentives being in place, knowledge of these benefits among firms appears to be low based on a recent survey (<i>draft</i>) on how to improve the agribusiness policy environment in Ghana. • Access to land and finance still remains a key challenge for investments in agribusiness. EDAIF is a source of financing for agro-entrepreneurs but it is yet to be effectively used. • Despite the existence of standards on paper, these are rarely enforced or widely disseminated. Interviewees highlighted the need for stricter standards in place to monitor the production of gari for the local and export markets. • There is also a great deal of chaos and uncertainty created by a lack of standard measurement. In the absence of any weights and measures, traders use this to their advantage to exploit farmers and lots of re-bagging and changing of quantities is done (which can lead to damage and losses of perishables). |
| Direct interventions to stimulate demand | <ul style="list-style-type: none"> • Local content policy has catalyzed oil companies like Tullow to source fruits and vegetables and other produce for their catering locally. This led to a successful relationship with a private catering company sourcing tomatoes directly from farmers. • Although focused on grains (rather than cassava, tomato and beans) the National Buffer Stock Company (NAFCO) was set up to guarantee an assured income to farmers by providing a minimum guaranteed price and to mop up excess staple produce in order to reduce post-harvest losses and protect farm incomes. | <ul style="list-style-type: none"> • NAFCO has suffered huge financial challenges and been unable to invest in sufficient storage facilities to serve its purpose limiting the actual effectiveness of the policy. |

KENYA

TABLE 5: OVERVIEW OF RELEVANT STRATEGIES

| Strategy | Objectives relevant to food loss |
|---|---|
| <p>Agriculture Sector Development Strategy 2010-2020</p> | <p>The ASDS's overall goal is to transform the current subsistence-dominated agriculture into a profitable, commercially oriented and competitive economic activity.</p> <ul style="list-style-type: none"> • Focus on cooperative sub-sector to enhance productivity <ul style="list-style-type: none"> ○ Improving capacity for marketing agricultural inputs and reducing post-harvest losses ○ Promoting value addition: promoting out-grower and contract farming models to partner with agribusiness ○ Promoting and improving internal and external trade |
| <p>Kenya Agribusiness Strategy 2012-2017</p> | <ul style="list-style-type: none"> • Focus on research and development and innovation to better catalyze growth of a vibrant agribusiness sector. <ul style="list-style-type: none"> ○ Build capacity to carry out innovation and research beyond improving agricultural productivity including value addition. ○ Build capacity for research in post-harvest engineering and technology |

TABLE 6: ASSESSMENT OF KENYA AGAINST CORE POLICY AREAS

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|---|---|
| Clear leadership and cross-ministry coordination on post-harvest Issues | <ul style="list-style-type: none"> The Agribusiness Strategy provides a comprehensive framework for government to support the agriculture sector and includes post-harvest technologies as a strategic priority area The Horticulture Policy (2012) also takes note of post-harvest issues and outlines deliberate efforts towards investing in this area (e.g. through infrastructure, agro-processing and packaging technologies) to increase produce shelf life, reduce post-harvest losses | <ul style="list-style-type: none"> According to stakeholders, there is insufficient government attention to post-harvest issues in food security crops, such as maize and beans/pulses with most resources focused on the high-value horticulture sector |
| Information for decision-making | <ul style="list-style-type: none"> Kenya has been the leading country in SSA in experimenting and piloting ICT solutions in agriculture. Kenya Farmers' Helpline and the mFarm initiative are examples of mobile technology to provide farmers with information on agriculture, including post-harvest related issues. | <ul style="list-style-type: none"> Post-harvest losses of key food security crops and high-value crops such as tomato are not regularly measured by the government. Despite relatively high access to ICT, many stakeholders interviewed stressed the lack of consistent and reliable market price information. Despite numerous ICT pilots, bringing services to scale in Kenya has been identified as a major problem. There is a low level of farmer understanding of grain flows and market prices. |
| Research and development into improved varieties and post-harvest technologies | <ul style="list-style-type: none"> The Agribusiness Strategy specifically address research into post-harvest engineering and technologies as well as education/training in these areas The National Agricultural Research System Policy seeks to establish an apex research body (KARO) and to, among other areas, fast-track national adoption of available technologies and knowledge; promote research and development by the private sector and non-state institutions. The AgResults Initiative has recently been rolled out in Kenya targeting farmers in the Rift Valley and Eastern, and seeks to incorporate private sector participation in providing innovative storage facilities to help reduce post-harvest losses. The Horticulture Policy encourages the use of low-cost technologies like charcoal coolers and wet walls in the absence of cold chain facilities | <ul style="list-style-type: none"> According to stakeholders, significantly more research needs to be done on aflatoxin. An increase in rejections of maize due to the moisture content was recently reported.⁸⁹ Farmers affected had to sell to traders at prices up to 33% below the NCPB price and incurred both physical and economic losses. Government needs to develop guidelines and simple scalable technology to deal with problem. The other side of the problem is the need to explore productive uses of already-contaminated maize. |

⁸⁹ Business Daily Africa (6 January 2014) "Farmers hit as NCPB rejects maize"

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|--|--|
| Provide extension services beyond agronomics | <ul style="list-style-type: none"> The long term goal of the Extension Policy (2012) is to have a private sector-led and fully commercialized extension service and from a food loss reducing perspective provides a framework to support farmers from production, value addition, storage, marketing to utilization, with a clear recognition of quality standards. Private agro-dealers are playing an important role in increasing uptake of improved technologies and have the potential to deliver post-harvest information and technology to farmers and farmer groups. The Agribusiness Strategy also seeks to develop tailored business and management skills training for small-scale entrepreneurs, including information on warehouse receipt systems. | <ul style="list-style-type: none"> Based on stakeholder interviews, while private sector provision of services may meet the needs of wealthier, net-surplus farmers, it is less likely to provide access to subsistence producers and therefore will limit impact on post-harvest loss in the absence of government support. |
| Provide transport, energy and other supporting infrastructure to key production areas | <ul style="list-style-type: none"> The National Cereals Board has constructed over 100 storage silos across the country. Development of the cold chain infrastructure has largely been driven by the private sector but importantly complimented by the government's Horticulture Crops Development Authority (HCDA). HCDA operates cold storage facilities at subsidized rates, and also provides subsidized transport services from different areas. The government also recently announced (April 2014) plans to establish 47 maize and horticulture value addition processing plants in different counties which will also help address loss. The Horticulture Policy also proposes community and private initiatives in the construction and maintenance of rural access roads as well as levies charged on horticulture to improve and maintain roads in production areas. | <ul style="list-style-type: none"> Road transportation remains very costly along the value chain – delays and logistics make up the vast majority of identified costs. In addition, the road quality is particularly poor in Western Kenya, a major area of food production. Based on interviews, high cost of electricity still continues to limit further development of the agribusiness value chain. Frequent power outages lead to losses and reduced efficiency in industry operations. Although the NCPB has had success in infrastructure development (storage construction) and building capacity in grain management and handling it has also stifled private sector investment in this area. Ensuring that storage is proximate to farmers is an important factor to alleviate loss. Stakeholders argue that smaller more dispersed 50-100 MT warehouses are preferable to large 1000 MT capacity warehouses. |

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|---|---|
| Improving the regulatory environment to increase private sector investment in target value chains | <ul style="list-style-type: none"> Refrigerated trucks have been exempted from import duties which can alleviate losses of perishables such as tomato. Government led rural finance initiatives, such as the Agricultural Finance Cooperation, and liberalized banking regulations have led to increased agribusiness investment. The government has supported the regulatory framework for increasing rural financial access and commercial banks have responded, rapidly expanding branch operations in rural areas. The government, with the support of the East African Grain Council and others, has introduced a warehouse receipt system that has led to an improvement in the quality of maize and arguably improved post-harvest management practices. The Kenya National Federation of Agricultural Producers (KNFAP) has been effective in promoting private sector interests and advocating open dialogue and discussion around policy and regulatory reform. | <ul style="list-style-type: none"> Government regulation that taxes grain handling equipment such as threshers, cleaners and moisture meters, has led to reduced availability, damaging growth in the sector, particularly among small and medium processors. In 2013, the VAT Act 2013 reduced the list of exempt and zero-rated goods and services According to interviews, unclear and unpredictable trade policy such as arbitrary export bans negatively impacts farmer confidence and limits their investment in inputs. Based on interviews, further refinement and uniformity of grain standards and the related inspection services are needed to increase investment and subsequently reduce post-harvest losses. From 2012, devolution has led to changes in county-level regulation which has made it difficult for agribusiness firms to operate across counties and regions. Collateral mechanisms remain underdeveloped and the warehouse receipt system remains underutilized. |
| Interventions to stimulate demand for selected crops | <ul style="list-style-type: none"> The NCPB procures and stores maize in a Strategic Grain Reserve (SGR) stock to be used for food security. This can absorb farmer surplus during peak production. | <ul style="list-style-type: none"> Although Kenya applies the EAC Customs Union's Common External Tariff (CET) of 50 percent for maize and maize flour⁹⁰ Government has often waived tariffs in situations of supply shortfall. |

⁹⁰ US Government (2013) "Kenya Trade Summary"

MOZAMBIQUE

TABLE 7: OVERVIEW OF RELEVANT STRATEGIES

| Strategy | Objectives relevant to food loss |
|--|--|
| Strategic Plan for the Development of the Agriculture Sector (PEDSA) 2010-2019 | <ul style="list-style-type: none"> • Reinforces research capacity to adapt and make technologies available and develop modern agricultural practices <ul style="list-style-type: none"> ○ Prioritizes focused investment in agricultural productivity in terms of improved seeds and disease control as well as improved post-harvest techniques ○ Gives priority to research on post-harvest technologies |
| National Plan for Investment in Agriculture (PNISA) 2013-2017 | <ul style="list-style-type: none"> • Investment plan for implementation of PEDSA to orient agriculture public investments in line with CAADP process and goals • Market access component include: <ul style="list-style-type: none"> ○ Building silos and warehouses ○ Reducing post-harvest losses through farmer trainings, including against pests and disease |
| Plan for Integrated Agricultural Commercialization (PICA) 2013-2020 | <ul style="list-style-type: none"> • Silos and storage construction • Establish commodities exchange, including: <ul style="list-style-type: none"> ○ Operationalize a warehouse receipt system ○ Manage a quality control system ○ Build, rehabilitate and manage public silos ○ Rehabilitate and maintain the road network |

TABLE 8: ASSESSMENT OF MOZAMBIQUE AGAINST CORE POLICY AREAS

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|--|--|
| <p>Clear leadership and cross-ministry coordination on post-harvest issues</p> | <ul style="list-style-type: none"> • PEDSA provides a framework for government to support the agriculture sector and includes post-harvest loss objectives. This framework is also aligned to a CAADP investment plan. Mozambique has also committed to the G8 New Alliance Cooperation Framework which channels support to support investment in agriculture value chains and markets. • Leadership and strategic direction on narrowly defined projects such as the Beira Corridor provides a good starting point for improving coordination in particular agriculture value chains. | <ul style="list-style-type: none"> • Within value chain development post-harvest losses are not a high-level policy priority. According to stakeholder interviews, despite being developed, the cassava sub-sector strategy (2008 – 2012) was not implemented. Sesame and groundnut do not have sub-sector strategies, leading to scattered investments and policy efforts in these value chains. |
| <p>Information for decision-making</p> | <ul style="list-style-type: none"> • According to interviews, the Swiss Development Agency is currently supporting IIAM efforts to measure post-harvest losses. | <ul style="list-style-type: none"> • Mozambique’s public institutions have limited capacity to collect, process and analyze agricultural data. The National Institute of Statistics (INE) works with MINAG to develop agriculture surveys, however, basic agricultural statistics on production, area planted and yield are not collected on a yearly basis and therefore data availability is very low with concerns over quality. |
| <p>Research and development into improved varieties and post-harvest technologies</p> | <ul style="list-style-type: none"> • IIAM has led seed breeding and certification improvements through the seed regulatory framework. This resulted in cassava varieties that are not susceptible to brown streak disease and mosaic virus. Groundnut and beans varieties are at an earlier stage of development. • Standards for seed have been harmonized with those in Southern African Development Community (SADC), potentially facilitating future export of crops to SADC countries. • Government, in partnership with WFP among others, is piloting technologies such as “Gorongosa” silos made with local and sustainable materials. This has potential to provide smallholder farmers with appropriate storage capacity at scale. | <ul style="list-style-type: none"> • Despite assistance from AGRA to develop a seed regulatory framework, there are challenges to ensure widespread release of certified varieties that can be accessed by smallholder farmers. Within research stations, there is inadequate production of breeder and foundation seed⁹¹ and the certified seed is reported to be as much as five times the cost of grain which makes adoption prohibitive for smallholder farmers. Certification was also identified as too time consuming and bureaucratic by the private sector. • Sesame seed is currently not supported by the research system and therefore lacks any varietal development. • Research and development of post-harvest technology is limited to small project trials with very little dissemination. • According to stakeholders interviewed, farmers do not trust the ‘Gorongosa’ technology, with an insufficient number of trained local artisans to scale-up production. In addition, for many farmers and farmer organizations the cost is currently prohibitive at approximately \$100 per silo. |

⁹¹ Analysis by the World Bank provides indicative examples of the challenges faced in the selected crops – the current supply of maize and rice certified seed would only cover 5.7% and 10.7% of the crops planted area. World Bank (2012) “Agribusiness Indicators: Mozambique”

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|---|---|
| Provide extension services beyond agronomics | <ul style="list-style-type: none"> The National Agrarian Extension Program (PRONEA) was revised in 2012 to provide a more comprehensive approach to supporting farmers in post-harvest management. | <ul style="list-style-type: none"> Based on stakeholder interviews, the extension network is extremely sparse in rural areas, with one extension officer per district. IFPRI⁹² data for example reveals that only around 8% of farmers in 2008 had access to farm extension services. No post-harvest training or guidance for staple crops is provided to farmers. For cash crops, such as sesame and groundnut, limited support from agro-processors is provided to a small number of farmers involved in direct sourcing. These include Sab Miller and DADTCO for cassava, and Export Trading Group and Olam for other crops. |
| Provide transport, energy and other supporting infrastructure to key production areas | <ul style="list-style-type: none"> Government has invested in metallic silos for grain across the country. According to interviewees, there are reported to be more than 40 silos with an overall capacity of 40,000 MT. | <ul style="list-style-type: none"> There are major infrastructure challenges especially with regards to roads and the high cost of transport.⁹³ Furthermore, approximately only 1% of rural households have access to electricity. According to interviews, many of the grain silos are not strategically located and lie empty with the Ministry of Industry and Commerce struggling to manage them. |

⁹² IFPRI (2013), "Why did Mozambique's Public Extension Halt the Implementation of the National Agrarian Extension Program (PRONEA)?"

⁹³ Mozambique has the lowest density road network in Southern Africa, around 18% of the 30,000 km of roads are paved, only 50% of the road network is deemed to be in good or fair condition and in the rural areas roads are not normally passable during the rainy season according to analysis by AfDB (2008), "Continental Program on Post-Harvest Losses Reduction: Rapid Needs Assessment for Mozambique".

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|--|--|
| Improving the regulatory environment to increase private sector investment in target value chains | <ul style="list-style-type: none"> The government has sought to provide incentives for agribusiness, such as tax breaks for energy use in agriculture processing, a corporate income tax rate reduction and exemption of duties and VAT on designated equipment. | <ul style="list-style-type: none"> Sudden and non-transparent foreign exchange controls have discouraged investments in the agriculture sector. Private firms are weary of the government intervening without warning or consultation. There is a lack of coherent and transparent agribusiness investment policy to engage domestic and international actors. Incentives for investment are considered to be ad-hoc and not transparent. Based on interviews, the National Institute of Norms and Quality (INNOQ) does not have sufficient capacity to enforce crops quality standards. Access to credit is particularly challenging and is a key driver of the lack of domestic investment in commercial agriculture. Despite efforts by actors such as AGRA and IKURU, warehouse receipt systems and inventory credit systems are not utilized by farmers and banks in Mozambique. More specifically, the legal and regulatory framework is underdeveloped with banks currently not accepting warehouse receipts as collateral. |
| Interventions to stimulate demand for selected crops | <ul style="list-style-type: none"> Government has importantly identified the need to build markets with the private sector and is seeking to build a commodity exchange. The government has partnered with the private sector in the Beira Corridor Project to build demand for smallholder agriculture produce. | <ul style="list-style-type: none"> Lack of market-friendly infrastructure such as market price information systems and connecting transport infrastructure will make it challenging to successfully implement a commodity exchange. |

NIGERIA

TABLE 9: OVERVIEW OF RELEVANT STRATEGIES

| Strategy | Objectives relevant to food loss |
|---|--|
| Agricultural Transformation Agenda (ATA) 2012 | <ul style="list-style-type: none"> • Reorients Nigerian agriculture from a development project to a business sector, with a value chain approach • Seeks to add 20m tons to domestic food supply by 2015 and add 3.5m jobs • Drives import substitution by accelerating local staples production |
| National Food Security Program 2008 | <ul style="list-style-type: none"> • Includes training on post-harvest loss reduction methods, such as processing • Establishes Agricultural Commodity Exchange Market (ACCOMEX) • Implements Maximizing Agricultural Revenue in Key Enterprises (MARKETS) programs |
| Cassava Transformation Action Plan 2012 | <ul style="list-style-type: none"> • Trains fabricators on agro-processing machine production • Trains farmers on production and processing methods • Establishes flour and sweetener processing factories • Distributes improved varieties of stems to farmers • Establishes Market and Trade Development Corporation (CMTDC) • Mandates up to 40% HCQF substitution for wheat flour in bread and 10% ethanol in gasoline |
| Horticulture Transformation Tomato Value Chain Implementation Action Plan 2012-2015 | <ul style="list-style-type: none"> • Launches the tomato subsector as source of farmer wealth, job creation and improved standards of living • Drives recommended varieties and farmer clustering to improve production, processing for value addition, storage and marketing. • Encourages private investment in processing plants, to reduce losses to 5% by 2015, reduce paste imports to zero, and promote adoption of improved technologies. |

TABLE 10: ASSESSMENT OF NIGERIA AGAINST CORE POLICY AREAS

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|--|
| Clear leadership and cross-ministry coordination on post-harvest Issues | <ul style="list-style-type: none"> Post-harvest loss is recognized as a challenge in the agriculture sector strategy (Agricultural Transformation Agenda (ATA)) which is a positive step towards high-level prioritization and federal government leadership on the issue. | <ul style="list-style-type: none"> Efforts to reduce loss in individual state/local governments or government departments lack the efficiency gains and synergies of harmonized efforts and the value chain approach pursued by government is hampered by gaps and overlaps in responsibility and implementation. |
| Information for decision-making | <ul style="list-style-type: none"> Some baseline estimates on general loss figures is a first step towards effective data gathering on loss levels, but there is scope for improved information management to support decision making | <ul style="list-style-type: none"> Without a systematic post-harvest loss survey, accurate data cannot be established to effectively track progress and impact of interventions. |
| Research and development into improved varieties and post-harvest technologies | <ul style="list-style-type: none"> Under the Cassava Transformation Action Plan, 1,557 Ha of certified seed farms have been contracted to different research agencies (the Root and Tuber Extensions Program (RTEP), International Institute of Tropical Agriculture (IITA), and National Root Crop Research Institute (NRCRI)) to produce stem of improved high-yielding and disease resistant cassava varieties for distribution to farmers. | <ul style="list-style-type: none"> Dissemination of research is problematic. There is no consistent coordination among research institution actors (project specific) and limited interaction with extension agents and farmers. This greatly reduces the potential impact of research and development activities. |
| Provide extension services beyond agronomics | <ul style="list-style-type: none"> An Agriculture Extension Transformation Agenda - establishing a Federal Department of Agricultural Extension has been developed and is focused on: reviewing current extension policies, recommending institutional structures and extension systems to strengthen and rationalize extension services. There is a strong prioritization of extension in the agriculture sector strategy of the National Economic Empowerment and Development Strategy (NEEDS), though practical implementation details not elaborated upon. | <ul style="list-style-type: none"> Extension delivery is hampered by limited reach and resources. Local Government Authorities need increased state funding/federal support – ATA lays the policy groundwork for this, but practical implementation must be refined. Interviews cited poor farmer post-harvest techniques as a priority intervention area, as well as fragmented government efforts The ATA also identifies the top-down, supply-driven extension system as a constraint in terms of management challenges and inadequate and untimely release of funds as pressing functional inefficiencies. |

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|--|--|
| Provide transport, energy and other supporting infrastructure to key production areas | <ul style="list-style-type: none"> Under NEEDS, reforms in the transport sector aim to complete the 3,000 km network of roads and strengthen the Roads Maintenance Agency which oversees the repair and rehabilitation of some 500 roads. The government aims to develop the country's sea ports to handle modern shipping activities, and upgrade the railways to support several sectors of the economy, including agriculture. | <ul style="list-style-type: none"> Poor roads and high cost of energy hamper transport and processing activities, while transport systems themselves e.g. informal hiring of old trucks and poor packing methods are a major source of onion and tomato loss, necessitating market enabling reforms and/or regulations and standards to ensure a well-functioning private transport market. |
| Improving the regulatory environment to increase private sector investment in target value chains | <p>Incentives to promote private investment in the agriculture sector include:</p> <ul style="list-style-type: none"> Zero duty on agricultural machinery and equipment imports Removal of restrictions on areas of investment and maximum equity ownership in investment by foreign investors Tax holidays for investors putting processing plants in staple crop processing zones Duty waivers and other industry related incentives e.g., based on use of local raw materials, export orientation etc. The Nigeria Incentive-Based Risk-Sharing System for Agricultural Lending (NIRSAL) provides a credit guarantee to finance a range of cassava processing equipment. | <ul style="list-style-type: none"> Despite the positive incentives, agro-processing efforts have been hampered by ad hoc implementation of tax breaks, as well as challenges around sourcing of raw produce Stakeholder interviews indicate that: 60-70% of agricultural loans are currently secured / backed by government, so banks have no incentive to expand available credit without a government guarantee. |

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|--|
| Interventions to stimulate demand for selected crops | <ul style="list-style-type: none"> • Domestic content policies include a requirement for 10-40% HQCF in flour and 10% ethanol in petrol, and import duties have been raised on alternatives to local commodities. • For tomato – special processing zones are under development - to attract the private sector to set up processing plants in zones of high food production enabled by appropriate fiscal, investment and infrastructure incentives.⁹⁴ • The ministry of agriculture is also developing marketing corporations for major crops (government-supported boards to stabilize prices received by farmers). | <ul style="list-style-type: none"> • The National Association of Nigerian Traders (NANTS) has conducted a survey of the experience and challenges faced in the Nigerian government’s cassava blending program. The NANTS report⁹⁵ identified key challenges in the implementation of the cassava blending program which include: shortage of cassava for industrial use (80% of cassava is used for direct consumption) and technical difficulties in ensuring the required quality of cassava flour. • A recent press report⁹⁶ also suggests that the Nigerian government may be planning to abandon its cassava blending policy, following repeated delays in expanding processing capacity for high-quality cassava flour in line with the government targets as well as the impact on the profitability of many of the wheat importers and processors in the country. • There is no crop specific policy for onion, where huge losses warrant action, and it may be difficult to draw attention to this value chain ahead of more significant (in volume and/or annual trade value) major volume commodities, seven of which have a specific transformation plan. |

⁹⁴ FMARD Website, SPCZ page, accessed May 2014

⁹⁵ Agritrade (24 February 2014) “Nigerian traders survey the challenges involved in the cassava bread initiative”

⁹⁶ This Day (1 April 2014) “Nigeria: [Federal Government] abandons cassava, wheat composite flour policy”

SENEGAL

TABLE 11: OVERVIEW OF SENEGAL STRATEGY LANDSCAPE

| Strategy | Objectives relevant to food loss |
|--|---|
| <p>National Economic and Social Development Strategy (SNDES) 2013-2017</p> | <ul style="list-style-type: none"> • Overarching strategy for the country with the main goals to accelerate economic growth and productivity, aligned with international commitments and MDGs. • Annual GDP growth rate of 6.8% and 500,000 jobs created over period from 2013 to 2017 • Accelerated Growth Strategy (AGS) pillar emphasizes local clustering and value chain approach to nationally/internationally competitive products. |
| <p>National Agriculture Development Program (LOASP) (2004)</p> | <ul style="list-style-type: none"> • LOASP provides legal framework for development of sector. Objectives includes: <ul style="list-style-type: none"> ○ The reduction of the impact of climatic, economic, environmental and health risks, through better water resource management, product diversification the training of rural communities; all this being aimed at improving food security, and in the long run, achieving national food self-sufficiency ○ The improvement of the incomes and living standards of the rural population, and the establishment of social safety nets. ○ The improvement of the quality of life in rural areas, particularly through access to public infrastructure and services, and through appropriate land use and planning ○ Environmental protection and sustainable management of natural resources through soil fertility improvement know-how ○ The establishment of an incentive system for private sector investment in agriculture and in rural areas ○ Improvement of the environment and quality of production to enable agriculture become the engine of industrial and artisanal development, and to better meet the needs of the domestic and foreign markets (sub-regional, regional and international) |
| <p>National Agricultural Investment Program (NAIP/PNIA) / CAADP Investment Plan (2011-2015)</p> | <ul style="list-style-type: none"> • Reduce climatic risks through better water resource management • Preserve and sustainably manage natural resources • Increase the production and the productivity of inputs • Enhance the value of agricultural products through further processing • Improve market access for agricultural products • Strengthen research for the generation and transfer of new technologies in production, processing and marketing • Significantly reinforce the capacity of various stakeholders • Ensure efficient direction and coordination of the IP implementation |

TABLE 12: ASSESSMENT OF SENEGAL AGAINST CORE POLICY AREAS

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|---|
| Clear leadership and cross-ministry coordination on post-harvest Issues | <ul style="list-style-type: none"> The National Agriculture Investment Program provides a framework for government to support the agriculture sector and includes post-harvest loss related objectives The government has also committed to the G8 Alliance Cooperation Framework which aims to attract and mobilize national and international private investment to stimulate and support the agriculture sector. A tangential positive effect on loss levels is anticipated, but the Framework does not prioritize post-harvest loss as an issue. | <ul style="list-style-type: none"> There is currently no specific post-harvest loss strategy in the government’s agricultural policy. Given the current emphasis on the agricultural sector as a development priority, the level of donor support, and pace of reforms, there is scope for advocating the prioritization of food loss as a high-level issue. |
| Information for decision-making | <ul style="list-style-type: none"> The Ministry of Agriculture periodically monitors production, processing and marketing of priority crops like groundnuts in conjunction with private actors and crop associations, suggesting potential to house post-harvest loss data gathering within the same networks and processes | <ul style="list-style-type: none"> Based on stakeholder interviews, at the research level very little has been developed in terms of specific post-harvest loss surveys and analysis hampering the direction and measurement of potential interventions. |
| Research and development into improved varieties and post-harvest technologies | <ul style="list-style-type: none"> The World Bank funded Agricultural Services and Producer Organizations Program (PSAOP) established the National Agricultural Research Fund which supports the Senegalese Agriculture Research Institute (ISRA) and the Food Technology Institute (ITA)⁹⁷ Within ITA: 17 new technologies have been developed and demonstrated to users; 50 training modules benefiting almost 700 private entrepreneurs were organized to demonstrate innovative technologies in the field of post-harvest operations for fruit and vegetables.⁹⁸ | <ul style="list-style-type: none"> Although the government strictly controls new seed varieties released in Senegal in reality, unapproved or banned seed enters Senegal illegally, and some critics say that government enforcement of laws is too weak.⁹⁹ |

⁹⁷ World Bank PSAOP Implementation Completion Report

⁹⁸ World Bank PSAOP Implementation Completion Report

⁹⁹ Stads et al (2011) “Private-Sector Agricultural Research and Innovation in Senegal”, CGIAR

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|---|---|
| Provide extension services beyond agronomics | <ul style="list-style-type: none"> Under the PSAOP, traditional public agricultural extension services, based on the training and visit model, were replaced by demand-driven, client-oriented agricultural advisory services, covering more than 50,000 rural producers. These services have also extended their scope to cover not only production but also agricultural inputs, market access and organization of producers.¹⁰⁰ Producer organization projects reaching 62,000 farmers included post-harvest techniques in their programs.¹⁰¹ | <ul style="list-style-type: none"> Despite progress in the provision and scope of extension services, post-harvest management is still not a discrete and prioritized element of the extension curriculum consistently disseminated across producers. |
| Provide transport, energy and other supporting infrastructure to key production areas | <ul style="list-style-type: none"> Over the last decade, the government has invested significantly in the Senegal River Valley. Development of the area was supported by government policies aimed at enhancing road infrastructure, packaging and logistics and hydraulic facilities, and development of specialized post-harvest storage and logistics infrastructure. A modern agro processing facility, the 'Agropole' was constructed in 2007 and is equipped with storage and cold-chain chambers, and packaging facilities. To reach the objective of 60% rural electrification by 2016, a three-year priority rural electrification program (2014-2016) is currently being prepared. In partnership with the World Bank, the Senegal Sustainable and Inclusive Agribusiness Development Project (SSIAP) aims to develop inclusive commercial agriculture and sustainable land management through investments in infrastructure (irrigation in particular) which can address drought driven loss. | <ul style="list-style-type: none"> While the government has been implementing an ambitious program of infrastructure building and rehabilitation. Some perceive it as excessive given the decreases in the health and education sectors which have occurred as a trade-off.¹⁰² Government focus has been on high-value export crops rather than cassava, and it has singled out the horticulture and rice value chains in the Saint Louis/Senegal River region as priority investment areas. |

¹⁰⁰ OECD Senegal brief: Making Better Use of Agribusiness Potential

¹⁰¹ World Bank PSAOP II Project Appraisal Document

¹⁰² USAID Senegal Country Development Strategy 2012-2016

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|---|---|
| Improving the regulatory environment to increase private sector investment in target value chains | <ul style="list-style-type: none"> Senegal’s Investment Code gives agriculture investors a range of exonerations.¹⁰³ Under its G8 New Alliance commitment, the Government of Senegal intends to improve and accelerate reforms to encourage the private sector to invest in the agricultural sector, especially by: (i) taking steps to facilitate access to land and its productive use, (ii) implementing national seed regulations that encourage greater private-sector involvement, and (iii) focusing on participation by all stakeholders in the development of policies.¹⁰⁴ | <ul style="list-style-type: none"> Decree 99-259 regulates quality control of horticulture products and this has been weakly enforced. According to stakeholders interviewed, this has led to significant losses, discards and rejects. |
| Interventions to stimulate demand for selected crops | <ul style="list-style-type: none"> The State supports the National Tomato Forum (CNCFT) and Groundnut Committee (CNIA) which are marketing bodies that have influence on value chain incentives – for instance the CNIA fixes the groundnut price to favor farmers, but also reduces processor margins due to declining world prices of groundnut oil. Although onion is not a focus crop for Senegal in this study, it is worth noting that the government has implemented seasonal import restrictions, linked import license allocations to the promotion of local production and supported these actions by investment in post-harvest infrastructure, with the building of a major storage and conservation warehouse in Dagana Region, with support from the EU. This allows producers to store their production (reducing waste) and sell it during the low season (increasing incomes).¹⁰⁵ | <ul style="list-style-type: none"> Interviews indicated that a leading cause of post-harvest losses was that there is a lack of proper coordination between the needs/orders of industrial processors and farmers. The demand/supply dynamic is thus disrupted. It is too early to comprehensively assess the impact of recent government efforts to address this. |

¹⁰³ APIX (2006) “Senegal Investment Code”

¹⁰⁴ New Alliance For Food Security and Nutrition – Senegal Cooperation Framework

¹⁰⁵ Agence de Presse Sénégalaise (5 February 2013) “*Senegal : Gel des importations d’oignons du 10 février au 31 août*”

TANZANIA

TABLE 13: OVERVIEW OF RELEVANT STRATEGIES

| Strategy | Objectives relevant to food loss |
|---|---|
| Kilimo Kwanza 2009 | <ul style="list-style-type: none"> • A national vision to accelerate agricultural transformation • Focus on modernizing and commercializing agriculture |
| Agriculture Sector Development Strategy 2001 | <ul style="list-style-type: none"> • Strengthening the agriculture investment framework • Creating a favorable environment for commercial activities • Clarifying public and private sector roles in improving support services • Developing input and output markets • Mainstreaming planning for agricultural development in other sectors |
| Tanzania Agriculture and Food Security Investment Plan (TAFSIP) 2011/12-2020/21 | <ul style="list-style-type: none"> • Ten year investment plan (in line with CAADP) with an overall objective to ‘rationalize allocation of resources to achieve annual 6 percent agricultural GDP growth, consistent with national objectives to reduce rural poverty and improve household food and nutrition security’ |
| National Agriculture Policy 2013 | <ul style="list-style-type: none"> • Strengthen agricultural support and technical services (research, mechanization, irrigation, extension and training) • Improve agricultural processing with a view to add value to agricultural produce and create jobs • Enhance production of quality products in order to improve competitiveness of agricultural products in the domestic, regional and international markets |
| Agriculture Marketing Policy 2008 | <ul style="list-style-type: none"> • Facilitate strategic marketing of agricultural products that ensures fair returns to all stakeholders based on a competitive, efficient and equitable marketing system. • Focus areas are value addition, standards adherence, promoting investment in infrastructure and agri-business |

TABLE 14: ASSESSMENT OF TANZANIA AGAINST CORE POLICY AREAS

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|--|
| <p>Clear leadership and cross-ministry coordination on post-harvest Issues</p> | <ul style="list-style-type: none"> A cross-sector coordinating unit mandated to address loss issues is a useful enabler in the core policy requirements for addressing loss. Tanzania has the benefit of a suitably aligned and resourced independent delivery unit that is well placed to assume this role. The recently established Agriculture Delivery Division within the Presidential Delivery Bureau, will act as a central working group to support the delivery and coordination of agriculture issues and reports, and there is conceivable scope for post-harvest losses to be prioritized as part of its mission. | <ul style="list-style-type: none"> Post-harvest losses are only tangentially mentioned in the agriculture sector strategy. The cognizance of scale and causes of losses in the National Agriculture Policy and the existence of strong political will to ensure food security does however provide a solid basis for advocacy towards a concerted response. According to TM-PAN, Tanzania currently lacks a PHL-specific policy or cross-sector strategic document that drives solutions to post-harvest issues across state agencies and partners.¹⁰⁶ A major consideration in formulation of such a policy is that strategies must be backed by sufficient resources and effective implementation plans in order to succeed in reducing losses. |
| <p>Information for decision-making</p> | <ul style="list-style-type: none"> Tanzania has begun the process of monitoring agricultural interventions by government, private and donor funders and implementers, through the development of a Portfolio Mapping Tool (PMT) by the ADD. The PMT serves a foundation on top of which an effective post-harvest loss evaluation system can be built. | <ul style="list-style-type: none"> There is currently no ongoing measurement or systematic survey of postharvest losses; effective data gathering must be prioritized in order to inform strategies and interventions going forward. Further, according to stakeholder interviews, official crop measurement statistics on crop availability do not take account of quality and quantity of crops held by informal traders and middlemen, distorting shortage/surplus responses. This gap serves as an entry point for advocating market formalization (e.g. designated marketplaces) for improved data gathering. |

¹⁰⁶ Tanzania Markets Policy Action Node (2013) “Post-Harvest Losses in Tanzania: Challenges and Options for Mitigation”

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|--|
| Research and development into improved varieties and post-harvest technologies | <ul style="list-style-type: none"> Tanzania has a Seed Law (2003) that is pro-private sector participation, removing restrictions to developing new varieties from foundation seeds. The Five Year Development Plan prioritizes research into improved varieties and mechanized production technologies, earmarking Tsh27bn and Tsh345bn into these activities respectively from 2011 - 2016¹⁰⁷ | <ul style="list-style-type: none"> Despite the liberalized environment post – 2003 Seeds Act encouraging private commercial seed production (75% growth in metric tons available between 2008 and 2012), improved seed adoption remains low (27% of cropped area for maize) due to remaining policy hurdles around securing public foundation seeds and certifying new varieties (delays of up to three years)¹⁰⁸. Additional policy reform is needed to remove these administrative constraints, as insufficient availability of improved seed varieties and research in the country¹⁰⁹ contributes to crop losses. There is inadequate public and private investment in agriculture training, research and extension. The government has agreed to allocate 1% of the national agriculture budget for R&D but currently only 0.3% of the sector’s budget is allocated to R&D) limiting its impact. |
| Provide extension services beyond agronomics | <ul style="list-style-type: none"> Government has earmarked a total of just over Tsh100bn under the Five Year Development Plan to infrastructure and equipment for extension services, building capacity of extension officers and mobilizing private extension services. Outgrower and contract farming arrangements fill some of the gaps in public extensions services provision. Agri-businesses provide part funding (ratio agreed with extension office), curricula, methods, and demonstrations to extension officers to support famers in their groups. These agri-businesses report an emphasis on post-harvest loss reduction in the curricula they disseminate. | <ul style="list-style-type: none"> Based on stakeholder interviews, implementation of post-harvest training in extension packages has been limited. This is due to over-stretched extension officer network (a ratio of 1 development agent to 2500 farmers)¹¹⁰ and under-resourcing of extension agents – funding, transport etc. |

¹⁰⁷ Tanzania National Five Year Development Plan, 2011-2016

¹⁰⁸ World Bank (2012) “Tanzania Agribusiness Indicators”

¹⁰⁹ National Horticulture Development Plan; Dalberg Interviews

¹¹⁰ Davis et. Al (2010) “In-Depth Assessment of the Public Agricultural Extension System of Ethiopia and Recommendations for Improvement”, IFPRI

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|--|--|---|
| Provide transport, energy and other supporting infrastructure to key production areas | <ul style="list-style-type: none"> • Transport regulation is fairly light, with no government intervention in prices, VAT exemption on heavy truck imports, and relatively quick registration and licensing processes, providing a good outlook for private entrepreneurs to serve farmers as infrastructure quality allows. • Government is currently implementing (2011-2016) the Marketing Infrastructure Value Addition and Rural Finance Program (MIVARFP) - funded by AfDB, IFAD and AGRA – including construction of 70 market/storage facilities (36 markets, 25 with cold-storage, two ice plants and 32 warehouses) and 1550 km of feeder roads upgraded to all-weather condition¹¹¹ | <ul style="list-style-type: none"> • The country is challenged by extremely poor rural road networks. Rural Access Index GIS data plots only 24% of people living within 2km of a road. More than 50% of the road sector budget is financed by external donors, and directed largely towards national (trunk and regional) roads. Financing for local roads seems to get much less attention with less than 1% of the total budget allocated for 2011/12¹¹² • Based on discussions with stakeholders, existing government warehouses are in states of serious disrepair, and larger warehouses are needed to meet high-value market requirements. |
| Improving the regulatory environment to increase private sector investment in target value chains | <ul style="list-style-type: none"> • The government convened SAGCOT (Southern Agricultural Growth Corridor of Tanzania) to boost agricultural output through public and private investment, in accordance with the Kilimo Kwanza (Agriculture First) initiative. • On paper, there is a policy framework covering standards, weights and measures. Relevant legislation includes the Standards Act, and the Weights and Measures Act,¹¹³ and the Tanzania Markets Policy Action Node (TM-PAN) has been supporting efforts in this area. • As a designated priority sector under Tanzania’s investment code, agriculture draws zero duty rates and VAT relief or exemption on all capital goods, agricultural machinery/equipment, fertilizers and pesticides and farm implements and inputs.¹¹⁴ | <ul style="list-style-type: none"> • In response to food security threats precipitated by poor weather, anticipated poor harvests or other unfavorable conditions, the Government has often used bans of cross-border trade in staple foods as a policy tool. These bans actually lead to increased price volatility, causing uncertainties in the value chain.¹¹⁵ This dissuades farmers and other private sector actors to make long term investments in agricultural production, storage, warehousing and transport • According to stakeholders, access to finance is a central challenge to investment in the value chain and in particular in post-harvest technologies • Regulatory environment gaps identified by TM-PAN include the lack of self-regulatory mechanisms for use of standards, weights and measures and insufficient market infrastructure close to smallholder farmers. This is exacerbated by organizations such as the Weights and Measure agency (WMA), Tanzania Food and Drugs Authority (TFDA) and the Tanzania Bureau of Standards (TBS) which have regulatory oversight for weights, quality and measures but are allocated inadequate resources and generally lack capacity to deliver required services as prescribed in their respective Acts. |

¹¹¹ MIVARFP Appraisal Report

¹¹² World Bank (2012) "Tanzania Agribusiness Indicators"

¹¹³ Tanzania Markets Policy Action Node (2013) "Assessment of Adherence to Recommended Weights and Measures in Grain Value Chain and Implications on Transaction Costs"

¹¹⁴ Tanzania Investment Centre: Investment Guide 2013-14

¹¹⁵ Tanzania Markets Policy Action Node (2013) "Impact of tariff and non-tariff trade barriers for staple foods on the livelihood of small scale farmers"

| Policy area | Strengths and leverage points of policy framework | Limitations and implementation challenges |
|---|--|--|
| Interventions to stimulate demand for selected crops | <ul style="list-style-type: none"> The National Food Reserve Agency (NFRA) was formed from the Strategic Grain Reserve (SGR) with the aim of maintaining a national optimal level of food reserves to address local food shortages and to buy produce from farmers at a fair price during peak harvest times. If properly managed it has potential to support farmers through acting as a buyer of last resort and reduce loss. | <ul style="list-style-type: none"> NFRA has not been able to stabilize prices nor play its role as buyer of last resort because of bureaucratic procedures, political interference, underutilization of capacity, and chronic inefficiency.¹¹⁶ |

¹¹⁶ Ibid.

Annex 2. Stakeholder list

| Country | Institution | Name | Role |
|---------|---|--|---|
| Ghana | USAID | Jorge Oliveira Candace Buzzard Alfred Osei | Regional Food Security Advisor Regional Agriculture Director Project Management Specialist- Agriculture (Ghana) |
| Ghana | GIZ | Uwe Ohmstedt | Deputy Team Leader & Marketing |
| Ghana | International Fund for Agricultural Development (IFAD) | Theophilus Otchere Larbi | Country Programme Officer |
| Ghana | Peasant Farmers Association of Ghana | Charles Nyaaba | Programme Officer |
| Ghana | Ministry of Food and Agriculture -- Policy Planning and Monitoring Directorate | Angela Danson and Lena Otoo | Deputy Director and Director |
| Ghana | Ghana Commercial Agriculture Program | Ram Bhavnani Ben Johnson | Technical Advisor Financial Management Specialist |
| Ghana | Ministry of Food and Agriculture -- Agricultural Engineering Services Directorate | Emmanuel O. Oppong AKB Deyang Johnson Panni | Deputy Director Senior Agricultural Officer Post Harvest Officer |
| Ghana | Parliament of Ghana | Hon Dr. Sagre Bambang | MP; Member, Select Committee on Food, Agriculture, and Cocoa Affairs |
| Ghana | Parliament of Ghana | Dr. Owusu Afriyie Akoto | MP; Ranking Member, Select Committee on Food, Agriculture, and Cocoa Affairs |
| Ghana | IFDC | Arno Maatman | Project Leader, 2SCALE |
| Ghana | International Food Policy Research Institute (IFPRI) | Shashi Kolavalli | Senior Research Fellow and Leader of the Ghana Strategy Support Program in the Development Strategy and Governance Division |
| Ghana | Accra Brewery Limited (SABMiller) | Richard Edzeame | Supply Chain Director |
| Ghana | Dutch Agricultural Development and Trading Company (DADTCO) | Kodwo Osei Sarfoh (and Farmers) | Supply Chain Manager |
| Ghana | Global Sourcing and Supply (GSS) | Colin Mason | Country Manager |

| Country | Institution | Name | Role |
|------------|---|-----------------------------------|---|
| Ghana | iDE Ghana (partner of GSS) | Laurin Banner | Country Director |
| Ghana | Melcom | Mahesh Malwani | Joint Group MD |
| Ghana | TEPCO - Techiman Tomato Processing Factory | Will Ofori | MD/CEO |
| Ghana | ETG - ETC Commodities | Mohammad Shanawaz | Finance Manager |
| Ghana | AGRA | Abdou Matieyedou Konlambigue | Programme Officer, Market Access Program |
| Senegal | TAKAMUL Food S.A | Mohamed LO | General Manager |
| Senegal | ITA (Institut de Technologie Alimentaire) | Dr Ababacar Sadikh Ndoye | Director |
| Senegal | SOCAS | Yvan Barry | Operations Director |
| Senegal | PDMAS (Programme de Développement des Marchés Agricoles du Sénégal) | Ndeye Coura Mbaye Diop | Monitoring & Evaluation expert |
| Senegal | Centre de Développement Horticole-ISRA | Youga Niang | Agronomist specialised in Horticulture |
| Senegal | CHOCOSÉN | René Regnault | General Manager |
| Senegal | CAIT (Complexe Agro industriel de Touba) | Moustapha Sène | General Manager |
| Senegal | CASINO Supermarket | Patrick Pouvrasseur | Marketing Director |
| Senegal | Ministry of Agriculture & Rural Equipment | Arona Niang | Horticultural Technical Advisor |
| Senegal | SUNEOR | Mandaw Guissé | Seed Purchase Coordinator |
| Senegal | AAFEX (Association Afrique agro export) | Hawa Sy Berete Dr Babacar Ndir | Information and Communication Manager Quality Management & Food Safety Manager |
| Senegal | Association of Cassava producers | <i>Focus group</i> | |
| Senegal | Cadre de Concertation des producteurs d'arachide | <i>Focus group</i> | |
| Mozambique | Plant Protection Department, IIAM | Raul Chaquisse | Deputy National Director of Agrarian Services |
| Mozambique | AgDevCo | Roseanne Whalley | Country Manager |
| Mozambique | IIAM | Anabel Zacarias | Head, Agri. & Nat Res |
| Mozambique | AgriFuturo | Randy Fleming | Agribusiness and Business Development Director |
| Mozambique | CEPAGRI | Adérito Mavie | Agronomist |
| Mozambique | TechnoServe | Jane Grob | Operations Director |
| Mozambique | SNV | Rik Overmars | Country Director |

| Country | Institution | Name | Role |
|------------|--|-------------------------------|--|
| Mozambique | SETSAN | Sisenando Marcelino | Officer |
| Mozambique | UNIDO | Jaime Comiche | Head of Operations |
| Mozambique | DADTCO | Hubert Van Melick | Country Director |
| Mozambique | IDE | Marco Machado | Director |
| Mozambique | Ministry | Elsa Timana | Seed Services Department |
| Mozambique | ECA | Grant Taylor | Managing Director |
| Mozambique | Beira Corridor | Emerson Zhou | Executive Director |
| Mozambique | Saverite | Nuno da Silva | Sales Manager |
| Mozambique | IIAM | Isabel Andrade | CIP-SSA, cassava |
| Mozambique | Alif Quimica | Feloz Mohamed Faruz | General Manager |
| Mozambique | FAO | Jorge Machanguana | Agronomist |
| Mozambique | Associaco Josina Machel | Samuel Gobe | Lead |
| Mozambique | FAO | Castro Camerada | Director |
| Mozambique | OLAM | Ujjwalkanta Senapati | CEO |
| Mozambique | Department of Agrarian Services | Rafik Vala | Director |
| Mozambique | Extension Service Department | Inacio Nhancale | Director |
| Mozambique | CleanStar Mozambique | Kevin Endres | CEO |
| Mozambique | JFS | Francisco Santos | CEO |
| Mozambique | DFID | Gareth Weir | Private Sector Lead |
| Mozambique | Ikuru | Daniel Gerson | General Manager |
| Mozambique | African Century Agriculture | Pedro Pinto | CEO |
| Mozambique | National Cereal Institute (Ministry of Industry and Commerce) | Sidonio Dos Santos | Director |
| Mozambique | IFDC | Alexander Fernando | Country Director |
| Mozambique | Maeva Agro (Maputo) | Daniel Mondlane | Executive Director |
| Mozambique | Genuala (Olho de soja) | Eng. Nelson Cardoso. | CEO |
| Mozambique | Plant Protection Department, IIAM | Raul Chaquisse | Deputy National Director of Agrarian Services |
| Tanzania | University of Dar es Salaam Business School | Prof. Marcelline Chijoriga | Dean of Business School, Director of Public Service, Acting Chair of Agricultural Delivery Division (ADD) |
| Tanzania | Agricultural Council of Tanzania (ACT) | Mark Magila | Tanzania Agricultural Partnership Coordinator |
| Tanzania | Export Trading Group (ETG) | Nadia Paschetta | Director of ETG Foundation |

| Country | Institution | Name | Role |
|----------|--|--|---|
| Tanzania | Tanzania Warehouse Licensing Board (TWLB) | Fidelis Temu | Director |
| Tanzania | Kilimo Markets | Daniel Charles Edward Charles Esther Lampart | Managing Director Technical Director Operations Director |
| Tanzania | Economic and Social Research Foundation (ESRF) | Dr Hoseana Lunogelo | Executive Director |
| Tanzania | Mohamed Enterprises | Billu Singh | Procurement Manager |
| Tanzania | National Food Reserve Agency (NFRA) | Josephine Amolo | Post-Harvest Team |
| Tanzania | 2Seeds Network | Ana Le Roche Colleen Shaffer | Country Director Senior Project coordinator |
| Ethiopia | Ethiopian Agriculture Transformation Agency | Mirafe Marcosl Iris Shim Dawit Mulugeta | Chief of Staff Senior Program Associate Program Associate |
| Ethiopia | Ministry of Agriculture, Extension Dept | Ato. Alemu | Planning Officer, the Extension Department |
| Ethiopia | Astu Injera | Ato. Derje Hailus | Managing Director |
| Ethiopia | Safeway | Fekadu Kebede | Managing Director |
| Ethiopia | Shoa Supermarket | Ato. Mohammed Idris | General manager |
| Ethiopia | Prosper International Pvt | Yemane Mekonnen | Managing Director |
| Ethiopia | Independent Consultant | Ravi Shankar | Consultant working on DFID PSD project |
| Ethiopia | SNV | Genzeb Akele | Sector Lead Agriculture |
| Ethiopia | Ethiopian Commodity Exchange (ECX) | Abenet Bekele | Chief Strategy Officer |
| Ethiopia | Sulet Hulling | Ben H.M. Van Ampting | General Manager |
| Ethiopia | ACDI-VOCA | Yohannes Agonafir | Value chain specialist |
| Ethiopia | SNV | Genzeb Akele | Sector Lead Agriculture |
| Nigeria | Thai Farm | Louw Burger | MD |
| Nigeria | International Institute of Tropical Agriculture (IITA) | Thierno Diallo | Post-Harvest Engineer |
| Nigeria | MARKETS (USAID) | Aliyu Samalia | Director of Agricultural Production |
| Nigeria | Sahel Capital | Ndidi Nwuneli | Co-Founder |
| Nigeria | Min. of Agriculture and Rural Development | Dr Jide Olumeko | Head of post-harvest value chain |

| Country | Institution | Name | Role |
|---------|---|--|--|
| Nigeria | National Root Crops Research Institute | Solomon Afuape | Biotechnologist & Cassava breeder |
| Nigeria | TGI Nigeria | Roy Deepanajan | Vice President |
| Nigeria | Dutch Agricultural Trading and Development Company (DADTCO) | Temple Chijoge | Administration Manager |
| Nigeria | Nigerian Stored Products Research Institute | Dr. P Pessu | Director Lagos Station |
| Nigeria | IFAD | Ben Oluemo | Agricultural economist |
| Nigeria | Spar | Prakash Keswani; Hargovind Daliyet | Deputy MD Operations Head |
| Nigeria | Syngenta Africa Ventures Team | Dimitri Pauwels Peter Veal | Head, Africa Ventures Team Operations Lead |
| Kenya | HCDCA (Horticulture Crops Development Authority) | Grace Kyallo | Acting Managing Director |
| Kenya | FPEAK (Fresh Produce Exporters' Association of Kenya) | Francis Wario | Technical Manager |
| Kenya | Fresh an Juici | Paresh Kanji Patel | Group Managing Director |
| Kenya | Trufoods | Hezbon Wafula | Executive – Supply Chain |
| Kenya | TechnoServe | Dickson Mbanda | Project Lead for Project Nurture |
| Kenya | NCPB (National Cereals Produce Board) | Dr. Kakai Shem Khakame Samuel Yego | Quality Assurance Manager Manager in Quality and Pest Control Department |
| Kenya | ACDI/VOCA | Steve Collins | East Africa Regional Representative |
| Kenya | KENFAP (Kenya National Federation of Agricultural Producer) Services Ltd. | Charles Gitau | General Manager |
| Kenya | Promasidor | Robert Clarke | Managing Director |
| Kenya | Eastern Africa Grain Council | Jane Wanza Kamau | Team Leader, EACG Kenya and Project Officer, Warehouse Receipts System (WRS) |
| Kenya | Cereal Growers Association | Anthony M. Kioko | Chief Executive Officer |