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APPLYING THE PRIORITISING SPS INVESTMENTS FOR MARKET ACCESS FRAMEWORK TO EAST AFRICAN REGIONAL TRADE:

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APPLYING THE PRIORITIZING SPS INVESTMENTS FOR MARKET ACCESS FRAMEWORK TO EAST AFRICAN REGIONAL TRADE

1.0 Introduction

Sanitary and phytosanitary (SPS) measures are applied by governments to control food safety, plant health and animal health risks, and to prevent incursions of exotic pests and diseases. In turn, such measures act to protect human health, promote agricultural productivity and facilitate the international marketability of agricultural and food products. Whilst the illegitimate use of SPS measures undoubtedly remains a problem, despite the obligations and rights laid down in the World Trade Organization (WTO) Agreement on Sanitary and Phytosanitary Measures, arguably the biggest challenge for developing countries is achieving and maintaining the required compliance capacity, both within the public sector and in exporting firms. Historically, these challenges have been mainly faced in the context of agri-food exports to industrialized country markets, but increasingly are also an issue in trade between developing countries.

In making efforts to expand their agri-food exports and to reposition themselves towards higher-value markets, developing countries can face a daunting array of SPS capacity-building needs that outstrip available resources, whether from national budgets or donors. Inevitably, therefore, hard decisions have to be made in order to prioritise particular capacity-building needs over others. At the same time, the drive towards greater aid effectiveness requires that beneficiary governments are able to present coherent and sustainable plans for capacity-building. Whilst decisions have to be made between competing needs on an on-going basis, such decisions often lack coherence and transparency, and there are accusations of inefficiencies in the allocation of resources, whether by developing country governments or by donors.[1]

Consequently, the Standards and Trade Development Facility (STDF) of the World Trade Organization (WTO) has developed the framework, "Prioritizing SPS Investments for Market Access (P-IMA)", based on Multi Criteria Decision Analysis (MCDA), to help inform and improve evidence-based SPS capacity building planning and decision-making processes. The STDF, in collaboration with USAID and COMESA, initially piloted the framework in Belize, Ethiopia, Malawi, Mozambique, Namibia, Rwanda, Seychelles, Uganda, Vietnam, Zambia, and Madagascar, to prioritize SPS investment options and leverage resources for capacity development under relevant investment frameworks. Currently, the COMESA Secretariat is also implementing the framework in Ethiopia, Kenya, Malawi, Uganda and Rwanda.

The P-IMA framework provides a multi-stakeholder, evidence-based approach of mainstreaming SPS capacity building investment needs into national investment frameworks for agriculture, trade, health, and/or environment. In light of this, the TradeMark East Africa (TMEA) is applying the framework to regional agri-food trade in the EAC region. Thus, this report provides the outcomes of the application of the P-IMA framework to East Africa regional trade.

[1]Henson, S.J., and Masakure, O., (2009). *Guidelines on the Use of Economic Analysis to Inform SPS-related Decision-Making*. Standards and Trade Development Facility, Geneva.

2.0 Overview of SPS Sensitive Trade in the EAC Region

It is widely held that SPS measures are among the major factors explaining the low level of regional trade in agri-food products within East Africa[2]. This situation particularly emanates from the fact that trade within the region is dominated by agri-food products, either in their raw or semi-processed forms. Although almost all products face SPS challenges, it is animal-based products that are of the major concern in this regard, including beef, dairy products, chicken and eggs, as well as grains. These SPS-related challenges are associated with food safety risks (such as food-borne pathogens and contaminants) and animal diseases. They relate both to the regulatory requirements of states within the region, as well as the non-recognition of test results and/or certificates.

In 2013, the East African Community (EAC) adopted a Protocol on SPS measures aimed at harmonising SPS measures and to facilitate the circulation of animals, plants and food within the region. The principal objective of the SPS Protocol is to adopt and enforce SPS measures with a special focus on the protection of human, animal and plant health in the region and to ensure safe trade. The longer-term objective is to have EAC regional SPS law, which is currently at the bill stage.

Despite these efforts, SPS issues continue to be a hindrance to intra-EAC trade. For example, in November 2019, Kenya and Rwanda banned imports of peanut butters due to high levels of aflatoxin being detected in the product.[3] However, specific information on the nature and extent of SPS-related barriers to regional trade in agri-food products remains limited. In part, this reflects the lack of a systematic and comprehensive analysis of trade-related SPS challenges within the region. Also, the fact that SPS requirements appear to be preventing the establishment of trade within the region, alongside the broader-based challenges associated with low productivity, high transport costs, administrative and other barriers, etc. Thus, many of the issues identified below have been identified through the recent application of the P-IMA framework to the prioritisation of SPS capacity-building in Uganda, Rwanda and Kenya, the focus of which is on agri-food exports in general rather than specifically within the East Africa region.

Regional trade in agri-food products

2.1.1 Kenya

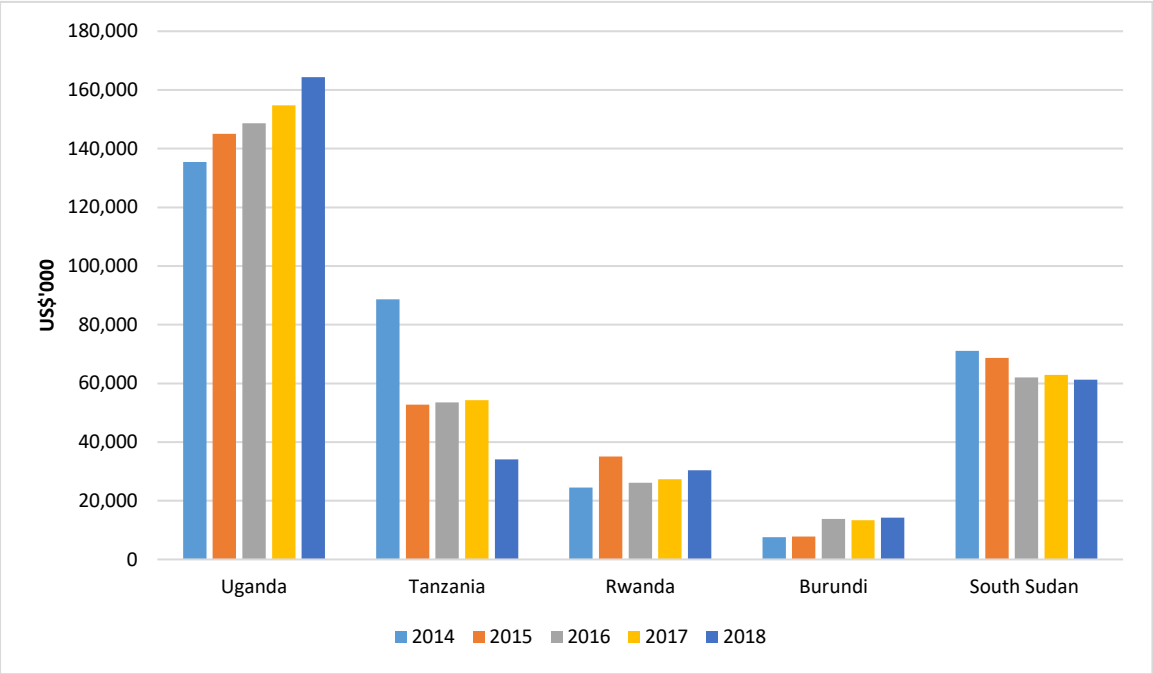
Kenya's main regional export market for agri-food exports[4] is Uganda (Figure 1) with trade valued at US$164 million in 2018. Furthermore, this is the only regional market that has exhibited growth in recent years, with the value of exports expanding by 21 per cent over the period 2014 to 2018. Exports to all other regional markets have either declined or seen minimal growth over this period. Exports to Tanzania, in particular, have declined sharply, from US$88 million in 2014 to US$34 million in 2018.

[2] EAC Score Card 2014.

[3] An official Letter by Rwandan Food and Drugs Authority dated 8th November 2019 titled "Suspension of Substandard Peanut Butter on Sale".

[4] Products in HS categories 01 to 24.

Figure 1; Kenyan regional exports of agri-food products, 2014-2018

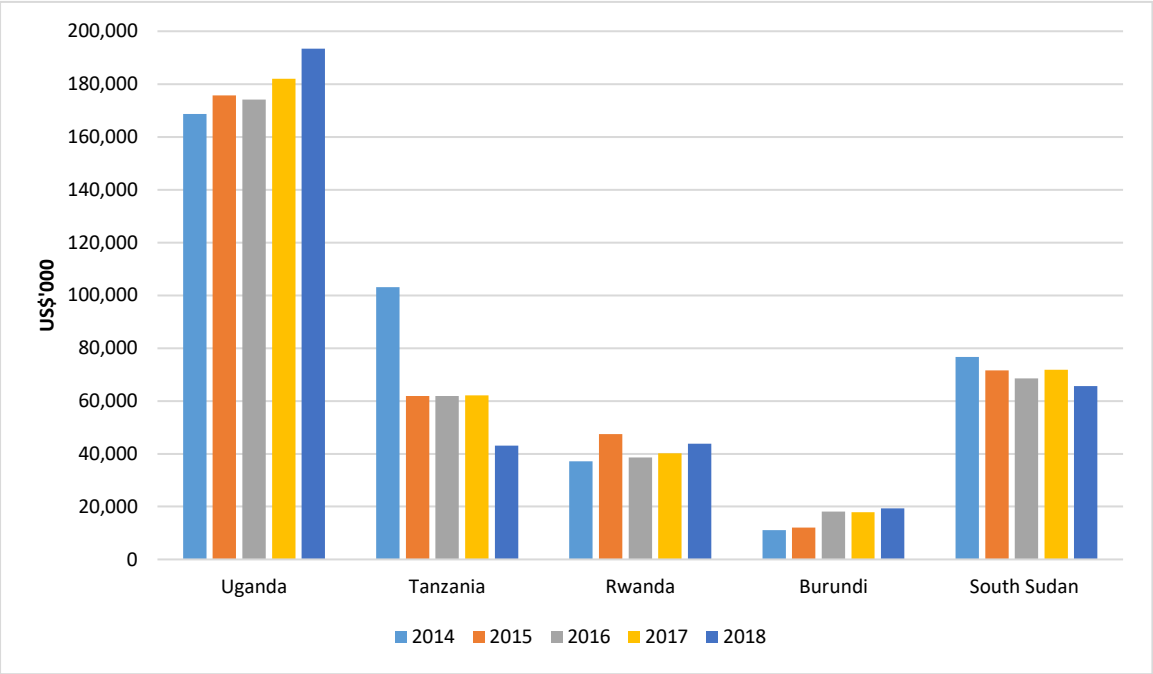


Looking to SPS-sensitive products more generally[5], Uganda again dominate Kenya's regional exports, valued at US$193 million in 2018 (Figure 2). Exports to Tanzania have declined markedly, from US$103 million in 2014 to US$43 million in 2018. Exports to Rwanda, Burundi and South Sudan have not exhibited appreciable change.

Table A1 in Annex 2 reports the value of Kenya's regional exports of SPS-sensitive products in 2018. In the case of Uganda, exports are dominated by vegetable oil, paper products, sugar confectionary, cereals (including sorghum, barley, rice and oats), cereal flours and beer and other alcoholic beverages. All of these products have low levels of SPS-sensitivity. Exports of highly SPS-sensitive products include meat, fish, seeds for sowing and fresh vegetables. Exports to other countries in the region are, likewise, dominated by products with low levels of SPS sensitivity including cereals, cereal flours, vegetable oil, sugar confectionary, beer and other alcoholic beverage, paper products, etc. Exports of more SPS-sensitive products include seeds for sowing (in particular to Tanzania), meat (especially to Tanzania and South Sudan), milk (especially to Tanzania) and fresh vegetables (especially to Tanzania and South Sudan).

[5] Including products in HS categories 41, 44, 46, 47, 48 and 50 to 53.

Figure 2; Kenyan regional exports of SPS-sensitive products, 2014-2018



2.1.2 Uganda

Uganda's regional exports of agri-food products are dominated by trade with Kenya (Figure 3). Exports to Kenya have grown appreciably in recent years, from US$137 million in 2014 to US$433 million in 2018. Other significant regional export markets are South Sudan (valued at US$204 million in 2017) and Rwanda (valued at US$78 million in 2018). Exports to Tanzania and Burundi are minimal.

Ugandan exports of SPS-sensitive products are likewise dominated by Uganda and South Sudan, being valued at US$516 million in 2018 and Us$213 million in 2017, respectively (Figure 4). Exports of SPS-sensitive products to Rwanda were valued at US$91 million in 2018. Exports to both Tanzania and Burundi were less than US$8 million in 2018.

Ugandan exports of SPS-sensitive products to Kenya are dominated by Coffee, milk and milk powder, fresh fruit (especially oranges), cereals (especially maize), sugar, dried beans, tobacco and wood products (Table A2 in Annex 2). There are also smaller but notable exports of frozen chicken and fish. Major exports to South Sudan include cereals (especially sorghum and maize), sugar, wheat flour, vegetable oil, beer and dried beans. There are also exports of milk. Exports of SPS-sensitive products to Rwanda are dominated by cereals (especially sorghum and maize), fresh vegetables (for example potatoes and cassava), maize flour, sugar and alcoholic beverages. The most notable exports of SPS-sensitive products to Tanzania are milk powder and seeds for sowing. In the case of Burundi, exports of live cattle are noteworthy.

Figure 3; Ugandan regional exports of agri-food products, 2014-2018

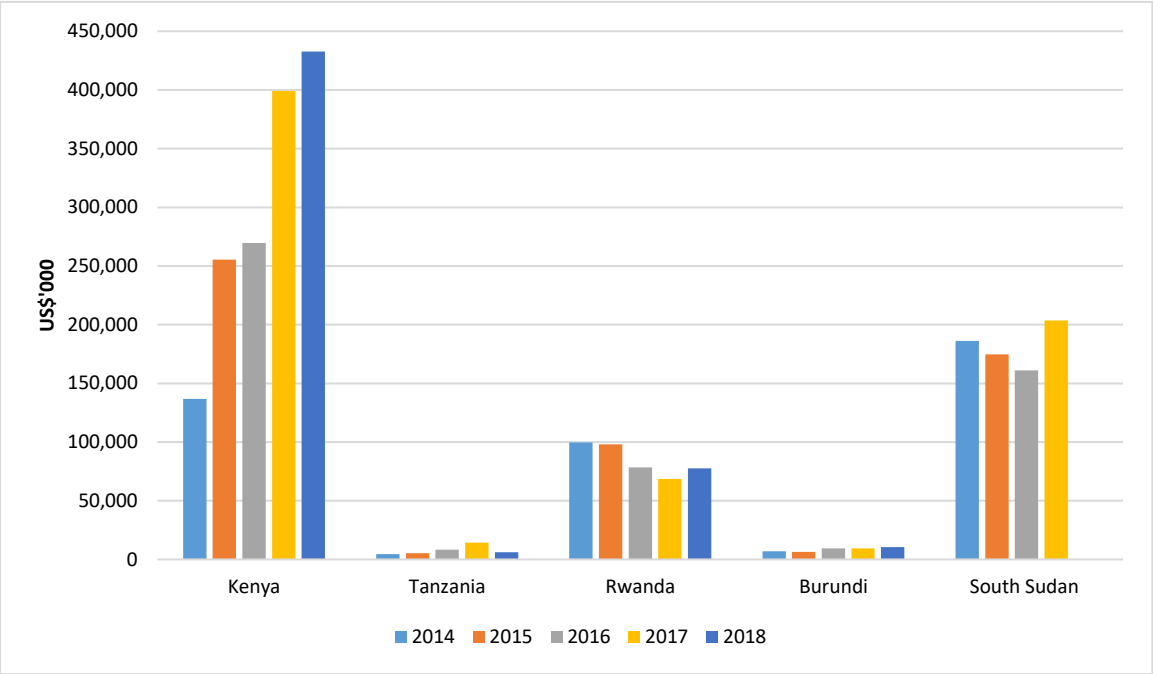
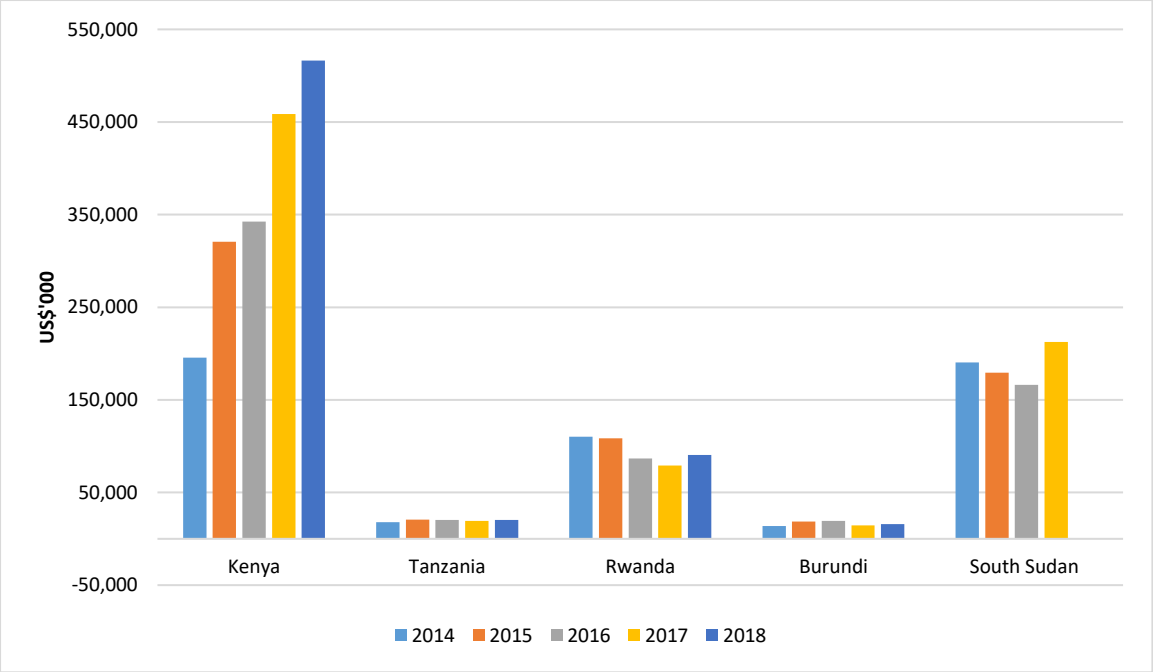


Figure 4; Ugandan regional exports of SPS-sensitive products, 2014-2018

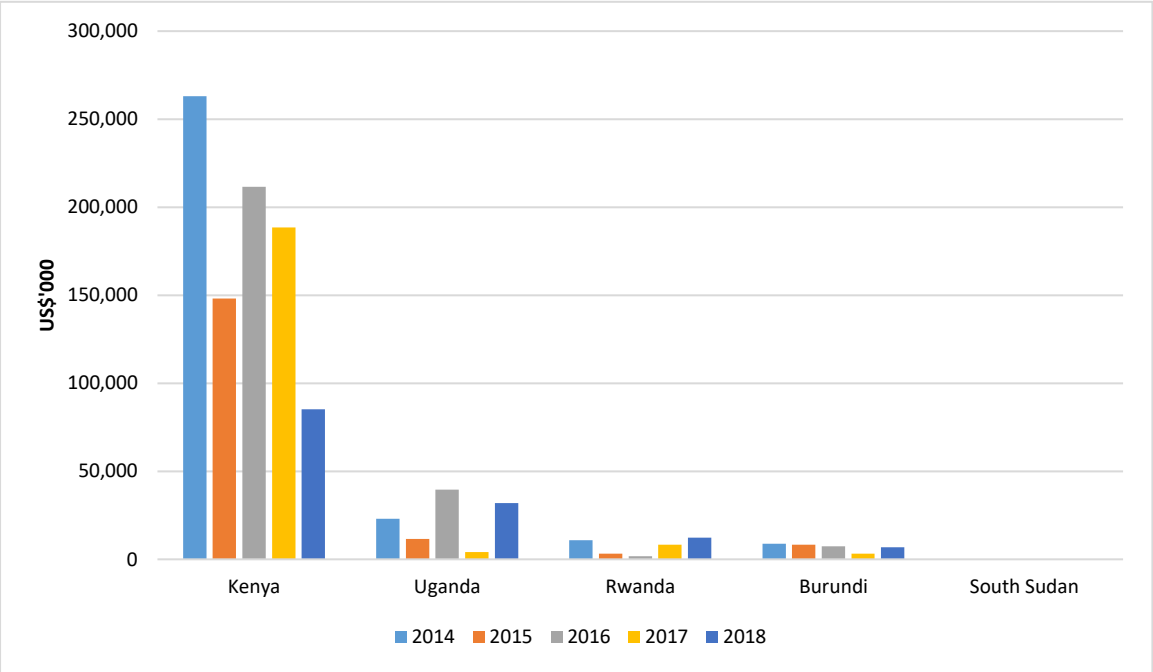


2.1.3 Tanzania

Whilst Tanzania's regional exports of agri-food products are dominated by Kenya (Figure 5), these have declined significantly in recent years. Thus, exports fell from US$263 million in 2014 to US$85 million in 2018. Likewise, exports of SPS-sensitive products more generally declined, from US$297 million in 2014 to US$127 million in 2018 (Figure 6). In contrast, agri-food exports to Uganda increased significantly in recently years, from US$23 million in 2014 to US$31 million in 2018. Exports of SPS-sensitive products more generally were valued at US$41 million in 2018.

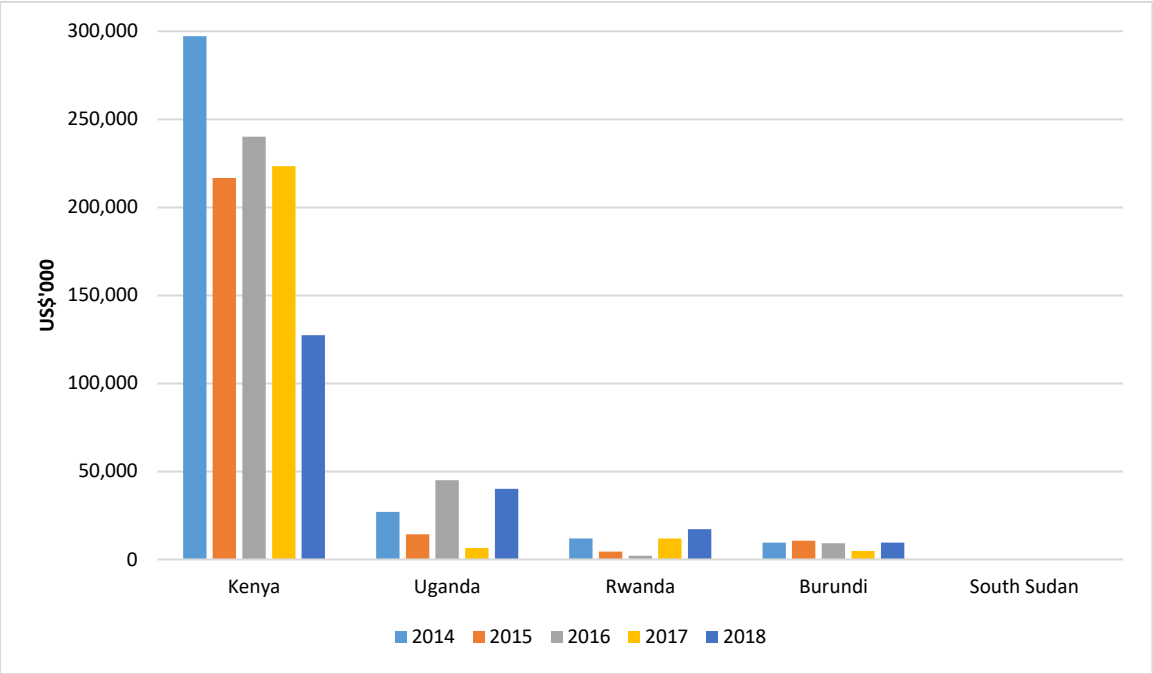
Tanzania's exports of SPS-sensitive products to Kenya (Table A3 in Annex 2) are dominated by live cattle, maize, paper products, dried beans, maize flour, fresh fruit and alcoholic beverages. Exports of fish and fresh fruit are also noteworthy. Exports to other countries in the region include maize and rice, paper products, fish (to Uganda), sugar, alcoholic beverages and wood.

Figure 5; Tanzanian regional exports of agri-food products, 2014-2018[6]



[6] Data for South Sudan are missing.

Figure 6; Tanzanian regional exports of SPS-sensitive products, 2014-2018[7]



2.1.4 Rwanda

The predominant regional market for agri-food exports from Rwanda is Uganda (Figure 7). Exports have grown significantly in recent years from US$29 million in 2014 to US$41 million in 2018. Conversely, exports to Kenya have collapsed from US$54 million in 2014 to US$6 million in 2018. Whilst exports to Burundi have historically been small, they have grown substantially in very recent years to reach US$6 million in 2018. Exports to Tanzania are insignificant.

Rwandan exports of SPS-sensitive products more generally, likewise, are dominated by trade with Uganda (Figure 8). In 2018, exports of SPS-sensitive products to Uganda were valued at US$45 million. In 2018, exports to Kenya and Burundi were valued at US$9 million and US$7 million, respectively. Rwandan exports to Uganda and Kenya are predominantly SPS-sensitive. Thus, almost 90 per cent of exports to Uganda, and 74 per cent of exports to Kenya, were SPS-sensitive in 2018. SPS-sensitive exports are far less important in the case of Burundi, accounting for less than 40 per cent of total Rwandan exports.

Rwanda's main exports of SPS-sensitive products to Uganda are fresh vegetables (notably beans, potatoes and mushrooms), dried beans, coffee, milk and raw hides (Table A4 in Annex 2). Exports of mushrooms are, likewise, significant to Kenya and Burundi. Other significant exports to Kenya are coffee, raw hides, cereal bran and malt extract. In the case of Burundi, other exports of SPS-sensitive products include potatoes, beans, sugar and malt products.

[7] Data for South Sudan are missing.

Figure 7; Rwandan regional exports of agri-food products, 2014-2018[8]

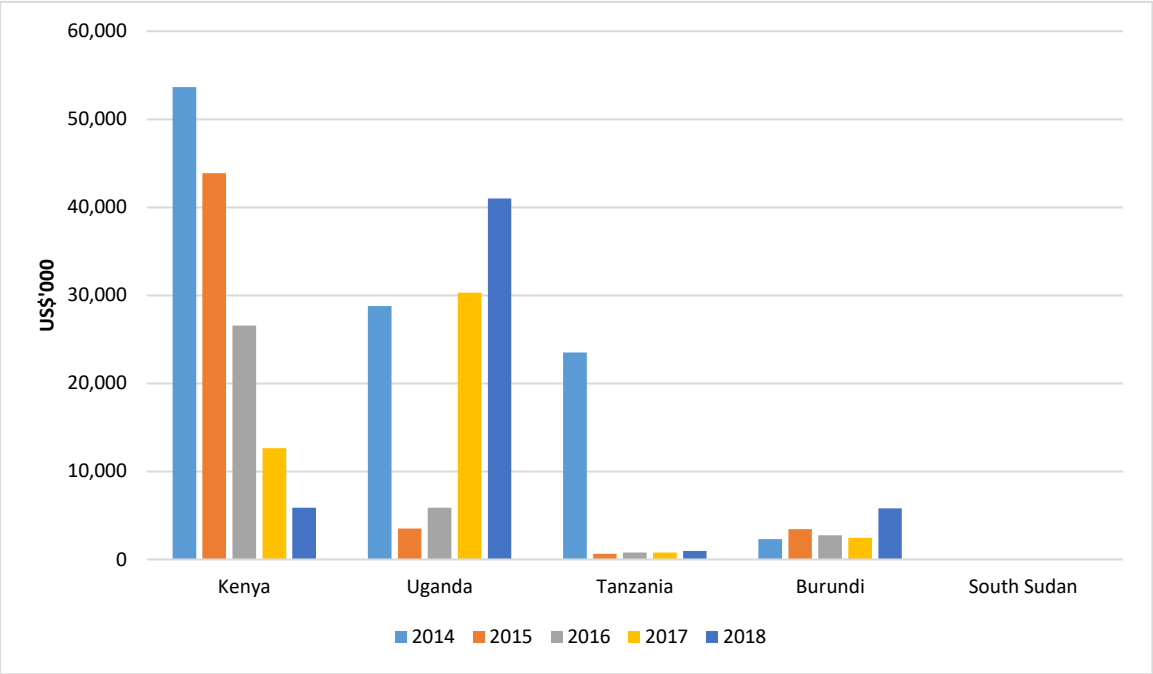
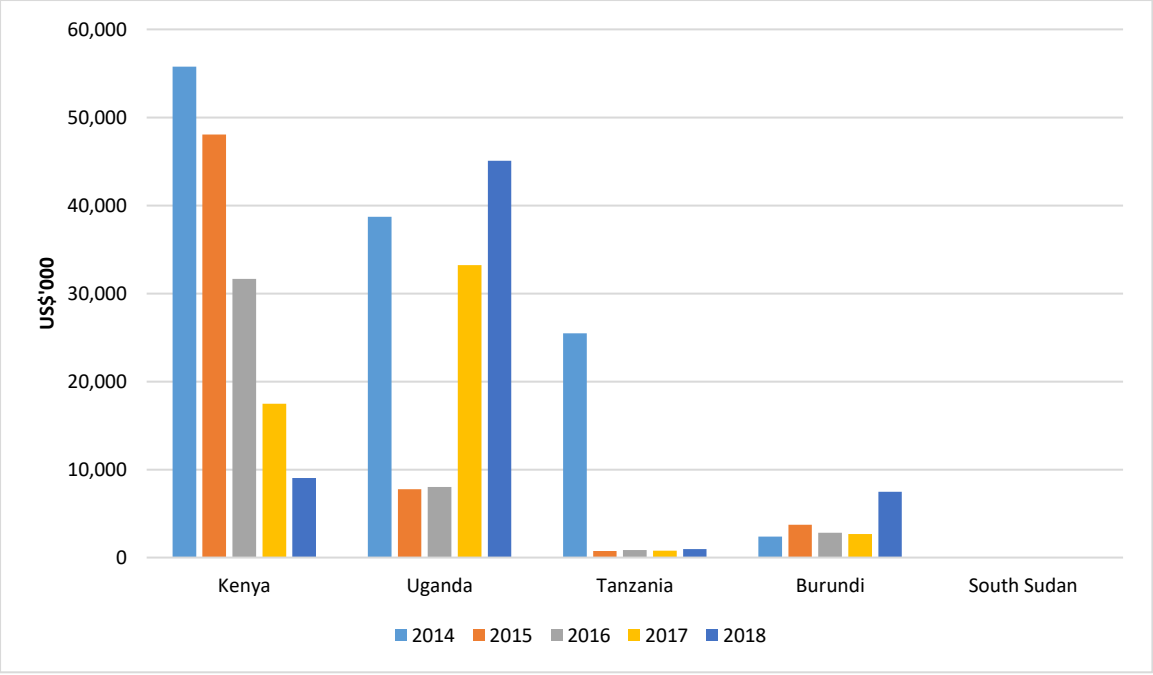


Figure 8; Rwandan regional exports of SPS-sensitive products, 2014-2018[9]



[8] Data for South Sudan are missing.
[9] Data for South Sudan are missing.

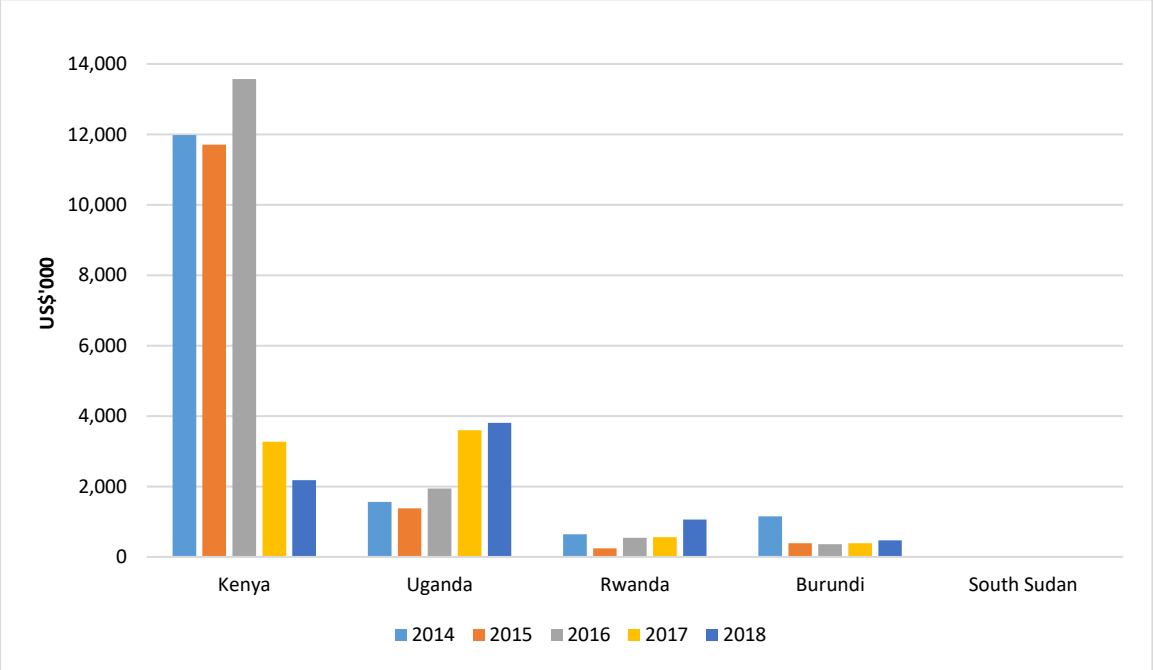
2.1.5 Burundi

In 2018, Burundi's exports of agri-food products within the East Africa region totalled US$8 million. Whilst annual exports to Kenya alone exceeded US$11 million over the period 2014 to 2016, exports in 2018 were only marginally above US$2 million (Figure 9). In 2018, Uganda was the largest export market for agri-food exports from Burundi, valued at US$4 million. Exports to Tanzania and Rwanda are minimal.

Exports of SPS-sensitive products from Burundi to the East Africa region were valued at US$8 million in 2018 (Figure 10). Uganda accounted for US$4 million of this total, and Kenya around US$2 million. Exports to Rwanda and Tanzania are minimal. Over 80 per cent of Burundian exports to Uganda are SPS-sensitive. In the case of exports to Kenya, just over half of exports are SPS-sensitive.

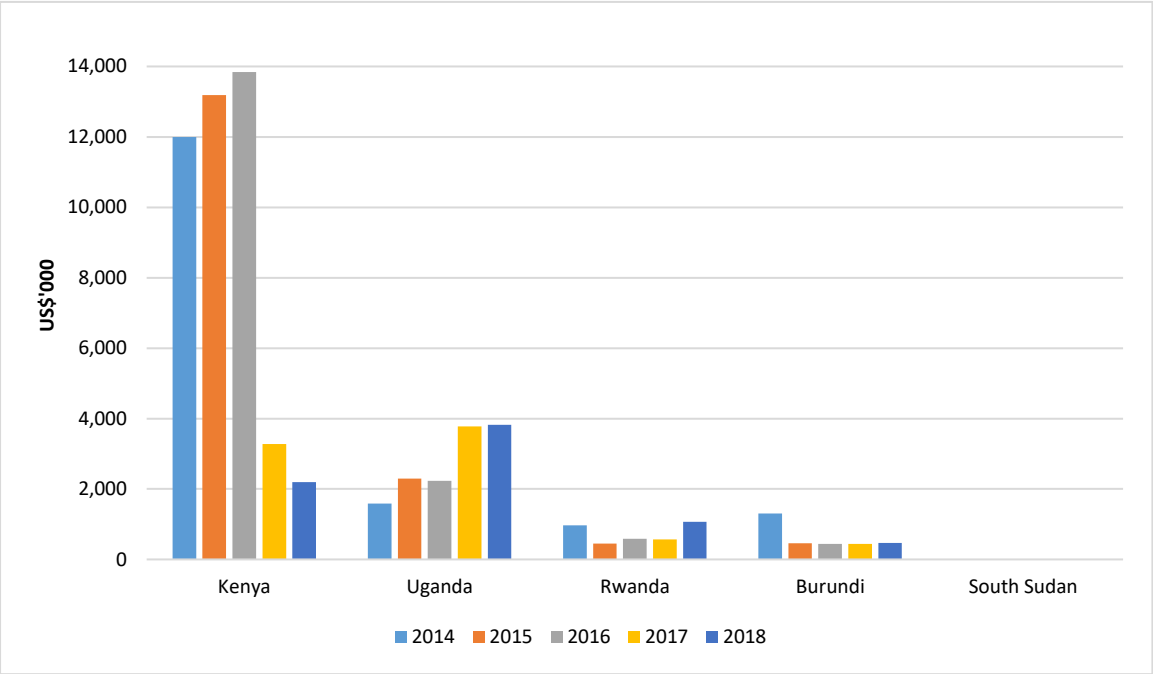
Exports of SPS-sensitive products from Burundi to Uganda are dominated by coffee and maize (Table A5 in Annex 2). Coffee, likewise, is the major export to Kenya, accompanied by cereal bran. In the case of Tanzania, exports of SPS-sensitive products consist of fresh fruit (notably avocados and bananas), beer and other alcoholic beverages. Malt and sugar are the main exports to Rwanda.

Figure 9; Burundian regional exports of agri-food products, 2014-2018[10]



[10] Data for South Sudan are missing.

Figure 10; Burundian regional exports of SPS-sensitive products, 2014-2018[11]



2.1.6 South Sudan

The available data suggests that exports of agri-food products from South Sudan to Kenya and Uganda are minimal (figure 11). Thus, whilst Kenya was the major destination of exports in 2017, these were valued at only US$61,000. Exports to Uganda were valued at US$15,000. Exports of SPS-sensitive products more generally, are likewise insignificant. Thus, exports to Kenya and Uganda were valued at US$87,000 and US$66,000, respectively, in 2017 (Figure 12). Whilst over 60 per cent of total exports to Kenya were SPS-sensitive in 2017, almost all exports to Uganda did not fall into this category.

In 2017, South Sudanese exports of SPS-sensitive products to Uganda consisted of honey, oats and dried plants for medicinal and aromatic purposes (Table A6 in Annex 2). Exports to Kenya consisted of wood.

[11] Data for South Sudan are missing.

Figure 11; South Sudanese regional exports of agri-food products, 2014-2018[12]

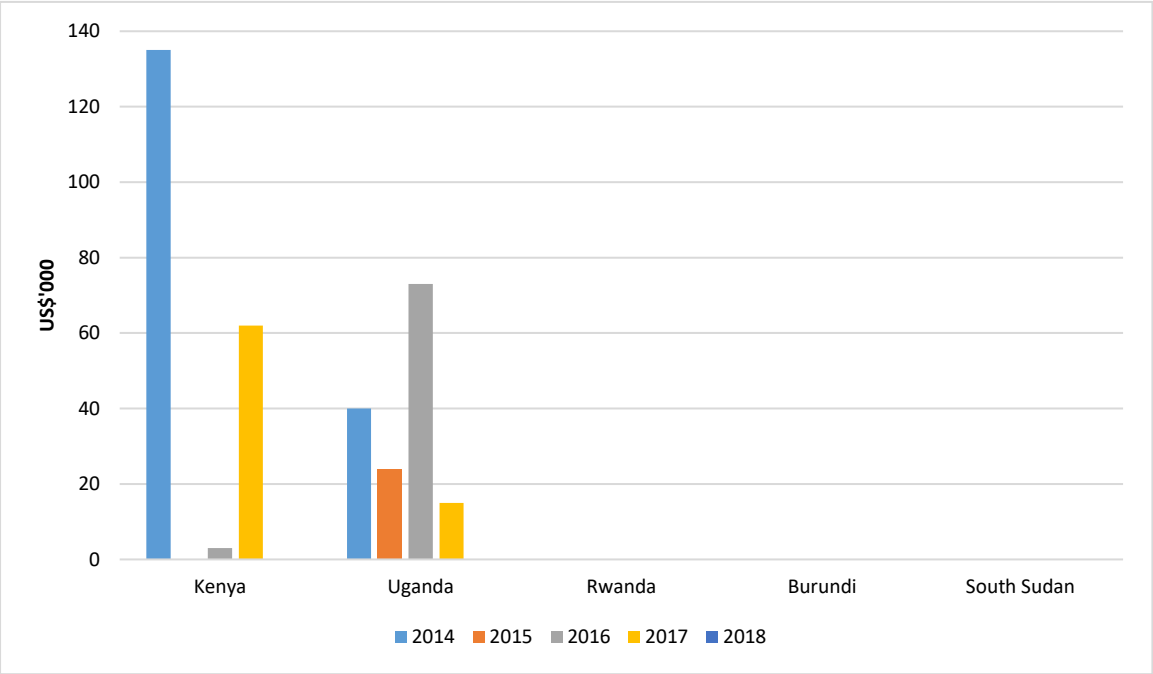
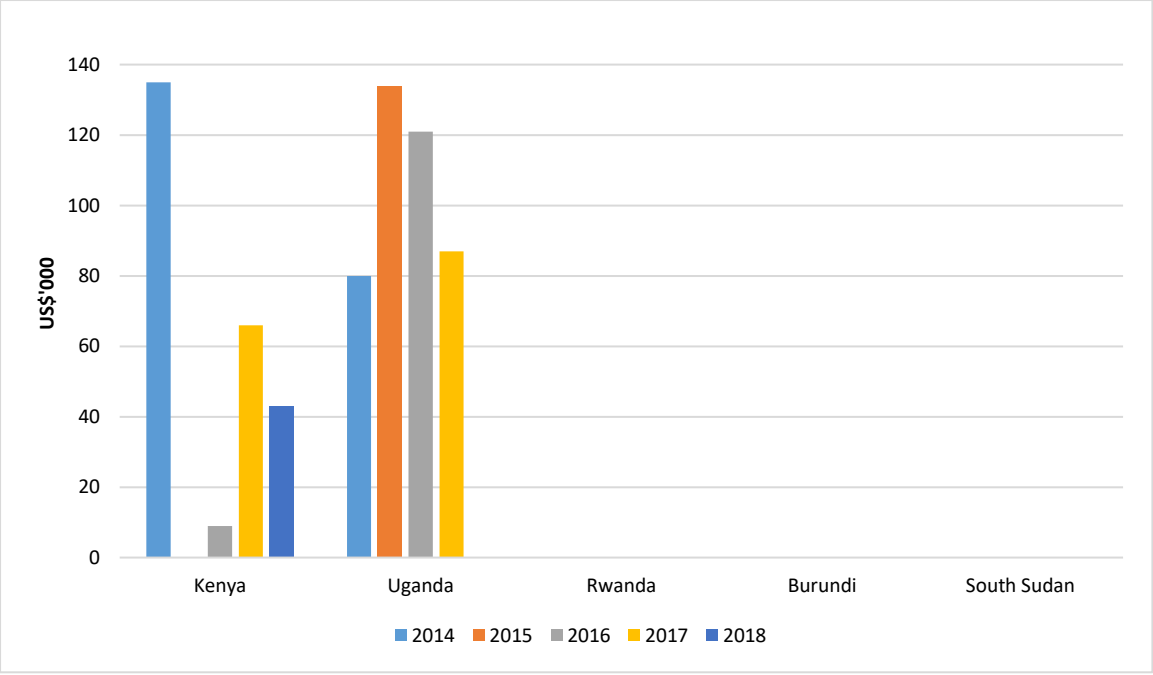


Figure 12; South Sudanese regional exports of SPS-sensitive products, 2014-2018[13]



[12] Data for exports to Rwanda, Burundi and Tanzania missing.
[13] Data for exports to Rwanda, Burundi and Tanzania missing.

Some Specific SPS Issues in EAC Regional Trade

2.2.1 Aflatoxins

Most EAC member states are net importers of food crops such as maize, sorghum, millet, rice wheat and groundnuts that are prone to significant contamination with aflatoxin[14]. Maize, in particular, is a staple food for all of the East African economies. Whereas food security has been a major reason for restrictions on maize exports, the presence of aflatoxin has been a major reason for import restrictions into most East African markets. For instance, the level of aflatoxin has been reported to be higher than the tolerable level in 60 per cent of exports into the region.[15] As a result in Kenya, for example, strict aflatoxin measures are applied at the border.

Aflatoxins are also an issue for trade in livestock product within the East Africa region[16]. Aflatoxins are transmitted through animal feeds to animals, and then on to humans through the consumption of animal products such as milk, meat and eggs. Tests results for animal feed in the East Africa region show high levels of aflatoxin[17].

Due to the transboundary nature of aflatoxins, the EAC has been at the forefront in addressing this through a regional approach and hence the development of EAC aflatoxin control and management strategy.

2.2.2 Fall Army Worm (FAW)

Fall Amy Disease (FAW) is an SPS challenges across the east Africa region EAC region. Indeed, according to the FAO, FAW is present in all Sub-Saharan African countries except Lesotho[18]. FAO considers FAW to be a dangerous transboundary pest with a high potential to spread continually due to its natural distribution capacity and international trade. Effective control, therefore, requires a regional approach for early detection and management through Integrated Pest Management (IPM) activities.

2.2.3 Maize Lethal Necrosis Disease (MLND)

Maize Lethal Necrosis Disease (MLND) was first reported in the African continent in September 2011 when it was detected in Kenya. It has since spread rapidly into Tanzania, Uganda and South Sudan[19]. Rwanda has also cited the disease as a challenge to its exports through the P-IMA process. Maize is a food security crop for the countries of East Africa, and as such most states are net importers. MNLD can therefore pose a serious food security risk states if not well managed regionally. In this regard, the EAC has drafted an MLND management plan with the objective of strengthening early warning and establishing a rapid response system.[20]

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[14] EAC Policy Brief on Aflatoxin Prevention and Control | Policy Brief Nos. 6 & 9, 2018
[15] EAC Policy Brief on Aflatoxin Prevention and Control | Policy Brief No. 1, 2018 and No. 3, 2018
[16] EAC Policy Brief on Aflatoxin Prevention and Control | Policy Brief No. 6, 2018
[17] Ibid
[18] FAO (2019), Briefing Note on Fall Army Worm
[19] FAO, Maize Lethal Necrosis Disease (MLND). A Snapshot. Prepared for FSNWG by FAO Sub-Regional Emergency Office for Eastern & Central Africa (REOA)
[20] https://mln.cimmyt.org/east-african-community-eac-meeting-on-maize-lethal-necrosis-mln-22nd-24th-may-2018/

2.2.4 Animal Diseases

Based on notifications to OIE by EAC member (Table 1) there are currently cases of African Swine Fever, Anthrax, Middle East Respiratory Syndrome Coronavirus (MERS-Cov), Rift Valley Fever, Foot and Mouth Disease (FMD) and Peste des petits ruminants in the East Africa region. Furthermore, Bovine Spongiform Encephalopathy (BSE), Avian Influenza, American Foulbrood (AFB) Disease and Contagious Caprine Pleuro Pneumonia (CCPP) have been reported by some countries as animal diseases affecting animal production and trade.

2.2.5 Foot-and-Mouth Disease (FMD)

FMD is a highly contagious livestock disease that is widespread in Africa and reported by the three EAC member states that are currently applying the P-IMA framework. Kenya reported a case of FND to the OIE in 2019.[21] FAO has also confirmed the existence of FMD in the region, as a result of which it launched its 15-year Global FMD Control Strategy introduced in 2012. This strategy involves the implementation of the Progressive Control Pathway for FMD (PCP-FMD) tool, which recommends a coordinated effort at regional level to address the issue.[22] The disease affects livestock production and trade in animals and animal products through the death of young animals, reduced productivity through loss of milk and meat, reduced draft animal power for freight transport and ploughing, etc.

2.2.6 Bovine Spongiform Encephalopathy (BSE)

BSE is a transmissible disease of cattle which has a long incubation period of four to five years and is fatal for cattle within weeks to months of its onset. Arguably, the most pronounced trade concern with the East Africa region relates to BSE and trade between Kenya and Uganda. This dispute has been ongoing for over 20 years. Thus, in 1997 Uganda placed a ban on cattle and beef imports from Kenya based on fears that BSE will be introduced into its territory.[23] Although there have been various attempts towards a political solution to the problem, the continuation of the restrictions relates largely to the fact that Kenya lacks the ability to demonstrate that it is free of BSE.

2.2.7 Avian Influenza

Avian influenza is a virus that affects poultry and wild birds. The first report of Avian Influenza in East Africa was in Uganda in 2017[24]. In response, Rwanda and Kenya banned imports of poultry and poultry products from Uganda.[25] Although, Avian Influenza is not currently present in most part of East Africa, many states consider it a challenge that requires constant surveillance.

[21] OIE (2019). Accessed at:
[22] Global Framework for the Progressive Control Transboundary Animal Disease (GF-TADs). Regional Roadmap Meeting III, Entebbe, July 2018 Report
[23] Daily Nation. Accessed at: https://mobile.nation.co.ke/business/1950106-1654356-uypg19/index.html
[24] FAO (2018): 2016–2018 Spread of H5N8 highly pathogenic avian influenza (HPAI) in sub-Saharan Africa: epidemiological and ecological observations.
[25] Zootecnica Internationa. Accessed at: https://zootecnicainternational.com/field-reports/avian-influenza-jolts-east-africa-poultry-trade/

Table 1. OIE notifications of epidemiological significant events in the East Africa region, 2018-2019

Country	Date of Notification	Disease	Reason for notification	Outbreaks	Date resolved
Burundi	11/01/2018	Peste des petits ruminants	First occurrence in the country	8	10/11/2018
Kenya	20/07/2018	Bluetongue	Recurrence	3	08/11/2018
Kenya	09/05/2018	Foot and mouth disease	New strain in the country	3	
Kenya	08/06/2018	Rift Valley fever	Recurrence	10	30/07/2018
Rwanda	10/08/2018	Rift Valley fever	Recurrence	8	Continuing
South Sudan	08/03/2018	Rift Valley fever	First occurrence in the country	1	
Uganda	18/05/2018	Anthrax	Unexpected change or increase		Continuing
Uganda	07/09/2018	Rift Valley fever	Recurrence	3	
Kenya	03/10/2019	African swine fever	Recurrence	1	Continuing
Kenya	10/04/2019	Anthrax	Unexpected change or increase		
Kenya	12/03/2019	Middle East Respiratory Syndrome Coronavirus (MERS-Cov)	Emerging disease	6	01/06/2018
Kenya	28/02/2019	Rift Valley fever	Recurrence	2	21/03/2019
Uganda	18/03/2019	Foot and mouth disease	New strain in the country	1	

2.2.8 American Foulbrood (AFB) Disease

American Foulbrood (AFB) Disease is a pathogen that affects honeybees, causing considerable loss to honey production. *Paenibacillus* larvae, the causative agent of AFB disease, is a highly contagious and often lethal pathogen of honeybees that is widely distributed.[26] A published study published in 2016 reports the first detection of the pathogen that causes AFB in Uganda.[27] During the P-IMA country process, Uganda officials indicated that the AFB is still a challenge and capacity is needed to detect and manage this issue.

2.2.9 Anthrax

Anthrax is caused by the bacterium *Bacillus anthracis* which produces different types of toxins that cause haemorrhaging, swelling and tissue death in herbivores and humans.[28] Kenya reported

[26] NCBI Resources. Accessed at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4947070/
[27] Ibid
[28] The Conversation (2019). Accessed at: http://theconversation.com/insights-from-kenya-why-anthrax-outbreaks-recur-in-the-same-areas-116615

outbreaks of Anthrax in Nakuru County in 2014, 2015, and 2017 .[29] Kenyan officials have indicated that the disease is a challenge in sheep and goats in a recent P-IMA national workshop.

2.2.10 African Swine Fever (ASF)

African Swine Fever (AFS) is a highly contagious viral disease in pigs which was first described in Kenya in 1921. It is endemic to most Sub-Saharan African countries.[30] The disease has been detected in Burundi, Rwanda, Kenya, Tanzania, and Uganda.[31] The OIE situation report for ASF of May 2019 also confirmed the presence of the disease in the East Africa region.[32]

2.2.11 Rift Valley Fever (RVF)

RVF is a viral disease that primarily affects animals but can also infect humans. The disease is of significant economic and trade concern due to death and abortion in affected livestock. Reported outbreaks in Kenya, Tanzania, and Sudan date back to the 1990s and have occurred more recently.[33] Uganda and Rwanda are reported to have had outbreaks in 2018.[34] Kenyan officials reported the disease to be on their watch list during the P-IMA country process.

2.2.12 Contagious Caprine Pleuro Pneumonia (CCPP)

Contagious Caprine Pleuro Pneumonia (CCPP) is a highly contagious and lethal disease in goats that is found in Africa, Middle East and Western Asia.[35] According to OIE reports, the diseases present in Kenya, Tanzania, Sudan, and Uganda[36]. Kenya has confirmed during the P-IMA country process that this disease is still an issue.

3.0 The P-IMA Framework

The P-IMA framework employs a Multi Criteria Decision Analysis (MCDA) tool that engages a multi-stakeholder approach to identify SPS capacity gaps, cost and rank the investment needs based on agreed economic and social defined decision criteria. The aim is to generate a set of evidence-based SPS priorities that gives the best return on investment and can be mainstreamed into national investment frameworks and/or leverage external resource mobilisation. The rationale behind the framework is that priorities need to be established on the basis of a range of economic and social considerations that may, at least on the face of it, be difficult to reconcile. In turn, this assumes that the rationale for investments in SPS capacity-building is not compliance with export market SPS requirements per se, but the economic and social benefits that might flow from such compliance, whether in terms of enhanced exports, incomes of small-scale producers and/or vulnerable groups, promotion of agricultural productivity and/or domestic public health, etc. The framework provides an

[29] NCBI (2018). Accessed at: https://www.ncbi.nlm.nih.gov/pubmed/30105965
[30] CABI. Accessed at: https://www.cabi.org/isc/datasheet/95040
[31] Ibid
[32] OIE (2019). Global Situation of ASF. Report N°17: 2016 – 2019
[33] WHO (2018). Rift Valley Fever, Key Facts. Accessed at: https://www.who.int/news-room/fact-sheets/detail/rift-valley-fever
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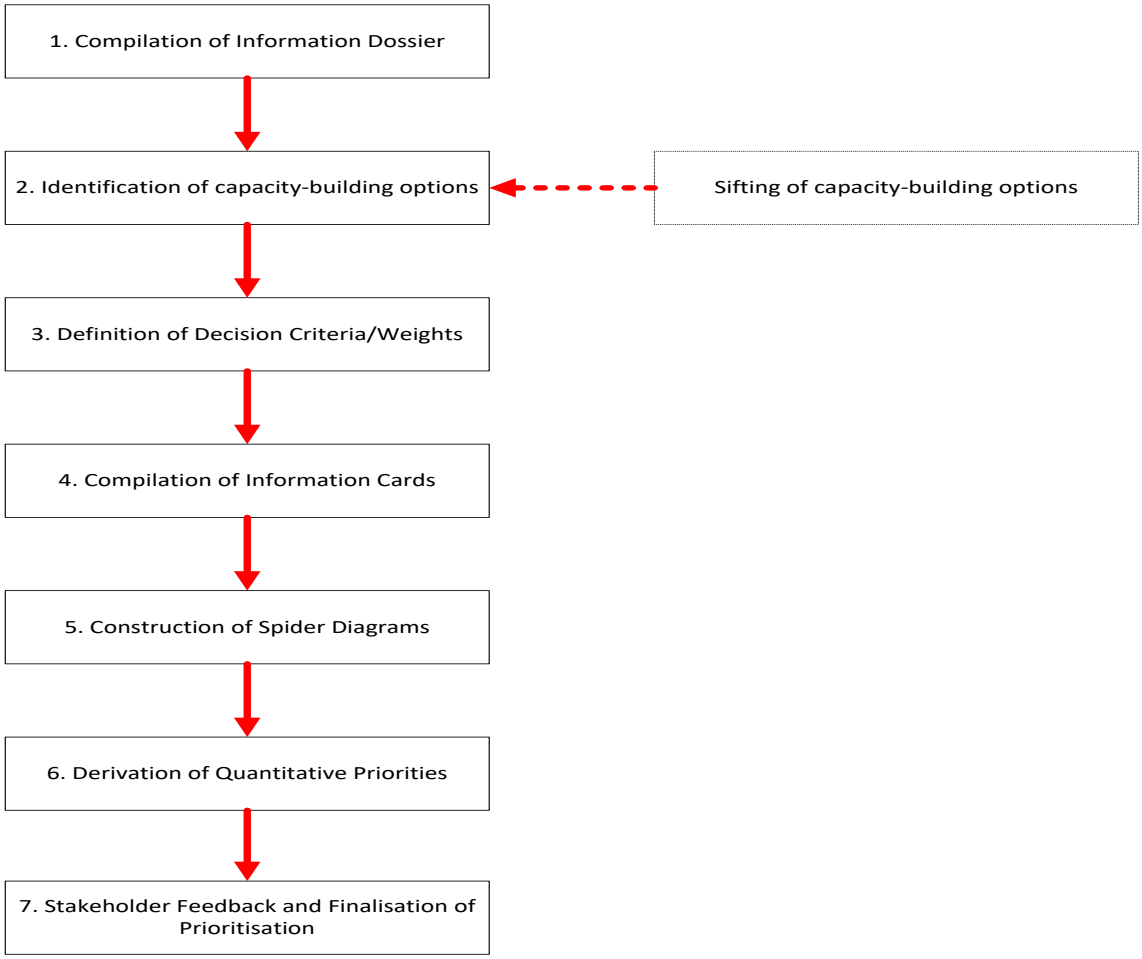
approach for different decision criteria to be taken into account, even though they may be measured in quite different ways.

In this regard, the framework aims to:

- Identify the current set of SPS-related capacity-building investment options in the context of existing and/or potential exports of agri-food products. Below this is termed the choice set.
- Determine the decision criteria that should drive the establishment of priorities between SPS-related capacity-building investment options and the relative importance (decision weights) to be attached to each.
- Prioritize the identified SPS-related capacity-building investment options on the basis of the defined decision criteria and decision weights.
- Examine the sensitivity of the established priorities to changes in parameters of the framework.

The framework employs a highly structured process that aims to be applied in a wide variety of contexts and to provide various diagrammatic and numerical outputs. The framework and its practical implementation are described in detail in a user's guide. Below in Figure 13, a relatively brief outline of the seven stages of the framework is provided, with a particular focus on how they were implemented in Rwanda.

Figure 13. Stages of the P-IMA Framework



3.1. Stage 1: Compilation of Information Dossier

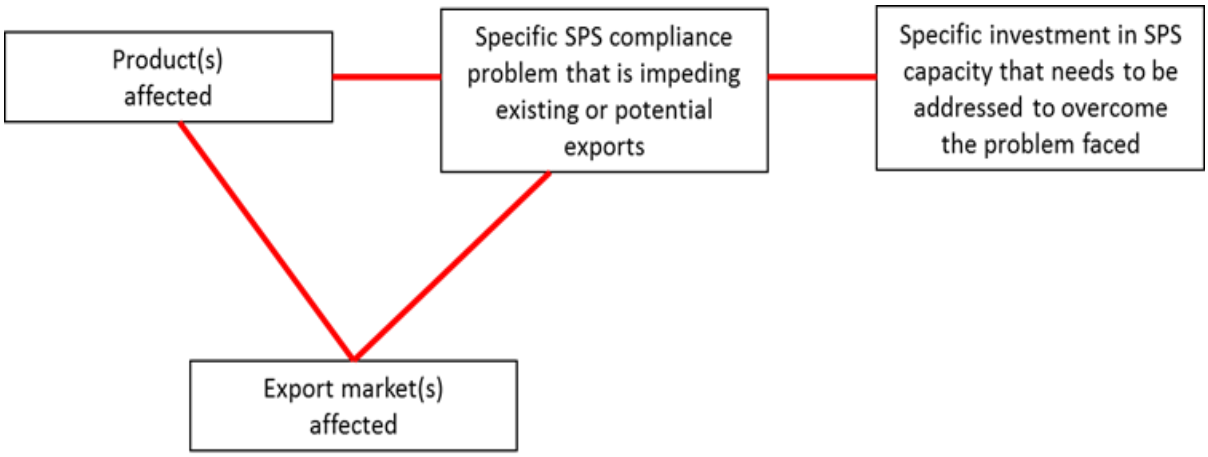
The first stage of the analysis involved the compilation of a comprehensive dossier of existing information on the SPS challenges facing agri-food exports and the associated capacity-building investment needs. In so doing, the aim was to ascertain what work had already been undertaken to identify capacity-building options and the definition of priorities for related investments. Consequently, this study undertook a background paper on regional agri-food trade in the East Africa region and the importance of SPS measures, which covered SPS-sensitive trade and current prevailing SPS compliance challenges. A great aspect of the outcomes from that background paper are incorporated into this report.

3.2. Stage 2: Definition of Choice Set

In order to identify the SPS capacity-building options to be considered in the priority-setting framework, a two-day stakeholder workshop was held from 19-20th November 2019. The workshop comprised of training of key stakeholders on the P-IMA framework and the D-Sight Software, which powers the P-IMA framework, and a dedicated session to identify each of the six EAC countries' specific SPS investment needs and Capacity Building Options (CBOs), Decision Criteria and Weights. Participants were presented with a series of cards and asked to identify the SPS capacity-building needs that is mutually-exclusive and consist of four key elements in Figure 14. First, the product(s) affected. Second, the specific SPS issue faced by exports of this product(s). Third, the market(s) where these SPS needs were an issue. Fourth, the CBOs that would solve the SPS issue being faced. The combination of these four elements defined a distinct capacity-building option. Respondents were free to define as many specific SPS capacity-building needs as they wished.

The CBOs generated from the above workshop was further reviewed by the country focal persons in consultation with their stakeholders back home. At this stage, certain capacity building options were excluded if they are not SPS issues related to trade, not mutually exclusive, part of an existing project, are not real or clear requirement from the market, etc. The options that were included are listed and defined in section 4.

Figure 14; Definition of SPS capacity-building options



3.3. Stage 3: Definition of decision criteria and weights

In the second stage of the stakeholder workshop, respondents were asked to define an appropriate set of criteria (i.e., the objectives) that will drive the priority-setting process and to assign weights to these. First, participants were presented with a series of potential decision criteria and asked which (if any) should be excluded and whether any potentially important criteria were missing. To define the decision weights, the workshop participants were each asked to assign 100 points amongst the ten decision criteria. The scores of participants were then collated, and an average weighting calculated. This average weighting was reported back to the workshop to identify any discrepancies. The final agreed weightings are reported in Table 2 below.

Table 2; Decision criteria and weights

Objective	Decision Criteria	Average Weights
Cost	Up-front investment	12.5
	Ongoing cost	7.8
	Ease of implementation	10.0
Trade Impact	Change in absolute value of exports	14.5
	Impact on export diversification	8.2
Domestic Spillovers	Agricultural productivity	8.7
	Public health	8.8
	Environmental protection	6.5
	Impact on Poverty	9.7
	Gender Impacts	6.2
	Impact on Youth	7.1
Total		**100.0**

3.4. Stage 4: Construction of Information Cards

Having identified the choice set of SPS capacity-building options and the decision criteria and weights to be applied in the priority-setting exercise, information was assembled into a series of information cards. The aim of these cards is not only to ensure consistency in the measurement of each decision criterion across the capacity-building options, but also to make the priority-setting exercise more transparent and open to scrutiny.

First, the specific nature of each of the SPS capacity-building options was described in some detail on the basis of existing documentation, consultation with stakeholders, etc. and are set out in Section 4. The metrics to be employed for each of the ten decision criteria were then defined, taking account of currently available data and the range of plausible ways in which each of the criteria might be represented. Table 3 sets out the final metrics. Note that the choice of metrics involves a sometimes difficult compromise between the availability and quality of data, and the imperative to employ continuous quantitative measures. However, it is important to recognise that the aim of the framework is not to provide a final and definitive prioritisation of the capacity-building options. Rather, the priorities that are derived should be revisited on an on-going basis and revised as more and/or better data for the decision criteria become available.

Information cards for each of the SPS capacity-building options were then compiled. These are reported in Annex 1. Each card presents data for the eleven decision criteria, measured according to

the scales outlined in Table 3. For each criterion, details are provided of how measures for each of the decision criteria were derived. There is also an indicator of the level of confidence in the measure reported. Where there is a lack of underlying data and/or these data are of dubious quality, a low or medium level of confidence is indicated. Conversely, where fairly rigorous and comprehensive prior research is available, a high level of confidence is reported. These confidence measures need to be considered in interpreting the results of the prioritisation exercise, and in considering how the analysis might be refined in the future.

Table 3; Decision Criteria Measurement Metrics

Decision Criterion	Details	Measurement
Cost		
Up-front investment	Monetary costs of investments to upgrade SPS capacity	Absolute value ($)
On-going costs	Direct costs of maintaining and operating the upgraded SPS capacity	Absolute value ($)
Ease of Implementation	Expected complications in terms of need for multi-stakeholder involvement and collaboration	Yes (1) / No (-1)
Trade Impact		
Change in absolute value of exports	Predicted enhancement of exports or avoided loss of exports five years from implementation of the intervention	Absolute value ($)
Export diversification	Would the implementation of the intervention allow for access to new/lost market or trade in a new product?	Yes (1) / No (-1)
Domestic Spillovers		
Agricultural productivity	Changes in productivity of agricultural or fisheries production of commodities to export and/or domestic markets	Large negative (-2); Negative (-1); No change (0); Positive (+1); Large positive (+2)
Public health	Changes in domestic public health, through food safety, occupational exposure to hazards, etc.	
Environmental Protection	Changes in protection of natural environment	
Impact on Poverty	Change in the incidence of poverty	
Gender Impact	Impact on women or children	
Impact on Youth	Impact on youth	

3.5. Stage 5: Construction of spider diagrams

Through Stages 1 to 4, the inputs to the priority-setting process were collected and then assembled into the series of information cards. The aim of Stage 5 was to present the information in the information cards in a manner that permits easier comparison of the capacity-building options. Thus, spider diagrams were derived that plotted the SPS capacity-building options against the eleven decision criteria. Scrutiny of these diagrams (see Section 5) identified the decision criteria against which each of the capacity-building options performed relatively well/badly compared to the other capacity-building options in the choice set.

3.6. Stage 6: Derivation of quantitative priorities

The formal priority-setting analysis involved the use of outranking through the D-Sight software package. The mechanics of the analysis are described in some detail in the user guide to the framework. The inputs to the model are the data assembled in the information cards. For most of the decision criteria preferences were modelled using a level function since these were measured using categorical scales. However, the up-front investment, on-going cost and absolute change in value of exports criteria were measured continuously and modelled using linear functions. Three models were estimated using D-sight:

- Baseline model using decision weights derived in Stage 3.
- Equal weights model in which all of the decision criteria are weighted equally.
- Costs and trade impact model in which only the cost and trade impact decision criteria are included in the analysis, all of which are weighted relative to their weights from baseline model.

The baseline model is considered to provide the most reliable set of priorities, in that it uses the full set of information derived through Stages 1 to 4. The two subsequent models were estimated in order to examine the extent to which the derived priorities are sensitive to changes in the decision criteria or weights; if the broad ranking of the SPS capacity-building options remains generally the same under the three scenarios presented by these models, we can be reasonably confident that the results of the framework are robust.

3.7. Stage 7: Validation

The final stage of the priority-setting analysis is completed with this report on the results of the analysis. The aim of the validation process is to ensure that the results of the priority-setting framework were broadly in accordance with expectations, or that unexpected rankings can be explained through the pattern of data in the information cards. To facilitate this process, the draft report will be disseminated to stakeholders by email with a request for comments. Further, the preliminary results will be presented at a stakeholder workshop.

4.0 Description of Capacity Building Options

4.1. Tanzania

4.1.1. Hygiene and pesticide residue monitoring and controls in fish

Fisheries are important to Tanzania's economy, providing employment, income, and foreign export revenue. The sector is responsible for over 4 million jobs (about 35% of the 14 million in rural employment) and contributes about 1.4% to the country's Gross Domestic Product (GDP). The most important fish stocks and other aquatic resources include the snappers, Scombrides, mackerels, Nile perch (Latesniloticus) from Lake Victoria, sardines from Lake Tanganyika (Stolothrissatanganicae and Limnothrissamiodon), Nile tilapia (Oreochromis sp.) and pelagic sardines (Rastrineobolaargentea).

Fish contributes the highest percent of protein rich food consumed in Tanzania. The relationship between economic growth and nutritional status is strong: vitamin and mineral deficiencies have been linked to about $390 million in annual revenue loss or 2.65% of the GDP. Moreover, pesticides used

to control pests and diseases in farms in the catchment areas of water bodies dissolves into rivers and consumed by fish causing direct accumulation of pesticide residues in fish. Consumption of pesticide contaminated fish increases the risk of pesticide exposure.

In 189 samples of 11 widely used foods at the table analysed using US FDA multi-residue methods, pesticide residues were detected in 29% of all samples including fish. In fish variety: g-HCH 0.05 microg/kg was found. Converted into consumer Average Daily Doses, these concentrations were within ADI/ PTDI levels set by CODEX and, therefore, posed no significant health risk. However, the presence of pp-DDT in fish samples indicates a recent contamination of food raw materials with DDT. Furthermore, non-fish organic contaminants were detected in both fresh and dried fish and fish products indicating hygienic issues during processing stages.

To improve hygiene and reduce pesticide residues in fish a more effective hygienic control system would be put in place followed by strict pesticide control before lifting the ban on DDT for restricted uses in vector control programs in Tanzania. This intervention will be training trainers (TOT) among fisheries and fish processors in four main fishing ports of Dar Es Salaam, Tanga, Mwanza and Kigoma on Good Hygienic Practices (GHP) and strengthening pesticide regulatory capacity by facilitating policy review on pesticides. Both the TOT and policy review guidelines would then be disseminated to wider stakeholders. In addition, the output from this intervention will be monitored through sampling and testing of fish samples for hygiene and pesticide residues along a period of three years form the beginning of the intervention.

4.1.2. Hot water treatment for mango

Tanzania ranks 17th in world mango production with an annual production of more than 300,000 tons (MMA 2011). Mango is among the most important fruits in Tanzania ranking number one after citrus and pineapple in the export markets (FAO, 1999). Tanzanian mangoes are exported to Kenya through the Holili border, and some export experiences have been done to Dubai and Middle East countries in the past. Several factors affect mango production with postharvest losses being among the major constraints. Postharvest losses of fresh mango fruits in Tanzania have been estimated at 60 % mostly due to microbial decay and fruit fly bastocera (both dorsalis and envedence). Mango cv. 'Dodo' is the most cultivated and traded local variety in the country, but little is known about its postharvest losses at different stages of the supply chain.

Several techniques are recommended to reduce storage temperatures such as cold storage but their applicability by small-scale farmers and traders remains poor. On the other hand, hot water treatment is particularly used as a non-chemical quarantine treatment to retard postharvest microbial decay though it may have detrimental effects on fruit quality of some mango varieties. The effects of hot water treatment to control bactocera development and microbial decay on storability and quality of fresh mango are hardly known to many. Hot water treatment reduced the incidence of microbial decay by 85% and improved fruit total soluble solids content by 15% in comparison to untreated fruits.

Since studies in potential mango producing areas shows farmers have little knowledge on thermo treatment this intervention intend to carry out a Baseline survey in 9 regions with intensive mango production to determine actual production, its economic contribution and farmers' training needs before carrying out training in the area. Parallel with this the intervention will engage Sokoine University of Agriculture for research, consultancy, design and construction of high temperature forced air equipment with the target of installing such facilities in the targeted 9 regions.

4.1.3. *Pesticide residue monitoring and management in fresh beans*

Tanzania produces a variety of pulses, focusing on four major pulses, namely kidney beans, chickpeas, pigeon peas and green gram**.** Tanzania Revenue Authority's data indicates that the combined export of these four pulses continued to trend upward, hitting 190,391 MT in 2019, a nearly 10% increase over 2018's level of 174,512 MT. However, the occurrence of unacceptable levels of pesticide residues in fresh beans produce has been a growing public health concern worldwide. High pest infestation forces farmers to apply pesticides intensively to rescue crop loss. It is reported that the crop loss due to pest infestation can be as high as 100% if they are not controlled. Consumption of pesticide containing food is the major route of chronic exposure to pesticides. It is estimated that dietary pesticide exposure is five times higher than exposure through other routes which include inhalation and contact. Health risks associated with exposure to pesticide residues range from acute characterized with coughing, headache, nausea, stomach-ache, diarrhoea and vomiting to chronic in the form of endocrine disruption, reproduction and immune systems malfunctioning and development of some cancers.

Present policies, regulations and codes of practices in subsistence communities in Tanzania do not guarantee presence of acceptable levels of pesticides in food. Surveys reported misuse and overuse of pesticides, non-adherence to the pre-harvest interval, poor storage and disposal of pesticide containers and use of banned and counterfeit pesticides. Efforts are needed to reinforce policy and regulatory loopholes on pesticides and reach subsistence communities to create awareness and build their capacity in GAP that will halt pesticides misuse. This intervention therefore intends to provide training on GAPs, GMPs, GHPs, PHH to plant health and extension officers at the Ministry, regional and district levels in 5 regions in order to enhance their capacity to disseminate proper knowledge to farmers on proper use of pesticides. Equip them with sampling, testing and analytical skills on pesticide, install and implement an inspection system. This intervention will finally establish a sampling and testing exercise in 5 regions potential for fresh beans production.

4.1.4. *Aflatoxin control and management in maize, groundnut and sorghum*

Tanzania is a leading producer of maize and groundnuts in the East African region, accounting for 2% of world production. They are the major staple food, and it is estimated that maize contributes to around 35% of the average daily calorie intake, making up nearly half of dietary requirements. However, these crops are highly susceptible to fungal infestation and aflatoxin contamination which affects the health of consumers. Aflatoxin is a known carcinogen and the leading cause of liver disease and liver cancer in Tanzania – and reduces the country's export earning potential. Studies carried out in the country have indicated that 25-45% of maize is contaminated by aflatoxin. On the other hand, groundnuts were reported to be contaminated by high aflatoxin level exceeding the set limits (5 and 10ppb for B1 and Total aflatoxin) in 18% of all samples tested. Among the risks associated with consumption of contaminated maize and groundnuts include immune suppression, malnutrition, liver cancer and death with acute exposure. Furthermore, chronic exposure is common since majority of households consume home-grown maize which does not undergo any quality assessment through the regulatory system. Situational assessment on the aflatoxin problem confirmed low level of awareness on aflatoxin issues among key actors along the food value chain, limited access to guidelines for good agricultural practices and poor storage were behind the prevalence of aflatoxin in maize and groundnuts grown and consumed in Tanzania.

This intervention will target hotspots of aflatoxin contamination in Tanzania through an integrated approach targeting both pre-harvest (e.g., GAP & Aflasafe use) and post-harvest measures (storage, drying techniques, sorting and grading, etc.) in maize and groundnuts food chain with the overall objective of improving food safety and food security, agricultural productivity and trade. Sampling and testing will be conducted in 5 regions of Dodoma, Manyara, Singida, Ruvuma and Tabora (total of 20 districts) potential in maize and groundnut production to establish the extent of aflatoxin contamination and establish what need to be done at different stakeholders' levels. This intervention will also train extension officers and farmers at village level in 20 districts as well as facilitate TV and Radio awareness programmes. In addition, this option will facilitate policy and regulatory support in promoting the use and subsidy on Aflasafe in 3 pilot districts for a period of three years.

4.1.5. Hygiene controls and monitoring of heavy metals in vegetable oil

Tanzania has great potential in the vegetable oil seeds sector, which can be scaled-up as one of its key sectors for industrial development. Demand for vegetable oil is at least growing with the rate of population growth. The production of oilseeds in Tanzania mainly focuses on groundnuts (40%), sunflower (36%), sesame (15%), cotton (8%), and palm oil (1%). While there is a large production of other oilseeds such as groundnuts and sesame, there has been no substantial oil production from these seeds, thus making sunflower oil the most important vegetable oil produced in Tanzania.

Despite the great potential of the sunflower seeds oil sector in Tanzania, it also faces many challenges including unavailability of technology/machines for refining resulting in contamination of heavy metals and residues in oil, inadequate knowledge of appropriate technology for processing and packaging of sunflower oil (both raw and doubled refined) and lack of awareness of TBS (Tanzania Bureau of Standards) Standards and Procedures.

Awareness of the sunflower oil standards is needed to all stakeholders in the whole value chain (supplier of quality seeds, farmers, processors, and traders). Also, food safety is increasingly a concern, which means a stakeholder training on TBS standards is quite necessary. There is a need to strengthen farmer associations as a key to develop bulk provisions and stronger marketing systems. Storage facilities and working sites are still in poor conditions. Majority of the small processors are working at their backyard and not oriented to Good Hygienic Practices (GHP).

Thus, farmers and sunflower oil stakeholders will be facilitated to understand TBS oil standards as initial step to improve their adherence to hygiene requirement during production. As researchers have noted that use of cheap, poorly made oil extraction machines contribute to traces of heavy metals contaminants in oil this intervention will encourage collective processing by strengthening farmer associations in Singida, Manyara and Dodoma, develop and disseminate guideline for storage facilities and extraction machines and train processors on GHP. Sampling and testing of oil samples will also be conducted for three years with a constant feedback to sunflower oil stakeholders and the government.

4.1.6. Monitoring and management of fruit fly in fresh fruits

The horticultural industry in Tanzania is constrained by many factors including insect pests, and particularly fruit flies. Almost all commercially grown fruits are prone to infestation by these pests. In Tanzania, both indigenous and exotic invasive fruit fly species have negatively impacted the production and trade of fruits and fruit-bearing vegetables. The oriental fruit fly, Bactrocera dorsalis, which arrived in Tanzania in 2003 inflicted heavy losses and necessitated the development of management programmes for fruit flies.

The available capacities to combat Bactrocera dorsalis is still low in detection and monitoring surveys, establishment of spatial and temporal abundance and studies on the host range and developmental biology of fruit flies. It is recommended to widen surveillances and include Area Wide Management programmes and implementation of IPM nationwide. Surveillances will be carried out in 9 fruits production regions (Kilimanjiro, Arusha, Tanga, Pwani, Morogoro, Mbeya, Bukoba, Katavi and Rukwa). Also, the intervention will procure and install traps with bioagents and lures to eliminate male flies as a demonstration and building capacity of farmers and extension staff to take over the intervention on their own.

4.1.7. Hygiene control for dry fish

Fish exports from Tanzania are considerable and consist mainly of frozen Nile Perch fillets, with the main markets being the EU and Asia. The total recorded value of fish exports from Tanzania was approximately US$150 million in 2009. Regional exports (cross border trade) of fish from Tanzania are also significant, particularly from Lake Victoria. However, this trade is generally informal, and data is not readily available or reliable. Apart from export, fisheries are one of the most significant renewable resources that Tanzania and East Africa have for food security, livelihoods and economic growth. Efforts, however, need to be made to ensure that as the population grows, and demand for food and employment likewise grows, the benefits that fishery resources provide are protected through sustainable management and value-addition. Improving quality and sanitation issues is critical to improving marketing opportunities regionally as quality standards are becoming an important requirement for trading fish across borders. Regionally harmonized quality standards should increase competitive access for traders and help to ensure improved quality of fish for consumers. Capacity building for all those involved in the value-chain is an important part of improving standards and quality.

In Tanzania, the processing of fish and its by-products is carried out by subsistence fishermen or artisanal processors using traditional technologies like drying, smoking and salting. The processing is usually undertaken on lake shores under temporary shades using tools like wire-mesh, wood spikes and ropes for hanging fish. These processing techniques are hygienically unhealthy. Yet, drying is the best way to save huge amounts of fish in remote fishing areas.

To enhance hygienic practices and preserve quality for dry fish, this intervention will conduct awareness creation in fishing ports of Dar Es Salaam, Tanga, Mwanza and kigoma targeting fisheries and fish processors on the importance of hygienic practices in the dry fish value chain. The intervention will facilitate engagement of consultancy, design and construction of economically viable hot air-drying facilities that will be installed in the four identified ports.

4.1.8. Monitoring and management of bacteria wilt in potatoes

According to national statistics, potato is the 8th principal food crops in Tanzania. In 2008, Tanzania produced about 650,000 tons (FAO, 2009), and in 2012 about $12,848,000 worth of potatoes. The trend however went down inconsistently ranging from $2,000-$10.9 million between 2014-2018. However, ITC estimated $46,600 untapped export potential of potatoes.

The decline is linked to reduced production caused by Bacteria wilt and other factors, bacteria wilt is caused by a soil-borne bacterium named *Ralstonia solanacearum.* Potato wilt bacterium mainly inhabits the roots and enters the root system at points of injury caused by farm tools or equipment and soil pests. Bacterial wilt is one of the most destructive diseases of the potato. It's responsible for

causing considerable losses to the potato industry where the disease exists. The disease can cause total loss of a crop and prevent the use of land for potato production for several years.

The capacity of farmers to combat bacteria wilt is limited due to the fact that the disease outbreaks are most often caused when infected potato tubers that appear healthy are planted or from contaminated soil carried on boots, tools and cultivation equipment and contaminated irrigation or flood water or when weed hosts on the side of rivers and streams carry the bacterial wilt pathogen. The disease can survive up to four years in the soil and in plant debris and the Bacteria are generally favoured by high soil moisture and low temperatures. To combat such a pest needs vigorous monitoring and management efforts that will inform phytosanitary actions. In addition, this intervention will carry out bacteria wilt surveillance in three regions of Kilimanjaro, Arusha and Mbeya to establish both the severity of the problem and develop training needs. Then training of farmers, extension staffs and potato traders on the major means of bacterial wilt transmission and ways to combat it will be provided. This will also include the development and dissemination of guidelines for identification and establishment of clean seed planting material.

4.1.9. Mycotoxin and antibiotics monitoring in animal feeds

Animal feeds are routinely subject to contamination from diverse sources, including environmental pollution and activities of insects and microbes. Animal feeds may also contain endogenous toxins arising principally from specific primary and secondary substances produced by fodder plants. The effects of feed contaminants and toxins range from reduced intake to reproductive dysfunction and increased incidence of bacterial diseases. Residues transferred to edible animal products represent another reason for concern. In Tanzania statutory control of contaminants is at best rudimentary. The scope for decontamination of feeds contaminants and toxins in animal feeds, accessing quality and safety of animal feeds is limited and generally uneconomical, and prevention is the most effective practical strategy.

To achieve a stronger and practical preventive strategy this intervention will carry out sampling and testing on animal feeds in Dar Es Salaam and Arusha (for chicken) and in Tanga, Kilimanjaro and Manyara (for beef and dairy) to establish the extent of the problem. Information from these tests will be used to inform the government, stakeholders and consumers on the need to take action. The intervention will establish a list of animal feed processors and Agrovets dealers in the targeted regions for the purpose of building their capacity to minimize mycotoxin and antibiotics contamination then carry out training on the identified processors and agrovet dealers. For the purpose of sustainability, a National guideline for mycotoxin and antibiotic control will be developed and disseminated.

4.1.10. Monitoring of cyanide in beverages

Tanzania exports some sizeable amount of beverages to the region, averaging over $15 million over 2014-2018. ITC estimates untapped export potential of $4 million of beverages (alcoholic & non-alcoholic) export by Tanzania to the EAC region. Some of these beverages use sorghum (esp. beer and malt) and cassava (some spirits) as raw material in their production. Cyanide concentration has become a grave health issue in some beverages because inputs such as cassava and sorghum have high concentration of it. High exposure to cyanide in humans causes nausea, vomiting, diarrhoea, dizziness, weakness, paralysis and sometimes death.

Cassava and sorghum contain potential hydrocyanic acid (HCN) that could be generated as free HCN by digestion and steam distillation. Sprouts of sorghum grown for 3 days in the dark at 30°C contained

from 258–1030 ppm potential HCN relative to the weight of the un-germinated, dry seed. The consumption of sorghum sprouts or products made from them may be hazardous. The average amount (61.3 mg) of HCN obtained in laboratory from sprouts grown from 100g of seed exceeds the average fatal dose for an adult.

Sorghum and cassava develop cyanide during their growth stages when glucosides breakdown or decompose into glucose sugars by hydrolysis. This decomposition process frees the cyanide from its chemical bond. The same process happens during spouting sorghum in beer making. Studies have noted that this process is triggered by sudden wilting both in the field and in the factory.

The capacity of farmers to control their crops from cyanide concentration is impossible. Therefore, to safeguard consumers, it is necessary to monitor cyanide concentration in raw materials before production and in samples of beverages before they are distributed for sale.

The problem of cyanide in beverages is little known in the community. Therefore, the first step toward solving this problem will be to create awareness on the dangers surrounding cyanide in beverages. This will be done by pilot sampling and testing beverages produced from sorghum and cassava and establish the extent of the problem, carry out awareness campaigns on the problem through TV and Radio programmes, procure and install cyanide testing equipment for 7 border posts, 3 airports and 3 harbours ports. Training border post plant health inspectors on sampling, testing, analysing and data transmission for cyanide.

4.1.11. Traceability system for maize seed

Tanzania exports a substantial amount of Maize seeds to the East African region, peaking almost at $100 million in 2014 and between $70-95 million between 2015 and 2018. The Tanzania seed supply system has several challenges. There are a huge number of companies registered to supply maize seed; the situation is unclear in terms of variety development, evaluation, release, commercialization, and breeding lines availability outside the public sector or its direct links. The PBR legislation is not ratified to modernizing the development of maize varieties by both the public and private sector and there are issues of grain being sold as seed. All this necessitate the need to have an effective traceability system as a means to ensure famers receive good quality maize seed.

The first step in establishing traceability system is to understand seed maize production chain and its code of conduct. This will enable recovery of the history, application and location of any activity or process the final product went through. Identifying and coordinating maize seed stakeholders is vital to achieving a true production chain and adherence to code of conduct. This intervention will develop electronic platform for on online traceability or QR code.

4.1.12. Hygiene and pesticide residue monitoring and controls in honey

Data on honey production in Africa indicates that Tanzania produce 34,000 tons of honey annually. It is second to Ethiopia which produces an estimated quantity of 41,233 tons. Interestingly, Tanzanian honey is known all over the world due to its natural state compared to honey from other countries due to its organic nature. Tanzanian honey is in high demand in many countries in Europe (e.g., Germany, Holland, England, and Belgium) and other countries in the world. The honey sector generates about $1.7 million each year and employ about 2 million rural people. Based on potential forest area it is estimated that Tanzania can produce 138,000 tons of honey worth $145 million and 9,200 tones of beeswax per year. Due to an increasing concern from consumers for no or little

chemicals in food products, it is expected that the demand for organically produced honey will be even more in the future.

The presence of pesticide residues and other contaminants in honey can have adverse health effects on bees and humans, decrease the quality of honey and devalue its beneficial properties. Typically, pesticide residues in honey occurs when bees in search for food, visit crops that have been treated with various agro-chemicals and/or when beekeepers use chemicals to control bee pests or diseases. So far, several researchers reported various residues of pesticides in honey at varying concentrations confirming the need to constantly monitor the presence of pesticide residues in honey to assess any potential health risk and to ensure that its quality, whether as food or as a therapeutic, is not compromised. Therefore, there is a need to intervene to regulate hive exposure to unhygienic environment and pesticides.

Studies in Tanzania have shown that Tobacco is cultivated in areas with high level of beekeeping activities and they are sensitive and prone to many diseases. Thus, tobacco farmers use a large amount of fertilizer, herbicide and pesticides. Among the pesticides commonly used are imidacloprid, chlorpyrifos, dichloropropene, aldicarb, dithane DF and methyl bromide. Unfortunately, the ability of smallholder honey producers to control pesticides use that can contaminate honey is limited because honey producers cannot control use of pesticides in neighbouring tobacco farms. Tanzania has therefore developed a legal framework which supports the development of the beekeeping sector. The legal framework is The National Beekeeping Policy, 1998, the Beekeeping Act, 2002(No. 15 0f 2002), and the Beekeeping (General) Regulations and Guidelines. The legal framework among other things promotes the use of Integrated Pest Management (IPM) agreement package and regulations on the use of pesticides; the application of pesticides at night when bees are not foraging, application of selected pesticides which are less toxic to bees, avoiding application of pesticides on flowers at "effective bloom period", the beekeeper confining the bees when pesticides are being applied (beekeeper be notified of the intention, date, time and place of pesticide application).

The framework state that Environmental Impact Assessment (EIA) will be required for investment which will take place inside or around bee reserves and apiaries, and which may cause potential damage to the bees, bee products and bee fodder plants. EIA must be incorporated into the planning and decision-making process in order to ensure beforehand that unnecessary damage to the environment is avoided and possible mitigation measures are identified. This is further elaborated to enforce the National Beekeeping Policy on pesticides management that any apiary product or bee product except where IPM is applied shall be established at least 7 kilometers away from where pesticides are applied, that No spray of pesticides shall be done during the day time within at least 7 kilometers to or inside an apiary and where a person intends to apply pesticides on land, he shall communicate such intention to beekeepers through the appropriate local authority and the general public within an area where such application is to be done. The Beekeeping Regulation state that “No person shall establish an apiary near a tobacco farm except in a distance of 7 kilometers away from where apiary is kept.

However, practical application of this regulatory framework as it hinges on the capacity of the stakeholders. This intervention will invest in enforcing the implementation of this legal framework by, among other things, create awareness on the legal framework, conduct regular sampling and testing for contaminants, and train beekeepers on GHPs.

4.1.13. Monitoring and management of fusarium wilt in banana

Banana is a staple food in many parts of Tanzania and neighbouring countries, where it provides approximately 20% of the total calorie consumed per capita. Production of bananas in Tanzania, however, has declined since the 1970s, and now yields a fraction of its potential. While low yields are partly the reason due to poor soil fertility in the region, pests and diseases have played a significant role in reducing banana production. Fusarium wilt caused by *Fusarium oxysporum*f. sp. *cubense* (Foc), pose a substantial problem to sustainable banana production in Tanzania, with a significant risk to destabilize food security and household income in the whole East and Central Africa. The main phytosanitary risk is in the transmission of fusarium wilt which can occur when living or dead host plants, infected plant parts and soil from infected fields are carried out of the field by persons, machinery and animals or mechanically as contaminant on articles.

This necessitate measures to included *Fusarium oxysporum* f. sp. *cubense* (Foc) in the national list of quarantine pests and obligatory declaration, prohibit importation of banana plants or plantlet as well as other hosts from countries where fusarium wilt is present. Capacity-building and sensitization campaigns among personnel that are in the line of duty, carrying out surveillance (e.g., surveys) for early detection of potential incursions of the disease, capacity building in symptoms and sampling would be the target of this option.

4.1.14. Hygiene and cyanide monitoring and controls in cassava

In Tanzania cassava is a major subsistence crop, after maize, especially in Tanzania's semi-arid areas where, due to its drought tolerance, cassava is sometimes considered a famine reserve when cereals fail. Most of the cassava production of Tanzania (84%) is for human consumption, and the remainder is used for animal feed, alcohol brewing, and starch production. Cassava production in Tanzania is estimated at 5.4mt according to the 2012 Food and Agriculture Organization Corporate Statistical Database (FAOSTAT). In that year Tanzania was the 12th largest cassava producer in the world and the 6th largest in Africa after Nigeria (top producer in the world), DRC, Ghana, Angola and Mozambique.

It is estimated that potential long-term requirement of cassava root in Tanzania is between 530,000t and 640,000t. The following sectors have been identified as potential drivers of increased local cassava demand: milling, animal feed, beer and beverages, sweets, snacks, starch manufacture, textile factories, paper mills and hardboard, paint, and pharmaceuticals.

Tanzania exports very minimal value of cassava over the last ten years of between $0-108,000 except in 2017 where it exported close to $1.8 million. In both locally consumed and exported cassava, cyanide concentration has become a health issue. High exposure to cyanide in humans causes nausea, vomiting, diarrhoea, dizziness, weakness, paralysis and sometimes death. Internationally, the Codex Standard for 'sweet cassava' (those varieties with low levels of cyanogens) is 50 ppm (fresh weight basis, FAO), but many countries have yet to formally adopt recommended limits (Kolind-Hansen & Brimer, 2009).

As cassava roots and its products are increasingly being exported into countries that do not have experience in growing and processing cassava, and thus lack knowledge about the health risks associated with consumption of these food products, it is strongly advisable that the maximum 50 ppm safe level for total cyanide in cassava products established by FAO be monitored to ensure that cassava roots and its products are safe for human use. This intervention will undertake sampling and testing of cassava to establish the extent of the problem, create awareness on the dangers

surrounding cyanide in beverages, procure and install cyanide testing equipment, as well as training border post plant health inspectors on sampling, testing, analysing and data transmission for cyanide.

4.1.15. Residue monitoring and control of contaminants in spices

Based on ITC export potential estimates, Tanzania has an untapped export potential of $537,900 of spices exports, consisting of black/white pepper, lemon glass, ginger, cinnamon, cardamom, cloves, vanilla, common pepper, brinjals and other spices. Although insect pests and diseases are a constraint to production of spices, use of agro-chemical inputs particularly pesticides are uncommon. However, in the production of black pepper insect pests such as grasshopper, mealy bugs, red and black ants, and snakes has been observed by farmers. This can be linked to reports of insect parts being found in processed spices. Nevertheless, Black pepper samples collected and analyzed for pesticide residues were found with four pesticide residues (γ-HCH, α-endosulfan, β-endosulfan, and *p,p'*-DDT). Since no pesticides were used in the production process it is evident that these pesticides residues are linked with upstream agriculture.

To reduce contaminants in the processed spices, capacity building of farmers to combat insect pests during production need to be improved. But to reduce pesticides residues will require a wide involvement of stakeholders upstream. Spice producers and processors will be trained on IPM in order to reduce use of pesticides during production. Also, training on GAP and GHP will be provided to give them the capacity to ensure good plant health and hygiene during handling of their produce. For monitoring and feedback, sampling and testing will be conducted on regular bases. To secure government involvement, the national strategy on spice and the policy and legal framework will be reviewed.

4.1.16. Monitoring and control of antibiotics in eggs

From available data, Tanzania exported eggs worth of $56,000 in 2016, $105,000 in 2017, and $162,000 in 2018. There is a steady growth in egg exports which is promising. However, surveys found that producers use an array of antibiotics. Most frequently used antibiotic drugs belong to the group of tetracycline and sulfonamides. Furthermore, some prohibited antimicrobial agents like furazolidone were found in some veterinary drug stores at poultry farms. Farmers are aware of drug withdrawal period but seem reluctant to observe this requirement in fear of investment losses. Due to this observation, there is high risk of exposure to unacceptable levels of drug residues from poultry products, as a result of failure to observe antibiotic withdrawal periods. Efforts involving various stakeholders such as the producers of poultry products, consumers and regulatory authorities are needed to bring awareness on public health implications associated with drug residues in foods.

This intervention will create awareness on the health issues surrounding consumption of eggs with high concentration of antibiotics and the economic losses faced when egg exports are rejected. A survey coupled with on-site training will be carried out in all veterinary drug stores to identify prohibited antimicrobial and counterfeit drugs. For farmers to produce quality eggs there is a need to build their production capacity by training on withdrawal period of permitted drugs.

4.1.17. Disease monitoring and controls for hides and skins of cattle and sheep

Tanzania ranks second in Africa in terms of cattle population with 32.2 million cattle, Tanzania also ranks third in Africa in terms of sheep and goat populations. Red meat is an extremely important component of the agri-food sector in Tanzania. It has many linkages along the chain, is a source of income for a large segment of the country's population, provides high value protein in the nation's diet, and contributes to food security and a major earner of foreign exchange. In spite of these facts, red meat value chain is facing series of challenges that have had a negative impact on its performance. Production and productivity have stagnated or declined over many years. Among the challenges is the lack of control of livestock diseases which have had a significant toll on the red meat sector.

Surveillance is an important element in the control of animal diseases and includes both active and passive search and monitoring. The current surveillance system involves a link between the Directorate of Veterinary Services and the decentralized local government system via the zonal veterinary investigation centres (it is believed 70 to 80 percent of all local councils have a veterinary officer on their staff). Almost all surveillance at the district level, however, is passive and based on clinical diagnosis. The level of reporting to the central unit dealing with epidemiological surveillance is extremely low and apparently reducing. The challenge facing surveillance and laboratory diagnosis is to have a strong and sustainable system supported by laboratory diagnostic facilities as well as private sector participation in surveillance.

Consequently, the quality of hides and skins produced is also of low quality due to pests and diseases that affect animal productivity. Other factors that contribute to poor hide and skins includes poor breeding policies and programmes, limited pasture/feed and water resources, poor value adding and marketing systems, low farmers' knowledge, poor husbandry practices linked with gross weaknesses in veterinary service supply chain. The MoLF has developed plans for monitoring diseases and evaluating the mechanisms for prevention and control of livestock diseases. However, there is weak execution of the plans due to resources limitation. For effective livestock productivity there must be a proper monitoring and evaluation that inform decision making.

To solve this problem a digital real time platform will be developed, installed and operationalised to enable the veterinary service to receive prompt information that will enable effective action to be taken. This digital platform will be able to work in remote areas with no network and transfer data once it reaches areas with network to enable field officers to reach livestock keepers who are scattered in remote areas in search of grazelands.

4.2. Uganda

4.2.1. Hygiene and pesticide residue monitoring and controls in fish

Uganda exports substantial amount of fish and fish products. ITC export potential estimation shows that Uganda has untapped export potential of $2.6 million fish exports to the East African region. The product also holds a great potential but is currently constrained by several SPS challenges including hygiene and pesticide controls. The world is increasingly getting aware of effects of heavy metals and other contaminants. The market for aquaculture is specifically aware that fish raised in controlled water bodies whereby pollution and its effects may be high. The capacity of technical personnel in terms of human resources and equipment are also low. There is need therefore to build capacity in hygiene control and to handle residue monitoring of fisheries and aquaculture products. This will

involve training of fish farmers on appropriate pesticide use and training of fishermen and fish traders on Good Hygiene Practices. In addition, appropriate level of public control must be strengthened, a fundamental change in the habits and practices of people involved in the production and handling chain must be enhanced through awareness creation, and some significant investment in basic infrastructure like cold-chain facility.

4.2.2. Aflatoxin control and management in maize

Mycotoxins are a major problem impacting exports of grain from Uganda totaling to 38 Million USD annually. Mycotoxins are generally also a major public health issue in Uganda, with Aflatoxin induced liver cancer at 3,700 new cases annually, monetized at a cost of 577 million USD in treatment annually. Major Mycotoxins of concern in Uganda are Aflatoxin and Fumonism. High aflatoxins concentrations were attributed to poor practices during harvesting, drying, processing, and storage. Uganda is a net surplus producer of maize, a substantial part of which is exported to Kenya that has a periodic deficit of 18 million 50kg bags annually, with about 600,000MT sourced from Uganda. The increase in demand for maize for human consumption and animal feed (1/3 of the maize) in the region coupled with the relevant food safety concerns (Aflatoxin) requires urgent attention to avoid loss of markets. Tackling this problem requires a package of complementary interventions, encompassing five priority areas of awareness creation; advocacy and communication; management of the agriculture value chains; public health management; policy and legislations; and coordination, monitoring and evaluation. According to ITC estimation of export potential, Maize seed for sowing shows the largest export potential for Uganda.

4.2.3. Hygiene, pesticide residue, and aflatoxin monitoring and controls in milk

Antibiotic residues in milk and milk products are a serious public health hazard and are among SPS issues that currently hinder trade. This, therefore, necessitates stringent control measures including testing, sensitization and training of dairy farmers to ensure continuous improvement. Hygiene issues are highly associated with rejection of milk and milk products exports. Dairy cold chain infrastructure features consistently and adjustable temperatures to keep milk at optimum level, so as to allow farmers contact the buyers for increased income and facilitate value addition for increased export volumes and values. The most important advantage of maintaining is improving milk safety and quality because checks at the centre enables farmers to produce clean and fresh milk to meet required standard for the market. It is, therefore, an important infrastructure to maintain milk at 4C˚ and below so as ensure its utmost quality.

Milk is also often contaminated through feeding livestock with aflatoxin contaminated grains. In this area, a consistent awareness creation and training of animal feed producers is required. In addition, sampling and testing of grains or animal feeds to eliminate contaminated grains and/or animal feeds would be crucial to addressing the problem.

4.2.4. Aflatoxin control and management in sorghum

Mycotoxins are a major problem impacting exports of grain from Uganda totaling to 38 Million USD annually. Mycotoxins are generally also a major public health issue in Uganda, with Aflatoxin induced liver cancer at 3,700 new cases annually, monetized at a cost of 577 million USD in treatment annually. Major Mycotoxins of concern in Uganda are Aflatoxin and Fumonism. High aflatoxins concentrations were attributed to poor practices during harvesting, drying, processing, and storage. Uganda exports about 10.1 million of sorghum. Aflatoxin is a concern in sorghum. Tackling this problem requires a

package of complementary interventions, encompassing five priority areas of awareness creation; advocacy and communication; management of the agriculture value chains; public health management; policy and legislations; and coordination, monitoring and evaluation.

4.2.5. Aflatoxin control and management in groundnuts

Mycotoxins are a major problem impacting exports of grain from Uganda totaling to 38 Million USD annually. Mycotoxins are generally also a major public health issue in Uganda, with Aflatoxin induced liver cancer at 3,700 new cases annually, monetized at a cost of 577 million USD in treatment annually. Major Mycotoxins of concern in Uganda are Aflatoxin and Fumonism. High aflatoxins concentrations were attributed to poor practices during harvesting, drying, processing, and storage. Uganda exports about $5.3 million worth of groundnuts. However, the crop is highly susceptible to aflatoxin. Tackling this problem requires a package of complementary interventions, encompassing five priority areas of awareness creation; advocacy and communication; management of the agriculture value chains; public health management; policy and legislations; and coordination, monitoring and evaluation.

4.2.6. Aflatoxin control and management in soya beans

Mycotoxins are a major problem impacting exports of grain from Uganda totaling to 38 Million USD annually. Mycotoxins are generally also a major public health issue in Uganda, with Aflatoxin induced liver cancer at 3,700 new cases annually, monetized at a cost of 577 million USD in treatment annually. Major Mycotoxins of concern in Uganda are Aflatoxin and Fumonism. High aflatoxins concentrations were attributed to poor practices during harvesting, drying, processing, and storage. Uganda exported as much US$3.8 million to the EAC region in 2017 although this has declined to just close to a million dollars in 2018. Nonetheless, the crop is highly susceptible to aflatoxin and hinders its potential. Tackling this problem requires a package of complementary interventions, encompassing five priority areas of awareness creation; advocacy and communication; management of the agriculture value chains; public health management; policy and legislations; and coordination, monitoring and evaluation.

4.2.7. Disease monitoring and controls in live cattle and beef

Regional and international trade in live animals requires both importing and exporting countries to have adequate infrastructure to control animal diseases and also observe sanitary and phyto-sanitary measures. Uganda is experiencing frequent outbreaks of transboundary and trade sensitive animal diseases such as Foot and Mouth Disease (FMD), Rift Valley Fever (RVF), Peste des Petites Ruminants (PPR), African Swine Fever (ASF). In addition, there are emerging and re-emerging animal diseases such as Congo creameam haemorrhagic fever (CCHF), Anthrax, Brucellosis, Avian Influenza (AI) that affect both production and human health. These challenges are partly attributed to uncontrolled animal movements internally and across the national borders as well as lack of functional animal quarantine stations and holding ground facilities. The Government has got a number of pieces of land earmarked either for animal quarantine stations or holding grounds that is scattered around the country. The land is not being used as the past developments were vandalised or became dilapidated. The Government through MAAIF will identify key strategic pieces of land and private entities to re-furbish animal quarantine stations and holding grounds. This will improve the capacity to control animal diseases and also observe sanitary and phyto-sanitary measures required for safe trade since there will be better monitoring of disease situation in animals that are imported or destined for export.

4.2.8. Pesticide residue monitoring and management in fresh vegetables

Pests and pesticide residues are one of the key SPS issues that is faced by horticulture products exports. In a recent diagnostic mapping of SPS issues in the horticulture sector, it was found that "fake inputs" was the single most often cited problem, while misapplication of agro-chemicals and the lack of expertise at the production level were also among the top challenges that is associated with frequent contamination of fresh vegetables. Uganda's principal market for horticulture products is the European Union (EU), although, about US$47 million exports of fresh vegetables also goes to the region. However, compliance with pest free produce is currently restricting exports. This capacity building option is intended to use combined complementary approaches of inspection, awareness creation, and training on pesticide use and GAP, GHP, GMP, etc.

4.2.9. Training on biosecurity to reduce AI in day-old chicks

FAO report in early 2020 confirmed the occurrence of Avian Influenza (H5N1 & H5N8) in Uganda since 2017. Uganda exports day-old chicks mostly to Rwanda, Kenya, and DRC. However, Uganda faces SPS challenges in exporting to EAC region mainly due to the different requirements by these importing countries. TMEA estimated that this causes unprecedented delays at border points with increased costs at US$500 per day in addition to other costs. Although the individual country's requirements include:

- having the veterinary officer of the government of the exporting country examining the chicks a day before shipment and the chicks must have been found free of any clinical signs of infections or contagious disease of poultry, and
- ensuring that there are appropriate testing and testing methods, vaccination, quarantining procedures, approved hutching conditions, registration of hatcheries, transportation and traceability procedures among others,

Some of the individual countries within the EAC still insist on their own tests and procedures for allowing consignments to access their markets.

Apart from the challenges with different requirements by EAC countries, local capacity in disease control and management is weak. This option therefore will seek to train poultry farmers on biosecurity to reduce the occurrence of AI in day-old chicks. Other aspects will include strengthening surveillance, response, and diagnosis for influenza viruses.

4.2.10. Mycotoxin and antibiotics monitoring in animal feeds

Animal feeds are routinely subject to contamination from diverse sources, including environmental pollution and activities of insects and microbes. Animal feeds may also contain endogenous toxins arising principally from specific primary and secondary substances produced by fodder plants. The effects of feed contaminants and toxins range from reduced intake to reproductive dysfunction and increased incidence of bacterial diseases. Residues transferred to edible animal products represent another reason for concern.

Similarly, antibiotics are used for animal feeds such as cattle, sheep, poultry, fish and others to increase efficiency (efficient conversion of feed) and growth rate, treat clinically sick animals and prevent or reduce incidences of infectious diseases. Prolonged feeding of animals with feeds containing antibiotics culminates into bacteria which are resistant to antibiotics. Human infections can occur when animal products e.g., meat containing the resistant bacteria is eaten. Inappropriate and

widespread use of antibiotics in animals has led antibiotic residues being found in foods of animal origin.

There is a rapid increase in demand for animal feeds in the EAC region driven by consistent growth in commercial livestock production as a result of demand in animal-based products. Uganda exported close to US$45 million worth of animal feeds to the EAC region in 2018. The governments in the EAC member states require feed to comply with their set levels of mycotoxin for different categories of ingredients for making feeds targeting different livestock, failure to which amounts to rejection of such consignments.

In order to address these gaps, investment is required in training extension officers, procurement of rapid testing kits with appropriate training on their use, awareness creation on antibiotic use, increased surveillance and monitoring to avoid the growth and spread of antibiotic resistance and reduce antibiotic residues in livestock products. Investment in laboratories and training and updating clinicians on trends about drug resistance, developing education materials and programs for training farmers and veterinarians on prudent drug use and appropriate storage.

4.2.11. Monitoring and testing of heavy metals in cane sugar

In 2018, Uganda exported close to US$39 million worth of raw cane sugar to the EAC region, and ITC estimate that the product holds about $44.6 million untapped export potential to the region. Nonetheless, the scale of contaminants in raw cane sugar, particularly heavy metals, pesticide residues, and other contaminants due unhygienic practices, is well recognized in the EAC region. This has led to the development of a draft standards for the EAC and currently at adoption stage by Uganda. The implementation of this standard will require appropriate training of stakeholders on the requirement of the standard, monitoring and testing for contaminants to comply with the standard. This CBO therefore will focus on monitoring i.e., sampling and testing of cane sugar to identify and eliminate heavy metals. This would be complemented by training of stakeholders on the requirements of the standard including training on GHPs.

4.2.12. Hygiene and pesticide residue monitoring and controls in honey

There has been detection of Permethrin I a chemical used in mosquito nets. Permethrin is soluble in oil. Melted beeswax is able to mix with the permethrin and it contaminates the wax. The major concern is with the contamination of the beeswax that is exported. Residue free or organic beeswax commands a much better price on the world market and is in huge demand currently. The general consensus is that this contamination is happening during the wax extraction process. The melted wax is strained through a mosquito net or a PP bag. However, it's important to note that this is not the only source of contamination but also from bags/sacks which have been previously used for storing pesticides, grains which has been treated with pesticides, and seeds treated with fungicides and pesticides. These are often PP bags or made out of material and used for straining the beeswax.

To avoid contamination, beekeepers and processors need to be aware of the causes of contamination, the effects of contamination as contaminated beeswax commands a lower price than residue free one and be equipped to process the honey using residue free material(s). Current residue free beeswax on Ugandan market before shipping goes for 8 dollars before shipping as compared to conventional one at 3 dollars. The demand for Ugandan Bees wax from one company alone (British wax refinery) is 40,000mt. It is observed that most samples of beeswaxes analysed passes most tests except for Permethrin.

There is a need for massive and combined awareness creation on advantages of residue free beeswax, development of SoPs and standards, providing modern processing materials to beekeepers, promotion of beeswax solar extractor that is able to process wax without these strainers, and removal of taxes from honey and beeswax extraction equipment. This will enable processors to buy comb honey and control the quality from processing centre.

4.2.13. Disease monitoring and controls in chicken meat

The poultry industry is one of the newly emerging industries within the livestock sub-sector. The poultry industry in Uganda plays social, economic and health roles in the lives of the rural households and the vulnerable communities especially those who do not have a right to land ownership. The most important poultry is the chicken. Of recent, large scale commercial broiler and layer chicken farms have been established and providing employment especially to the youth and women. The country has also been able to diversify exports to the regional markets. However, in the last ten years, the chicken population has reduced by 5.4% despite the increase in the number of chicken rearing households and large-scale farms across the country. The rampant diseases such as Newcastle and infectious bronchitis are partly responsible for the reducing numbers of chicken in the country. This mostly affects the rural households. Under the current Agriculture Sector Strategic Plan, the poultry industry, unlike the dairy and beef industries, is not prioritized for support. Most public and private interventions in the past have been focusing on the large animals such as cattle. The private sector and individual farmers are the ones responsible for providing all the services including disease control. This project therefore must focus on a national effort for disease control in the poultry sector. This would involve training poultry farmers and slaughterhouses on GVPs, and GHPs as wells conduct surveillance for early identification of disease outbreaks and their elimination.

4.2.14. Residue monitoring and control of antibiotics use in eggs

Eggs production is an important source of income for many households in Uganda. According to an internal report cited from the Uganda Department of Animal Health, Uganda exported about UGX4,676,094,323 in 2018, approximately US$1.3 million in current 2020 exchange rate. Almost all of these eggs were exported to DRC, Kenya, South Sudan, and Zambia. It is however evident that there is widespread use of antibiotics in poultry production in Uganda, especially in the intensive farming systems. There is growing concern that the widespread misuse of antibiotics has led to a rise in the level of drug residue or drug-resistant bacteria in the food of animal origin that passes on from animals to humans, thus posing a danger to human health. Many assessments[37] concluded that the level of knowledge and information on appropriate use of antibiotics is the driver of its abuse and its potential health effects. Therefore, this option will focus on raising farmers' awareness and understanding of instructions on use of veterinary antibiotics. Also, a survey coupled with on-site training will be carried out in all veterinary drug stores to identify prohibited antimicrobial and counterfeit drugs. For farmers to produce quality eggs there is a need to build their production capacity by training on withdrawal period of permitted drugs.

[37] Kigozi M M and Higenyi J 2017: Evaluation of farmer`s knowledge and application of guidelines on use of veterinary antibiotics in layer poultry production in Mukono district, central Uganda. Livestock Research for Rural Development. Volume 29, Article #176. Retrieved August 22, 2020, from http://www.lrrd.org/lrrd29/9/hige29176.html

4.3. Burundi

4.3.1. Hygiene and pesticide residue monitoring and controls in fish

Burundi has an important part of Lake Tanganyika, which abounds in many species of good quality fish (taste and flavour). A study on monitoring and control of hygiene and pesticide residues confirmed the presence of pesticide residues in fishes. This is a result of observation of several cases of death of fish in Lake Tanganyika during the aerial spraying campaign of cotton fields cultivated on the shores of Lake Tanganyika and in the Imbo region. The use of pesticides in vegetable crops such as tomatoes and cabbages grown along the lake and in the fields of coffee trees that are planted on the mountains overlooking the lake shoreline and around the tributaries flowing into the lake are also a danger to the pollution of the lake and the productivity of the fish.

Burundian fish market is made up of the local market (especially the urban centres of the provinces) and the regional market (DRC, Uganda, and Tanzania for fresh fish; and Rwanda, DRC and Tanzania for dried or smoked fish). In view of the government's objective to promote the competitiveness of Burundi's fish in the regional and international trade, and to preserve local consumer health, this capacity building would be helpful to achieve this objective. This option will involve training of fish farmers on pesticide and training of fishermen and fish traders on Good Hygiene Practices. In addition, appropriate level of public control must be strengthened, a fundamental change in the habits and practices of people involved in the production and handling chain must be enhanced through awareness creation, and some significant investment in basic infrastructure, including the provision of ice (and the building of ice-making plants), where the water used must be fit for human potable.

4.3.2. Monitoring and management of fruit fly in fresh fruits

In Burundi, fruits are quite diversified and grow well throughout all regions, some throughout the year. This shows that the fruit sector (notably mango, orange, malacouja, avocadoes, pineapple and banana) has a great potential for development, on the one hand, and contribute to the creation of wealth through the links of the fruit-juice value chain on the other.

Several problems prevent the fruit sector from thriving despite the favourable conditions for its development. For example, the major challenge for fruit growers is related to the preservation of fruit, not to mention its processing. The various agri-food processing units are industrial, semi-industrial or artisanal. The low purchasing power of the population, difficult access to credit, lack of infrastructure, competition from imported products, inadequate equipment, etc. are also challenges that deserve special attention.

And yet, if well exploited, the fruit sector could contribute to the diversification of export products. Some economic operators in Burundi have vast fruit fields such as mango, mandarin and orange trees in the Imbo plain, malacouja in the Mugamba region and avocados throughout the country. The export of fresh fruit is motivated by the lack of sufficient quantities of modern fruit processing units in Burundi. Most Rwandan operators buy the fruit from the fields and organise its transport from Burundi to the processing units in their country. Tanzania has developed processing plants for products from Burundi consisting of avocados, ripe bananas and pineapples. Mangoes and oranges are vulnerable to fruit flies called Bactrocera invandens and Bactrocera zonata which can cause damage estimated at over 80% of the crops if left untreated. Ripe bananas are attacked by a fly called Drosophila sissex but the economic impact is low (10-15%) compared to the impact of Bactrocera. These hamper full access

to these markets, as fruits are subject to verification of conformity on the basis of phytosanitary and fumigation certificates.

Specific interventions will include:

- Investment in digital technologies e.g., sensors and data analytics for identifying pests,
- Pest risk and cost–benefit analysis,
- Development of strategic and action plans and guidelines
- Investment in survey including drafting methodology, detection tools (e.g., traps, light, pheromones etc.),
- awareness (public awareness materials),
- Facilities and equipment including for laboratories, safety equipment (Entomology lab, plant pathology lab), computers, etc.
- Development of training materials and training of personnel, etc.

4.3.3. Disease and hygiene controls in hides and skins

There is a Kenyan company, based in Burundi, which is responsible for collecting hides from Burundi, DRC and Tanzania to be processed and sold in Kenya. This product is therefore important for Burundi. Hides and skins are often subjected to conformity verifications and phytosanitary certificate requirements at the port of entry. Burundi exports some sizeable amount of hides and skins to the world, e.g., about $4.3 million in 2015 and $1.5 million in 2018, but very little to the EAC region. The highest export to the region was in 2015, where it exported about $2.4 million but this has since dropped to $17,000 in 2018.

Hides and skins are perishable resources that can be damaged by parasitic diseases and human error, which result in downgrading or rejection. This may originate from pre-slaughter or post-slaughter defects due to animal health or handling practices. Therefore, any effective control measures must target improved animal health service delivery, effective disease control strategies and strong collaboration between stakeholders to enhance the quality of skins and hides. Thus, this capacity building will seek to building capacity of stakeholders involved in hides and skins processing and marketing in disease and hygiene controls measures. This may involve monitoring and assessment of disease prevalence, training of abattoir operators and hides and skins processors on good handling practices, and awareness creation on animal disease control practices.

4.3.4. Monitoring of cyanide in beverages

Burundi has a large company called BRARUDI which manufactures different kinds of drinks such as: Amstels, primus, royal and lemonades (Fanta). Burundi exports Amstels and beers (primus). Also, IMENA produces and exports banana beer and wine to Tanzania and DR Congo. For these products intended for export, the tests are done in the manufacturing plants and are validated/confirmed by BBN. On arrival at the border post, the products are submitted to the verification of the conformity of these documents. These documents are then compared with the exported products, followed by the taking of samples for visual analysis.

Cyanide concentration has become a grave health issue in some beverages because inputs such as cassava and sorghum have high concentration of it. High exposure to cyanide in humans causes nausea, vomiting, diarrhoea, dizziness, weakness, paralysis and sometimes death. The capacity of farmers to control their crops from cyanide concentration is impossible. Therefore, to safeguard

consumers, it is necessary to monitor cyanide concentration in raw materials before production and in samples of beverages before they are distributed for sale.

The problem of cyanide in beverages is little known in most communities. Therefore, the first step toward redress will be to create awareness on the dangers surrounding cyanide in beverages. This will be done by pilot sampling and testing beverages produced from sorghum and cassava and establish the extent of the problem, carry out awareness campaigns on the problem through TV and Radio programmes, procure and install cyanide testing equipment. Training border post plant health inspectors on sampling, tesing, analysing and data transmission for cyanide.

4.3.5. Monitoring and testing of heavy metals in tea

Tea is cultivated in Burundi in state estates (22.1%) and in small family farms (77.9%). The product is the second most important export crop in terms of revenue (around 25%) after coffee (60%). Tea is cultivated exclusively in the high altitudes that constitute more or less a quarter of the national territory and is practiced by more than 60,000 households. The OTB alone oversees some 10,000 ha of state and peasant tea plantations, divided into five tea-growing regions (from North to South): Buhoro, Rwegura, Teza, Ijenda and Tora. This company buys the green leaves from the tea farmers, processes the black tea and directs the finished product to the various international markets. From the 2000s onwards, tea's rise in export earnings has been noted. According to data from the Bank of the Republic of Burundi (BRB), this situation is explained by the performance recorded in the sector, such as the increase in farm and factory yields, the reassuring market, etc.

The liberalization of this sector has created a spirit of competitiveness. While a law on the liberalisation of the tea sector was signed in 2007, a new private company, Promotion du thé à Mwaro (PROTHEM), started operations in 2011. It has led to competition and higher prices paid to farmers. Other private companies are in the process of setting up their own new plantations to enter this sector that promotes the national economy.

Tea growing attracts more farmers today than in the past, because with the liberalisation of the sector in 2011, the price per kilo of green leaf has risen from $0.14 to $0.25 today. The state-owned tea processing and marketing company has been forced to raise the price of green leaf, fearing that farmers will sell their entire production to the private company. In addition, since 2011, Burundian tea has ranked second in terms of quality after Kenyan tea among the eleven East African countries that sell this product at the Mombasa auction.

Some international trade data source (e.g., trademap.org) shows virtually no exports of tea from Burundi. However, the Bank of the Republic of Burundi (BRB) report of 2018 shows the sale of dry tea outside the country under auctions in Mombasa and direct sale to countries of unknown destination (Table 4).

Table 4; Value of tea exports from Burundi, 2014-2018

Sales	Cost of dry tea (in million Burundian francs)				
	2014	**2015**	**2016**	**2017**	**2018**
Auction in Mombasa	26 686	41 838	29 709	37 671	36 829
Direct sales	5 662	9 136	6 147	8 638	7862

Source: Bank of the Republic of Burundi

Also, ITC export potential estimates shows untapped export potential of $643,800 of black tea annually. The main SPS constraint in tea in South Sudan is heavy metals. This CBO therefore will target monitoring and testing of cyanides and training of farmers.

4.3.6. Pesticide residue monitoring and controls in coffee

Coffee cultivation has an important role to play in the Burundian economy. It is the leading export crop in terms of value (BRB, 2014) and the main source of foreign exchange for the country. In recent years, the quantity of green coffee produced annually by Burundi has decreased significantly, despite the cyclicality of the coffee tree, from nearly 40,000 tonnes in 2004 to 15,000 tonnes in 2014. Quality has also declined, with the share of fully washed coffee in total production being almost 85 percent in 2004 but only about 50 percent in 2013 (ARFIC, 2015). Almost all Burundian coffee is exported from warehouses in Bujumbura. The main buying countries are Belgium, Germany, the Netherlands, Japan, the United States and Australia (AFCA, 2015).

The government of Burundi's agenda is to boost the sector's dynamism and strengthen its contribution to the country's economy. To this end, the executive is planning to increase by 40% the amount devoted to fertilizer subsidies for producers. By 2022, Burundi hopes to reach a coffee production of 30,000 tonnes through the World Bank-funded Competitiveness Support Project for the Coffee Sector (PACSC), which was launched in 2016.

Again, some international trade data source (e.g., trademap.org) shows virtually no exports of coffee from Burundi. However, the Bank of the Republic of Burundi (BRB) report of 2018 shows the sale of coffee outside the country under auction in Mombasa to countries of unknown destination (Table 5).

Table 5; Exports of coffee from Burundi, 2014-2018

Sales	Cost of market coffee (in million BIF) per year				
	2014	**2015**	**2016**	**2017**	**2018**
Auction in Mombasa	84 988,4	62 685,7	74 825,1	63 433,1	72 827,9

Source: Bank of the Republic of Burundi

Pesticide residue is the main SPS constraint in coffee from Burundi. This option, therefore, involves the training of farmers in GAPs, including pest and disease control and the appropriate use of agrochemicals. Support may also be provided for infrastructural improvements on farms, including post-harvest handling and storage, as well as strengthening testing capacity pesticide residues.

4.3.7. Hygiene controls and monitoring of heavy metals in vegetable oil

Although it has taken time to develop in Burundi, oil palm is a potential source of income and food security for many Burundians. Cultivated mainly for its oils (palm and palm kernel oils), oil palm also produces a wide range of by-products that are used in many different ways and none of its morphological parts are thrown away by well-informed producers. World statistics show that in vegetable oil production, oil palm is the most important oilseed crop, far ahead of groundnut, sunflower and cotton. This is also the case in Burundi.

Despite the investments already made in this sector by the Government of Burundi since 1983, its production is evolving slowly. Until the end of 2014, annual palm oil production will remain at a ceiling of 19,305 tonnes (2004 production), whereas when the programme to replant old palm trees was

initiated, all indications were that its level of production would cover national lipid requirements (260,500 tonnes) and, better still, generate a marketable surplus.

However, it must be recognized that this sector occupies an important place in the national economy by the money supply it injects through the production, processing and especially the marketing of its oils (turnover estimated at over 25 billion francs BIU in 2014) and its by-products (soaps, perfumes, cakes, brooms, fuel briquettes, organic fertilizers etc.). Palm oil production has also enabled the Office de l'Huile de Palme du Burundi (OHP) and the communal administrations to collect significant amounts of royalties (about 360 million francs in 2014 for the OHP alone), to offer employment to many people (including a good proportion of women) employed by the 1180 processing units including one industrial processing unit, 3 semi-industrial processing units, 946 artisanal processing units, 168 improved processing units and 62 soap factories. Table 6 shows the palm oil exported by Burundi by destination country.

Table 6; Exports of palm oil from Burundi in 2018 (million BIF)

Country	**Kenya**	**Uganda**	**RDC**	**Rwanda**	**Tanzania**	**Total**
Value of exports	0,1	0,2	103,8	1,6	118,8	224,5

Source: BRB/ISTEBU survey report on informal cross-border trade in 2018

Hygiene issues and the presence of heavy metals are common SPS issues that affect the export of the product. In this regard, effective sampling, testing and analysis of products intended for export must be carried out. This capacity building option must therefore target:

- The national laboratory and phytosanitary inspectors should be equipped with modern rapid diagnostic equipment at border posts.
- Support must be given to the establishment of a product quarantine structure.
- There is a need to strengthen the capacity of SPS Experts and phytosanitary inspectors at the borders and in the provinces.

4.4. Kenya

4.4.1. Harmonization of standards and documentation for AI in day-old chicks

Kenya has an estimated poultry population of 31 million birds. Of these, 75% consist of indigenous chicken, 22% broilers and layers 1% of breeding stock. The business for one day old chicks in the EAC is growing fast. According to Kenyan Revenue Authority (Busia and Malaba), approximately 5000-10,000 chicks are cleared at the border every day (approximately 3.5 million chicks per year valued at US$3.5 million). According to available figures, Rwanda imports about 150,000-day-old chicks every month from Uganda, Belgium and Holland estimated at $1.8 million. ITC indicates that Kenya has the potential to sell to Uganda, Tanzania and the Democratic Republic of Rwanda within the EAC partner states.

However, Kenya faces SPS challenges in exporting to the EAC countries mainly Rwanda and Uganda. This is due to the different requirements by these importing countries which rely on their own requirements and do not recognize the measures which Kenya has put in place in totality. The impact of the same is felt in the unprecedented delays at the border points with increased costs estimated at US$ 500 per day in addition to other costs (TMEA). Rwanda's Ministry responsible for Agriculture temporarily suspended importation of chicken and all poultry products (eggs and meat) from Uganda

and countries in Europe where Bird Flu has been detected. Although the individual country's requirements include:

- Having the veterinary officer of the government of the exporting country examining the chicks a day before shipment and the chicks must have been found free of any clinical signs of infections or contagious disease of poultry.
- Ensuring that there are appropriate testing and testing methods, vaccination, quarantining procedures, approved hutching conditions, registration of hatcheries, transportation and traceability procedures among others.

Some of the individual countries within the EAC still insist on their own tests and procedures for allowing the consignment to access their markets.

Kenya has embraced hatcheries certified by Agricultural stakeholders e.g., Kenya Agriculture and Livestock Research Organizations (KALRO) Non-ruminant research center, vaccination against common poultry viral diseases. Compliance with standards and market access requirements are prerequisites for a successful EAC and by extension global market access. It also improves competitiveness of the member state exporters. There is no harmonized regional standard for the one-day old chicks in EAC. Absence of such regional harmonized standards and procedures for commodities traded within the member countries leads to the application of national technical regulations, which do not have a common administrative approach neither in process or in the list of standards declared as mandatory. This option therefore seeks to promulgate the establishment of a common and acceptable standard regionally.

4.4.2. Hygiene, pesticide residue, and aflatoxin monitoring and controls in milk

The dairy sector in Kenya is one of the largest and fastest growing subsectors in Sub-Saharan Africa, producing about 5.2 billion litres of milk annually and contributing 6–8% of the national gross domestic product (GDP). The sector is dominated by smallholder producers who account for over 70% of the marketed milk. Most of the milk and the milk products are consumed locally and estimated average value of $6,200 is exported to the EAC member states (ITC) in the form of milk products. Only 10% of the total production is processed while the rest are consumed raw. Kenya is currently a net importer of milk and milk products due to the increasing demand and rising incomes and urbanization. In order to meet its demand, Kenya relies on EAC trading block which has a liberalized trading regime to meet milk demand. However, according to the National Dairy Development Policy Sessional Paper No. 5 of 2013, the country intends to transform the industry into an exporter of dairy animals and products as well as maximize dairy exports into the regional and global market.

In working towards this policy goals, Kenya is faced with food safety issues related to microbial and chemical hazards (chemical hazards mainly pesticide residues and aflatoxins) arising as a result of failure to observe Good Agricultural Practices (GAP) and hygienic handling practices. This does not only affect the market but also leads to food loss in the sector. The importing countries within the EAC through their regulatory agencies require pesticide residues and aflatoxin levels to be within the acceptable levels in the EAC standards and hygienic products free from pathogenic micro-organisms e.g., salmonella (bacteria). Kenya has numerous institutions with key functions of sensitization, inspections and implementation of codes of hygiene and agricultural practices by stakeholders throughout the food chain. They include: Kenya Agricultural and Livestock Research Organization (KALRO), Ministry of Agriculture, Livestock and fisheries (MoALF), Ministry of Health, Department of Public Health, Kenya Dairy Board (KDB), Directorate of Veterinary Sciences, Kenya Bureau of Standards

(KEBS). There are also private sector players including; Kenya Dairy Traders Association (KDTA), Kenya Dairy Processors Association (KDPA) among others. However, most of the farmers are from the rural regions with inadequate food safety, husbandry and hygiene knowledge, access to professional services (Veterinary Extensions Services) among others. There are also several regulations governing the dairy industry. Therefore, in order to address the SPS issues, Kenya requires funding in training on GAP, GHP, GMPs, HACCP systems, sampling and testing and access to professional services e.g., Veterinary Extension services.

4.4.3. Mycotoxin and antibiotics monitoring in animal feeds

There is a rapid increase in demand for animal feeds in the EAC region driven by consistent growth in commercial livestock production as a result of demand in animal-based products. Diminishing grazing land as a result of growth in population is forcing Kenyan farmers to gradually shift from open grazing to zero-grazing, which entails use of animal feeds other than pasture. The main inputs to the feeds include: maize, cereal bran (mainly from maize) constituting between 50-65% of the animal feeds produced in Kenya while the rest are derived mainly from sunflower seed cake and rice bran. Of the mentioned inputs, maize is the most affected by mycotoxin contamination in Kenya just like other developing countries. Livestock get poisoned when they consume contaminated feeds leading to low value of the commodity and rejection of affected lot. The cost/losses incurred are borne by individual farmers, handlers, processors, distributors or government.

The governments in the EAC member states require feed to comply with their set levels of mycotoxin for different categories of ingredients for making feeds targeting different livestock, failure to which amounts to rejection of such consignments. Over the years, the government has been involved in various interventions activities including farmer's education, public and private sector driven initiatives in mitigating the aflatoxin challenge, formation of aflatoxins task force which is an interdepartmental/inter-ministerial team instituted to spearhead surveillance of aflatoxins in maize as well as advise the government on looming outbreaks and containment measures. Establishment of regional laboratory to conduct research in the East African region, awareness through public and private sector stakeholders' consultations both at the national and county levels. Provision of moisture meters and aflatoxins testing equipment to extension agents to assist farmers in monitoring moisture content in grain and undertake surveillance. Data so far generated in Kenya is adequate to ignite a shift of resources, towards management.

However inadequate official surveillance and monitoring programs by the government of Kenya and human capacity to address various facets of aflatoxins mitigation is still low. Up-to-date research facilities for mycotoxin research, for food commodities and human and animal exposure, is inadequate particularly in public institutions. Gaps including sparse documented information on human exposure, inadequate sampling mechanisms in smallholder farms and grain holding stores/containers, overlooking social learning networks in technology uptake and lack of in-depth studies on array of aflatoxin control measures among others. In order to address these gaps, investment is required in awareness creation through training along the value chain, facilitation of the extension officers, rapid testing kits with appropriate training on their use, additional research, public private engagement on a common approach to mitigation measures.

Antibiotics are used for animal feeds such as cattle, sheep, poultry, fish and others to increase efficiency (efficient conversion of feed) and growth rate, treat clinically sick animals and prevent or reduce incidences of infectious diseases. Prolonged feeding of animals with feeds containing

antibiotics culminates into bacteria which are resistant to antibiotics. Human infections can occur when animal products e.g., meat containing the resistant bacteria is eaten. Inappropriate and widespread use of antibiotics in animals has led antibiotic residues being found in foods of animal origin.

Kenya does have legislation in place to control the use of antibiotics. But it needs to do more to step up enforcement efforts. Encouraging awareness on antibiotic use, increased surveillance and monitoring to avoid the growth and spread of antibiotic resistance and reduce antibiotic residues in livestock products. Investment in laboratories and training and updating clinicians on trends about drug resistance, developing education materials and programs for training farmers and veterinarians on prudent drug use and appropriate storage. More research on factors promoting resistance.

4.4.4. Disease monitoring and controls in live cattle and beef

The livestock sector is one of the key agricultural sub-sectors accounting for approximately 40 percent of the agricultural gross domestic product (GDP) in Kenya. Pastoralist households are dependent on this sector with about 60 to 80 percent keeping livestock to supplement their food needs and household income. More than 50 percent of Africa's livestock is located in the East Africa Region. The region is home to 107.2 million head of cattle, 178.8 million goats and sheep, 1.3 million camels, and 4.4 million pigs. As productivity increases and regional tariff barriers are eliminated, Sanitary-Phytosanitary (SPS) issues are rising to greater prominence, given their impact on public health and agriculture and food systems.

Ethiopia/northern Kenya, northern Tanzania/southern Kenya, the commerce accounts for an estimated $61 million per annum. About 10 percent of this commerce passes through official trade channels. It's worth noting that up to 25–30% of the volume of meat exports from Kenya is likely from animals sourced from neighbouring countries via informal cross-border trade. Also, this trade is among the most volatile due to international competition and periodic bans resulting from animal health issues, especially periodic outbreaks of foot and mouth disease (FMD), Rift Valley fever and BSE concerns. The livestock sector in Kenya is also bedeviled with:

- Weak legal framework, legislative capacity and inadequate resources to deal with food safety, animal and plant health SPS measures.
- Insufficient coordination at the national level among the relevant ministries, agencies and institutions dealing with SPS measures.
- Weak public and private sector capacities to deal with food safety, animal and plant health SPS measures, which severely limit export capacity and the ability to control imports.

Similarly, lack of effective monitoring and sustainable disease reporting systems across countries in the region keep livestock keepers vulnerable to both regular anticipated and unexpected disease outbreaks. Pastoralists and farmers need support in terms of periodic vaccinations, provision of drugs for timely treatments, and laboratory and related services. Given the increasingly stringent SPS requirements by importing countries, the importance of putting in place an effective monitoring mechanism along with a robust veterinary system cannot be overemphasized. This capacity building option will seek to address the following:

- Provide training for public and private sector to cope with evolving SPS requirements and enhance compliance market participation.

- Provide adequate infrastructure, budget and relevant staff in public laboratories as well as training institutions.
- Establish holding facilities for fattening animals for efficient monitoring of ill-health conditions and ensure appropriate vaccination on, pre-marketing treatment and drug clearance requirements are fulfilled.
- Establish early warning system for pests and diseases which should entail national and regional protocols and action plans for the collection of surveillance data for priority pests and diseases.
- Development and roll out of national and regional surveillance systems and protocols linked with quality assurance systems.
- Establishment of or up-scaling an SPS information system. The system to be used in communication and transmitting necessary SPS related information on and trade documents such as permits, sanitary and phytosanitary certificates.
- Finally, provide an e-learning platform for sustained interaction on and continued knowledge and experience sharing on evolving trends on SPS.

4.4.5. Disease monitoring and controls in sheep meat

Cross-border livestock trade represents one of the most significant growth areas of regional trade in eastern Africa. Since 1990 it has grown from a relatively minor informal activity to a dynamic enterprise that contributes to local and regional food security and poverty alleviation among vulnerable populations. About 20-30% of all red meat consumed in Kenya comes from small ruminants. The 2009 livestock census gives the number of goats as 27,740,153 and sheep as 17,129,608. It is hard to establish production data, as most of the slaughter is done informally. In 2006, PPR hit Kenya and spread rapidly. In native populations, it can cause up to 100% mortality: in later years abortions and high mortality in lambs and kids. Also, sheep/goat pox is endemic. CCPP in goats cause up to 80% mortality and 100% morbidity.

There is the continuous risk of RVF outbreaks, for which an early warning and preparedness system with timely vaccination will have to be in place. To meet the SPS challenges Kenya needs to:

- Assist in the development of small-scale preferably export worthy small ruminant slaughter facilities at the margins of the pastoral areas in collaboration with meat traders and county governments to upgrade current conditions of operation and improve food safety.
- Assist in the development of more hygienic meat outlets in the high-density areas, where the bulk of the meat is being sold with simple and robust cool displays, better equipment that can be disinfected/sterilized.
- Develop a quality and safety assurance system in the small ruminants' value chains throughout Kenya with investments in the above small-scale small ruminant slaughter facilities and improved cold chain can more easily gain access to lucrative export markets.
- Assist in the development of a strategy for the further development and strengthening of a Kenya dairy goat industry, based on zero-grazing in small holdings of limited land size only after a thorough revision of the earlier experiences, Kenya is a major exporter of dairy goats in the region.
- Improve on inspection and certification of animals at primary and tertiary quarantine centres to assure proper health certification along the market chain.

Strategies are needed to improve veterinary service delivery by field staff and laboratories. Improved veterinary health services will reduce disease incidence, mortality and morbidity and improve the

quality of marketed animals. There are specific export requirements for quality assurance and safety of Kenyan sheep and sheep meat, and there are rules and procedures in place to test, certify and assure supply of quality and safe animals and meat to the East African importers.

4.4.6. Disease monitoring and controls in pigment

Kenya exports about 2,139 thousand tonnes of pig meat per year. Insecure feed availability, insufficient sanitation and poor pig husbandry, as well as a lack of sound veterinary services and meat inspection are factors that lead to poor animal, public, and environmental health risks. Traditional/backyard systems are the main systems in Western and Nyanza Provinces while commercial systems are predominant in Eastern and Central Provinces. In Nairobi, the traditional/backyard systems dominate in the slums while commercial systems owned by Farmer's Choice and by a few commercial farmers who supply pigs to Farmer's Choice are found in the outskirts of the city. Twenty-five percent of the total Farmer's Choice factory output of processed pork products is exported. These include special cuts of meat, value-added pork products such as ham, bacon and sausages. Over 80% of the slaughter was carried out by Farmer's Choice, which is the main supplier of pork and pork products to the domestic and export market. Among COMESA and non-COMESA countries, the largest share of pork exported from Kenya goes to Tanzania which takes over half of the exports per month.

The main SPS concerns is African swine fever, H1N1, and Porcine cysticercosis, an infection of pigs by larval stages of the human tapeworm Taenia solium. National prevalence of porcine cysticercosis at meat inspection is less than 0.02 percent. Those keeping animals should have a special license. In rural areas, a farmer who plans to keep pigs is expected to build a house and put in place other infrastructure as outlined in the Animal Disease Act. Keeping strict biosecurity is the only way to prevent the introduction of African swine fever since at the moment no vaccine is available. The handling of wastewater and high-risk materials is a challenge in most slaughterhouses. The main challenges in Kenyan slaughterhouses include:

- Capacity building to support good slaughtering practices.
- Capacity building activities that focus on veterinary public health and slaughterhouse inspections.
- Being able to comply with clients' requirements in terms of food safety and quality: working GMP, GHP and HACCP systems that are audited and certified.
- Development of knowledge infrastructure on veterinary public health, GMP codes in slaughterhouses, training of management and midlevel staff in slaughterhouses.

4.5. South Sudan

4.5.1. Disease and hygiene controls in hides and skins

Livestock production is an important component of South Sudan's agricultural economy, accounting for up to 15 percent of household food supply (FAO, 2020). South Sudan's livestock population is estimated at 12.6 million cattle, 24 million sheep and goats. These livestock are the sources of milk, meat, and income, particularly for the rural population. The pick of South Sudan's exports of hides and skins was in 2012 and 2013 where she exported about $1.8 million and $1.7 million respectively. Since then, exports have drastically reduced to a mere $31,000 in 2018. Livestock production and hence

hides and skins have been greatly lost due to conflicts and an attendant rise in livestock raiding during the period.

Livestock diseases, including Rift Valley Fever, East Coast Fever (ECF), trypanosomiasis, Anthrax, Haemorrhagic Septicaemia, intestinal worms, Bovine Pleuropneumonia (CBPP), BQ, Foot-and-Mouth Disease, Peste des petits ruminants (PPR), Newcastle disease, and coccidiosis, are often threat to the sector's performance (FAO, 2020). Importers of hides and skins often require certification that they originate from areas that are free from animal diseases. The export of partially processed ('green') hides is essentially a by-product of beef production exported from areas geographically free from Foot and Mouth Disease (FMD) and other quarantine animal diseases.

Therefore, this CBO will seek to strengthen existing efforts by FAO and other players in disease monitoring and control. Particular attention would be paid to training slaughterhouses and hides and skins traders in good hygiene practices as well as awareness on sourcing from disease free animals.

4.5.2. Monitoring and controls of contaminants in gum arabic

UNCTAD study in 2018 indicates that Gum Arabic has a great potential to drive the development of African Countries that have it.[38] South Sudan has large quantities of the gum Arabic trees in the central, western and northern parts of the country. The South Sudan Gum Arabic Federal Union (SSGAFU) indicated that it has huge stock files of the acacia gum but cannot access the international market due to lack of trade treaties and under investment in the sector. [39] Gum Arabic can be bedeviled with physical, chemical , microbiological or other kinds of contamination such as bacteria, moulds and yeasts and thermophilic spore-formers, as well as some pathogens such as Staphylococcus aureus, Salmonella, and coliforms and faecal coliforms (E.coli). They are also susceptible to pests.[40] This CBO therefore intends to build capacity of the sector through monitoring of contaminants and training of the sector players on Good Practices at the stage of harvesting (hand picking) /collection of the gum in the local areas, during the interim storage in the rural communities and the subsequent transportation , and at the stage of storage in warehouses and treatment in processing facilities, before and during exportation. This will also involve some initial investment in storage, testing, and accreditation facilities.

4.6. Rwanda

4.6.1. Disease and hygiene controls in hides and skins

International trade of agricultural commodities relies on the principle that plants, animals and people in the country are protected from pests, diseases and other human health hazards that can be introduced into the country or be unintentionally spread in the country or in other countries as a result of local, regional or international trade in agriculture. For this purpose, agricultural commodities being locally produced or imported/exported shall comply with national, regional, or international

[38] UNCTAD. 2018. Viewed at https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1736 on 15th July 2020

[39] Cited in a news article viewed at: http://www.xinhuanet.com/english/2019-04/19/c_137988682.htm#:~:text=South%20Sudan%20has%20large%20quantities,of%20its%20gross%20domestic%20product. On 15th July 2020

[40] Eltohami, Abu. 2018. T1 - Threats to Green Gum Arabic Production in Sudan. VL-3. Biomedical Journal of Scientific & Technical Research. Accessed at: https://www.researchgate.net/publication/328854074_Threats_to_Green_Gum_Arabic_Production_in_Sudan

standards. Hides and skins are animal products that may vehicle animal diseases and/ or disease causative agents via international trade. Also, hides and skins are perishable resources that can be damaged by parasitic diseases and human error, which result in downgrading or rejection. This may originate from pre-slaughter or post-slaughter defects due to animal health or handling practices. Their handling might be highly precautious with a particular attention of hygienic measures to ensure they are free from diseases and/ or disease causative agents while protecting trade partners from unintentionally spread of diseases.

According to Rwanda's National Export Strategy II, non-traditional exports accounts for the majority of exports to the region. Hides and skins accounts for about 10% of non-traditional exports and about 66% is exported to the EAC region. Other major market for hides and skins is Asia and Europe, at 19% and 15%, respectively. In terms of available capacity, existing animal disease control programs in place and the personnel to implement the monitoring and controls are inadequate. To address the existing weaknesses, this option would strengthen regulatory framework, train and coach livestock value chains operators and stakeholders for the operationalization and sustainability of these programs.be Thus, effective regulatory control measures targeting improved animal health service delivery, effective disease control strategies and strong collaboration between stakeholders to enhance the quality of skins and hides, must be undertaken. This capacity building option will seek to strengthen the monitoring and assessment of disease prevalence, train stakeholders involved in hides and skins processing and marketing in disease and hygiene controls measures and creating awareness on animal disease control practices. It will involve training of abattoir operators and hides and skins processors on good handling practices.

5.0 Results

5.1 Regional ranking of all countries

Figure 15 below presents the main result of the prioritisation at regional level involving capacity building options of all the six East African Countries. The result shows that the capacity buildings Hot water treatment for Mango in Tanzania; Hygiene and pesticide residue monitoring and controls in honey in Tanzania; Monitoring and testing of heavy metals in cane sugar in Uganda; Hygiene control for dry fish in Tanzania; and Hygiene and pesticide residue monitoring and controls in fish in Tanzania ranked top five. This is followed by Hygiene, pesticide residue, and aflatoxin monitoring and controls in milk in Uganda; Monitoring and management of fruit fly in fresh fruits in Tanzania; Hygiene controls and monitoring of heavy metals in vegetable oil in Burundi; Residue monitoring and control of antibiotics use in eggs in Uganda; and Hygiene and Cyanide monitoring and controls in cassava in Tanzania, add up to make the top ten (Table 7).

Conversely, the capacity building options Aflatoxin control and management in soya beans in Uganda; Aflatoxin control and management in groundnuts in Uganda; Pesticide residue monitoring and management in fresh vegetables in Uganda; Disease monitoring and controls in pig meat in Kenya; and Mycotoxin and antibiotics monitoring in animal feeds in Uganda, makes up the bottom five.

Figure 15; Baseline Model

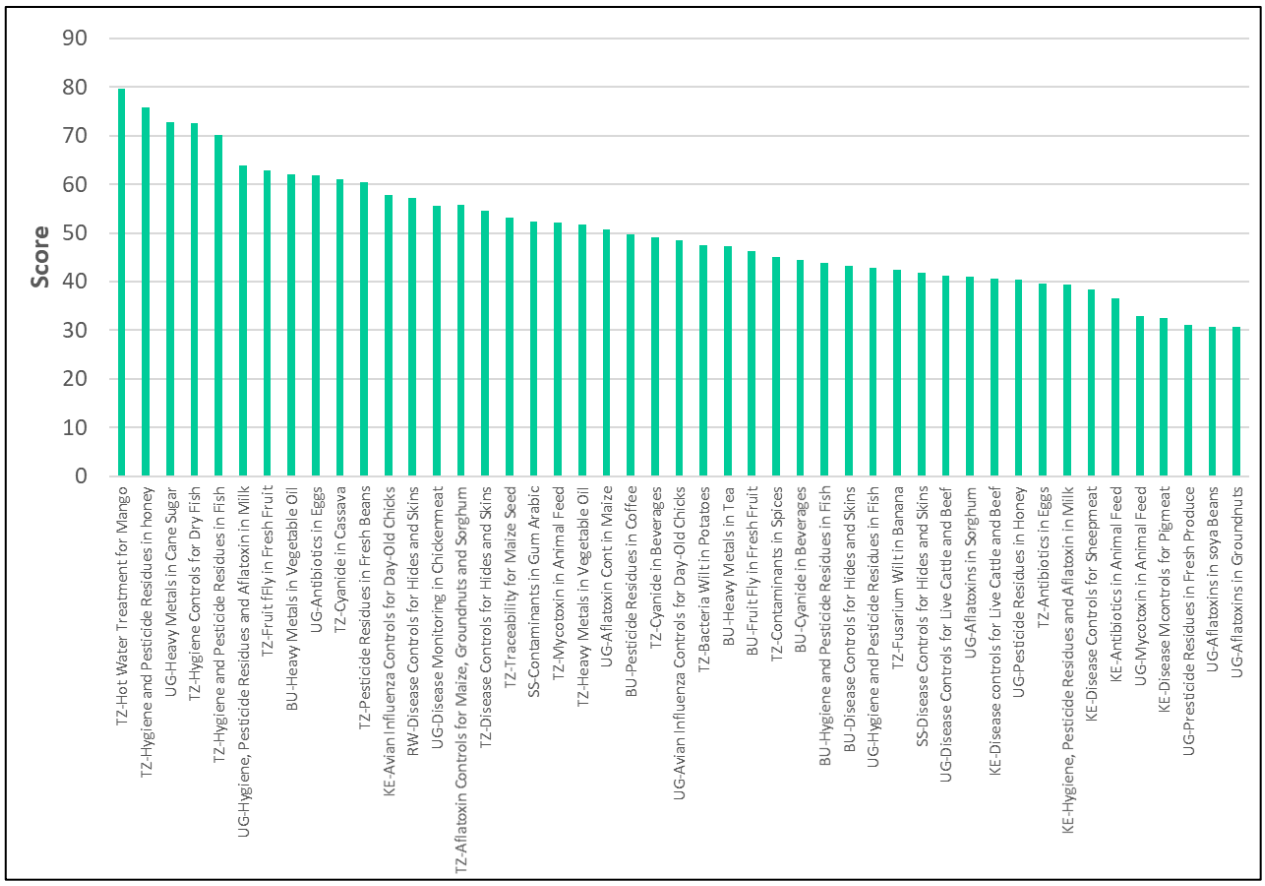


Table 7; Top ten capacity-building options for the East Africa region

Rank	Option	Country
1	Hot Water Treatment for Mango	Tanzania
2	Hygiene and Pesticide Residues in honey	Tanzania
3	Heavy Metals in Cane Sugar	Uganda
4	Hygiene Controls for Dry Fish	Tanzania
5	Hygiene and Pesticide Residues in Fish	Tanzania
6	Hygiene, Pesticide Residues and Aflatoxin in Milk	Uganda
7	Fruit Fly in Fresh Fruit	Tanzania
8	Heavy Metals in Vegetable Oil	Burundi
9	Antibiotics in Eggs	Uganda
10	Cyanide in Cassava	Tanzania

Figure 16 reports the contribution of each decision criteria towards the overall performance of a capacity building option. The decision criteria having the greatest impact on the ranking, and especially the position of the top-ranked options are the impact on exports and poverty impacts.

To test the resilience of the result in the baseline model, we employ a sensitivity analysis by setting the weights on all decision criteria equal (Figure 17). The result shows that nine of the top ten capacity-building options are insensitive to changes in decision weights. Overall, the ranking of the 47 capacity-building options is insensitive to changes in the decision weights. Thus, we can say safely that the result in the baseline model is robust.

Figure 16; Criteria Contribution of Baseline Model

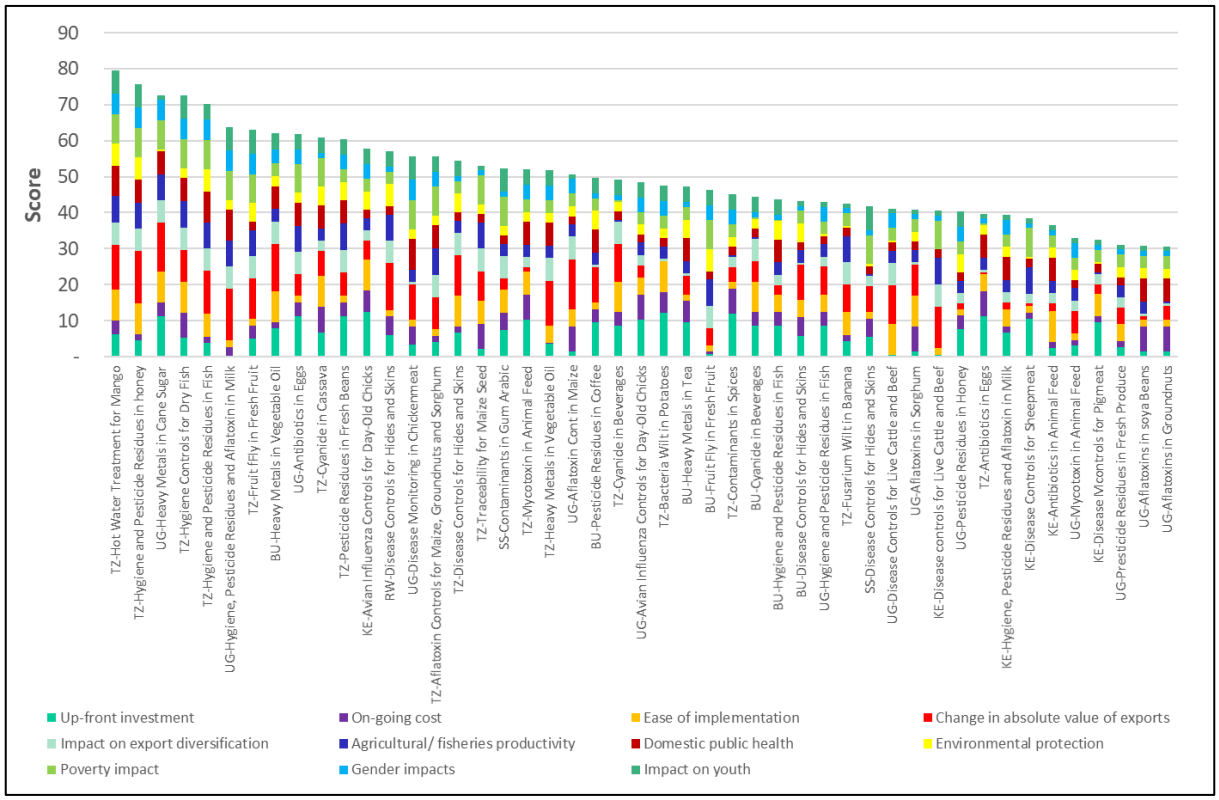
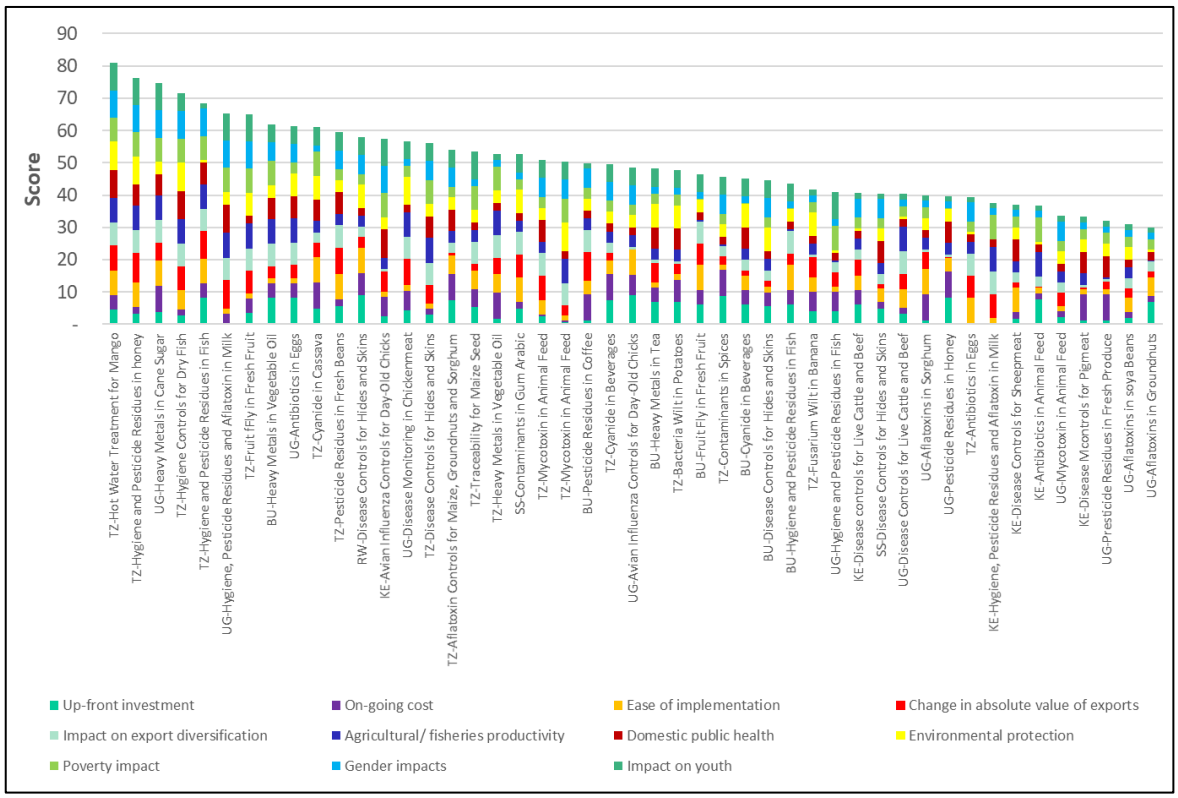


Figure 17; Equal weights model



5.2 Prioritisation results for Tanzania

The top five capacity building options for the Tanzanian prioritisation (Figure 18) include Hot water treatment for mango; Hygiene and pesticide residue monitoring and controls in honey; Hygiene and pesticide residue monitoring and controls in fish; Hygiene controls for dry fish; and Monitoring and management of fruit fly in fresh fruits. At the other end, Monitoring and control of antibiotics in eggs; Monitoring and management of fusarium wilt in banana; and Monitoring and management of bacteria wilts in Potatoes, ranked the lowest. The contribution analysis is reported in Figure 19. The main decision criterion driving the prioritisation in the impact on exports, by far.

Figure 18; Tanzania baseline Model

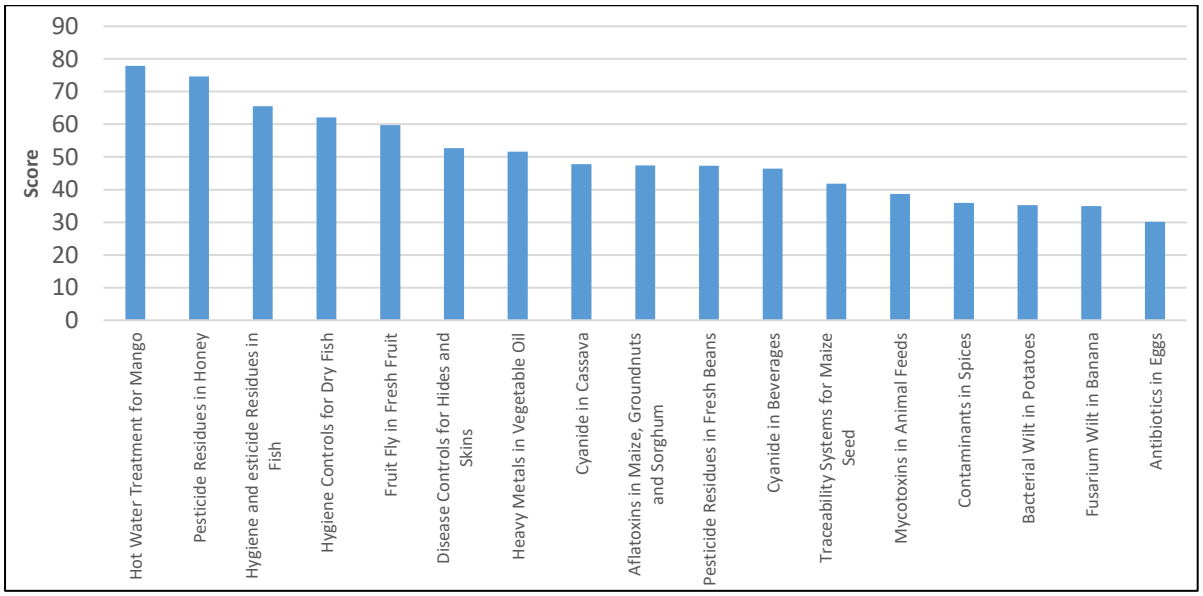
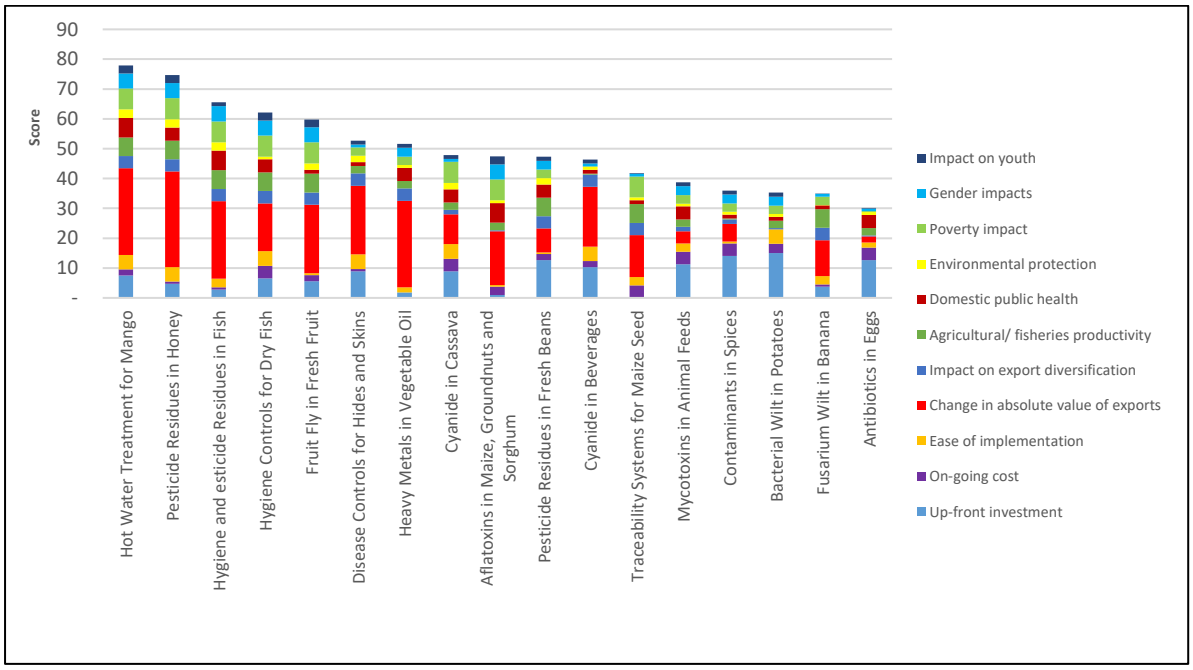


Figure 19; Baseline model criteria contribution



5.3 Prioritisation results for Uganda

From Figure 20, Monitoring and testing of heavy metals in cane sugar; Hygiene, pesticide residues and aflatoxins in milk; Residue monitoring and control of antibiotics use in eggs; Disease monitoring and controls in chicken meat; and Aflatoxin control and management in maize, are the top five capacity building options. From the bottom, the capacity building on Aflatoxin control and management in soya beans; Aflatoxin control and management in groundnuts; and Pesticide residue monitoring and management in fresh vegetables, ranked the lowest. The contribution analysis is reported in Figure 21. Again, the main criterion driving the prioritisation is the impact on exports.

Figure 20; Uganda baseline model

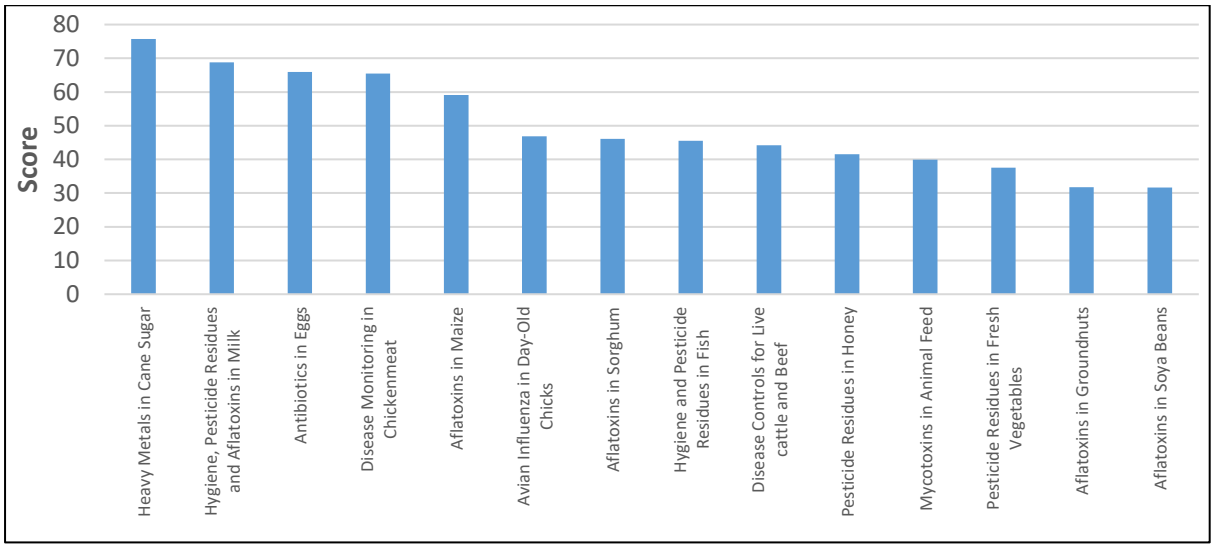
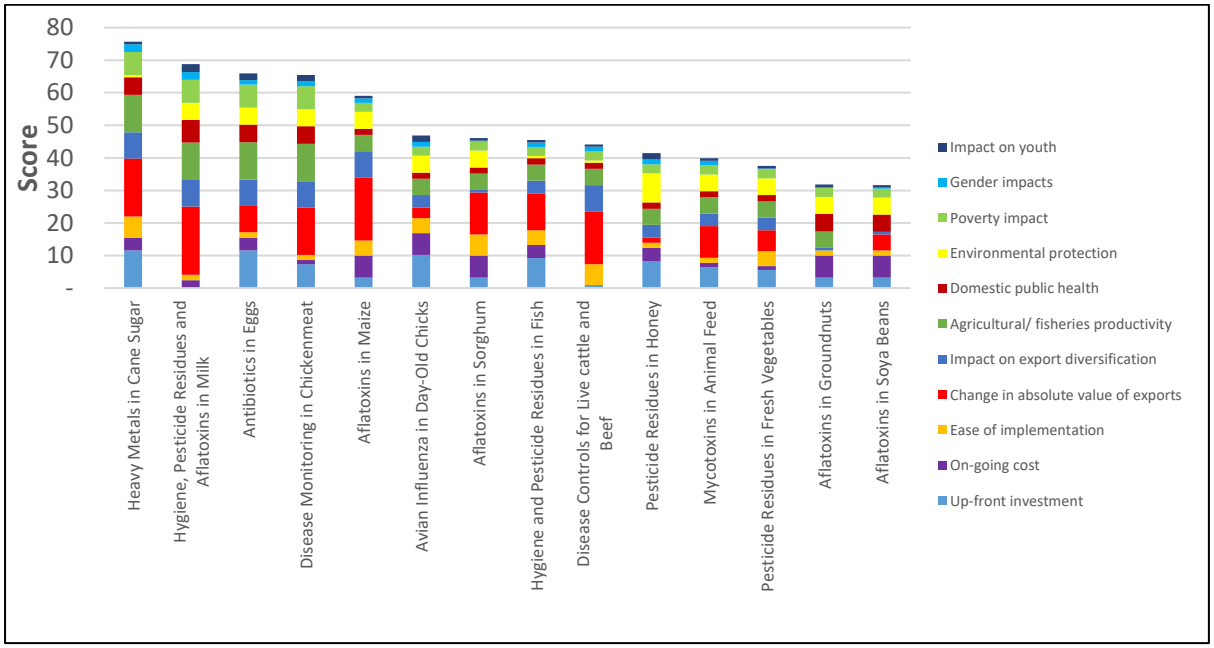


Figure 21; Baseline model criteria contribution



5.4 Prioritisation results for Burundi

The results shows that CBOs heavy metals in Hygiene controls and monitoring of heavy metals in vegetable oil; Pesticide residue monitoring and controls in coffee; and Monitoring and management of fruit fly in fresh fruits (mango, orange, malacouja, avocadoes, pineapple, and banana). On the other hand, monitoring of cyanide in beverages, and Monitoring of cyanide in beverages ranks lowest. The contribution analysis is reported in Figure 23. Again, the main criterion driving the prioritisation is the impact on exports.

Figure 22; Burundi baseline model

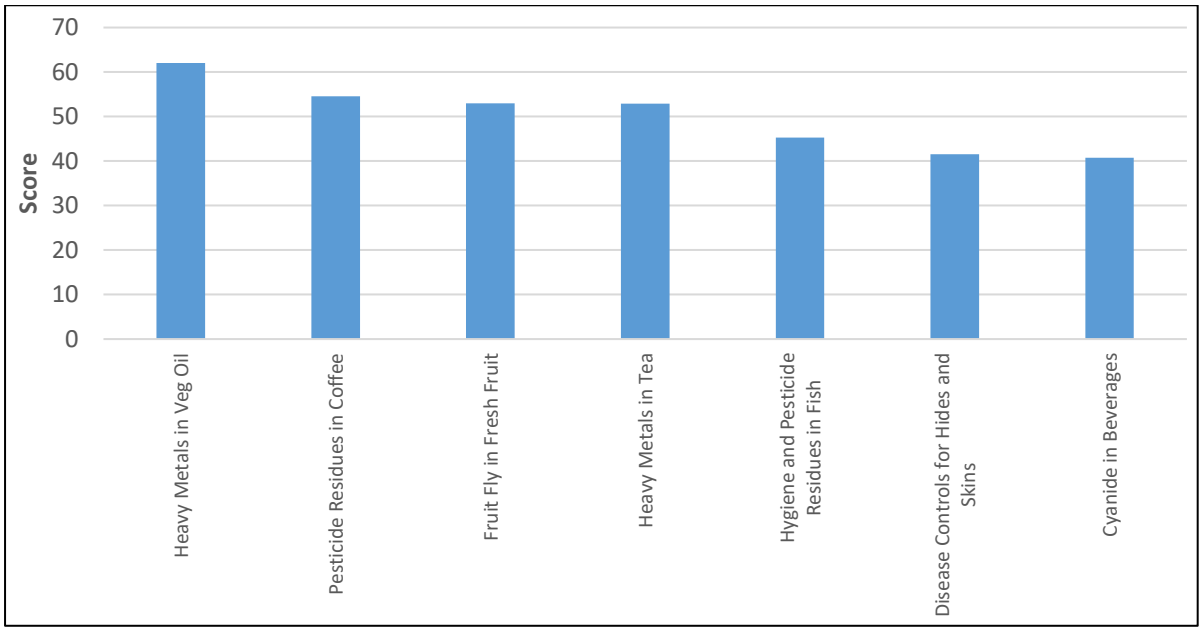
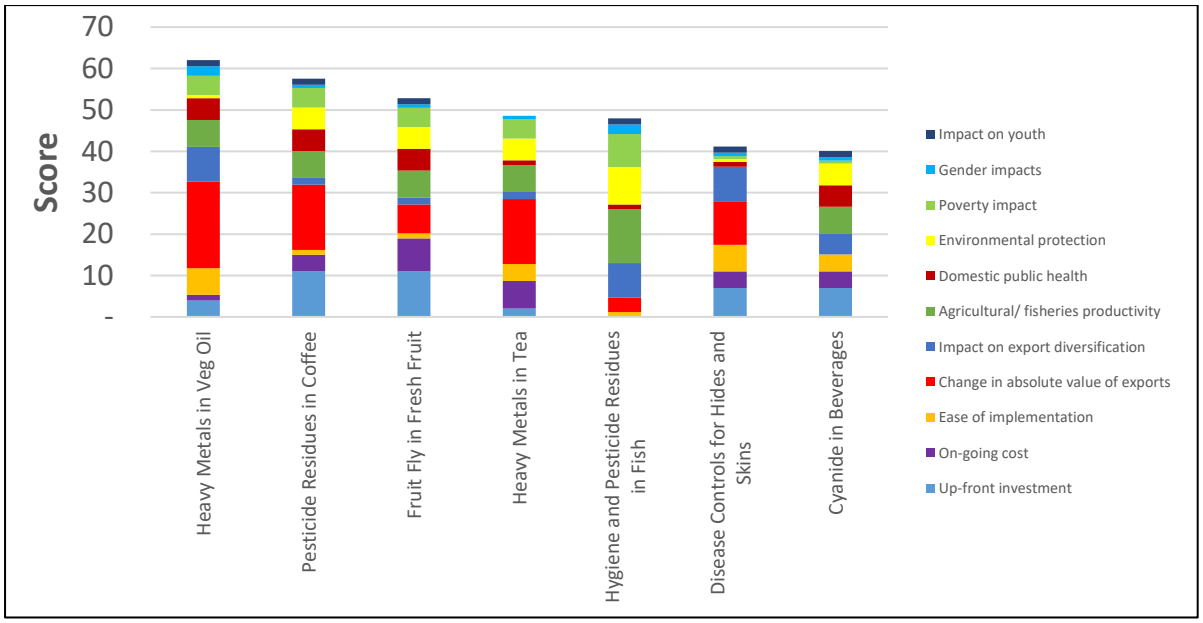


Figure 23; Baseline model criteria contribution



5.5 Prioritisation result for Kenya

The results in Figure 24 show that harmonization of standards for Avian Influenza in day-old chicks ranks the best, followed by Mycotoxin and antibiotics monitoring in animal feeds. In reverse, disease monitoring and control in pig meat followed by disease monitoring and control in sheep meat ranks lowest. The contribution analysis is reported in Figure 25. Contrary to the other countries in the analysis, the impact on exports is not a major determining factor in the prioritisation. Rather, the ongoing cost and ease of implementation are major determinants of the top-ranked options.

Figure 24; Kenya baseline model

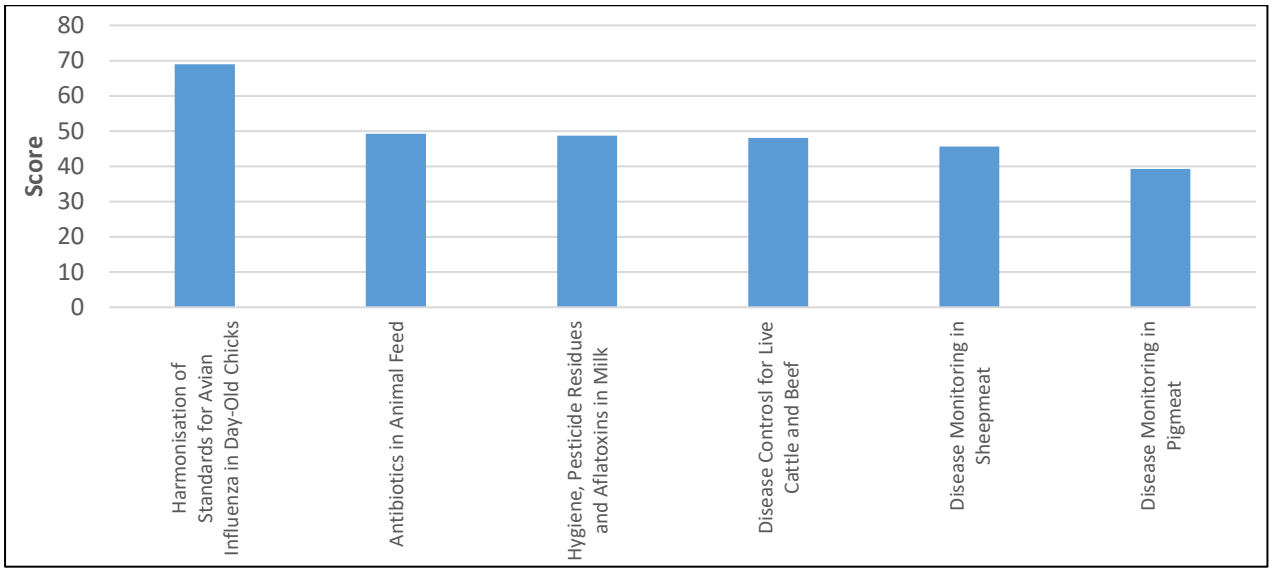
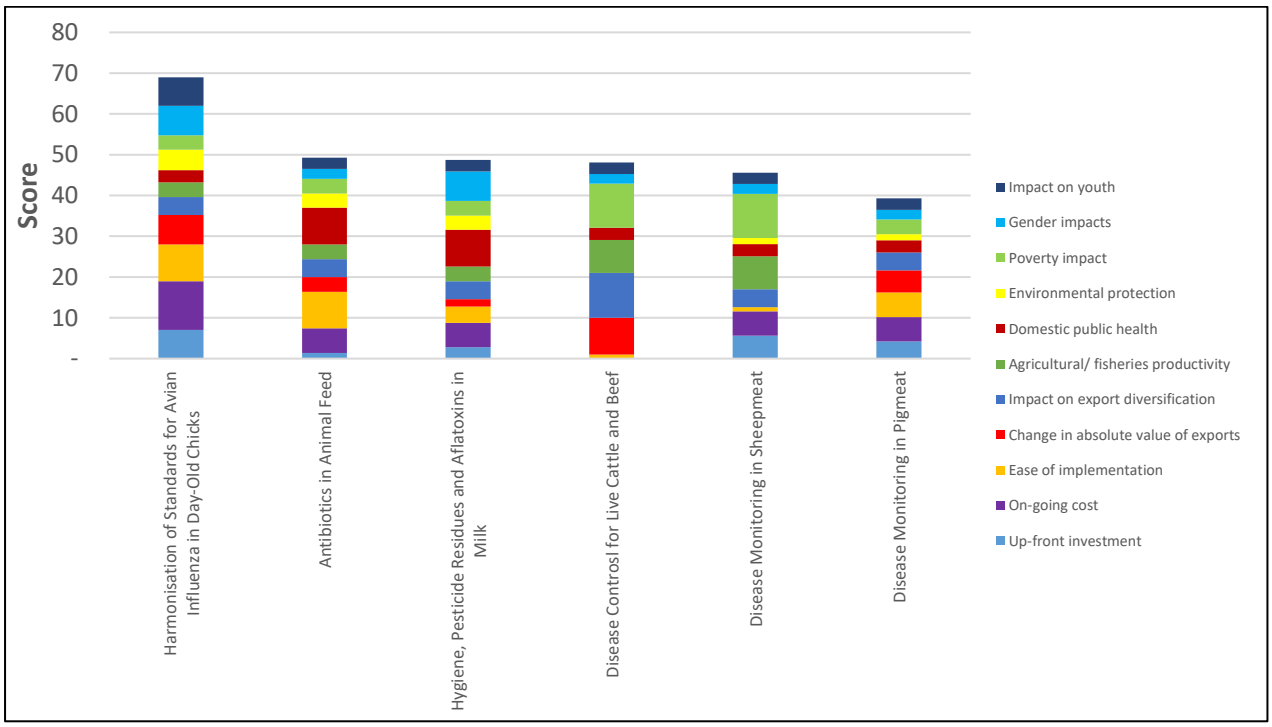


Figure 25; Baseline model criteria contribution



5.6 Prioritisation results for South Sudan

Figure 26 below presents the result for the two capacity building options for South Sudan. Monitoring and controls of contaminants in Gum Arabic ranked above disease and hygiene controls in hides and skins. This is because the later performed poorly on ease of implementation and environment protection.

Figure 26; South Sudan baseline model

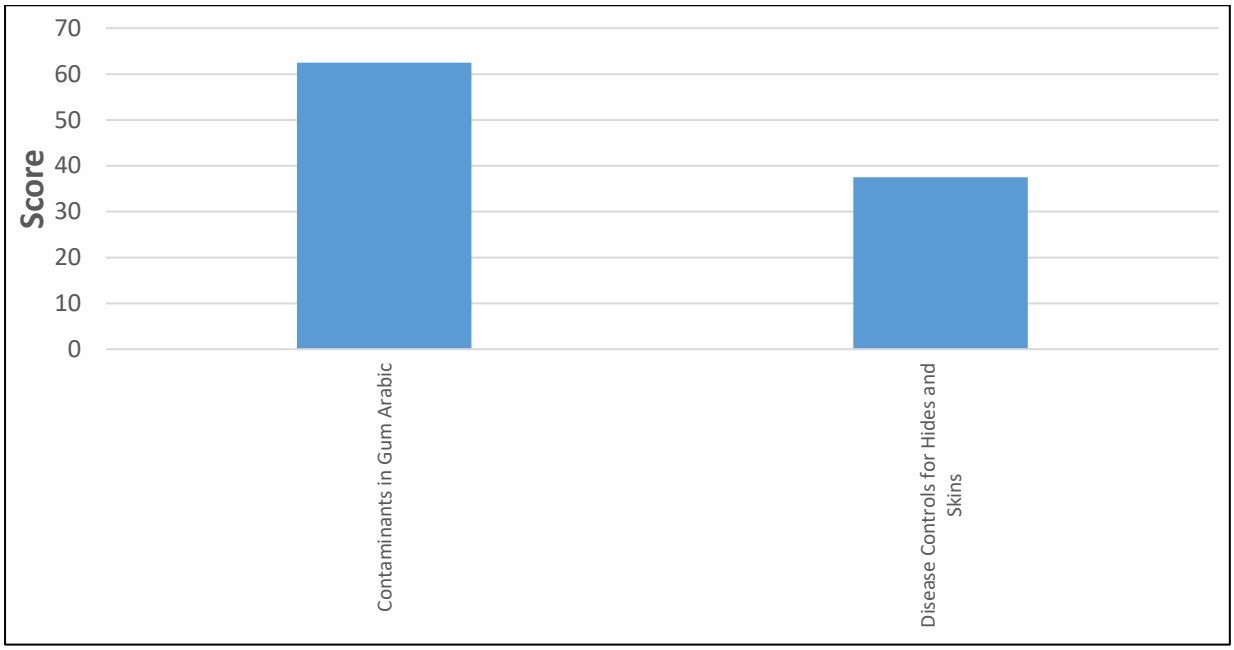
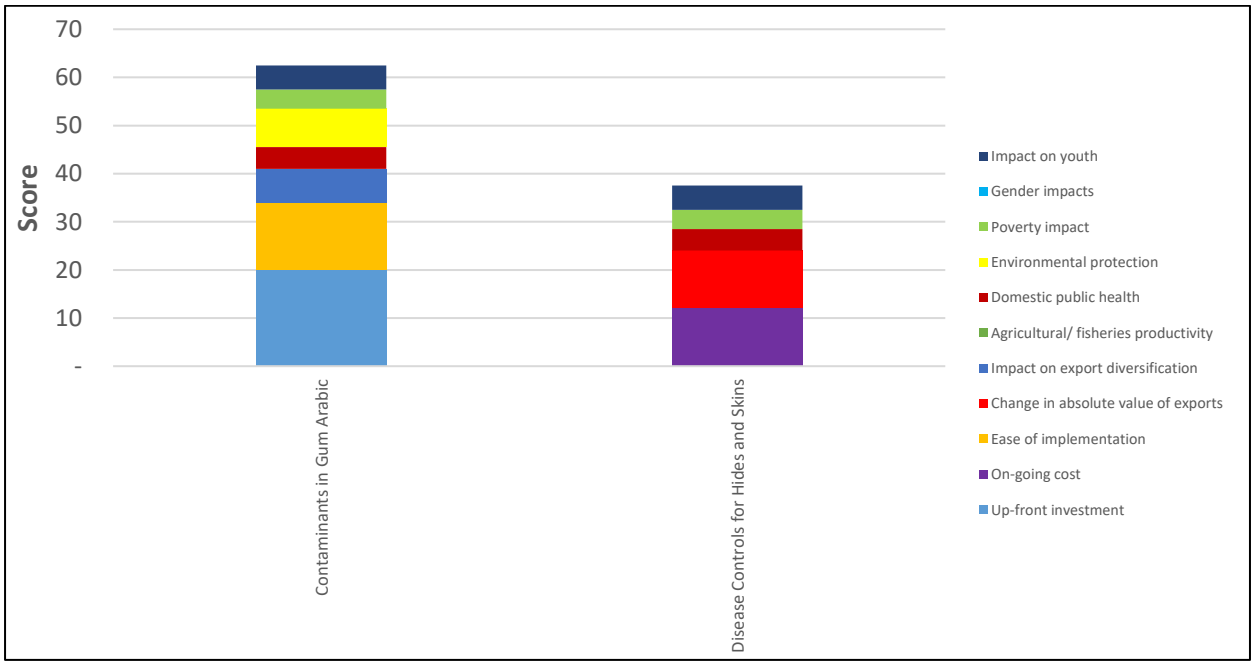


Figure 27 Baseline model criteria contribution



6.0 Conclusions

Overall, a significant number (47) of SPS capacity-building needs that impact regional trade were identified for the East Africa region. The countries with the largest number of identified capacity-building options are Tanzania (36%) and Uganda (30%). Similarly, these two countries represent the clear top-five capacity-building options that dominate all others, Tanzania (4) and Uganda (1). At country-level prioritisations, the dominant capacity-building options for each of the six EAC countries are:

Tanzania:

- Hot water treatment for mango.
- Hygiene and pesticide residue monitoring and controls in honey.
- Hygiene and pesticide residue monitoring and controls in fish.
- Hygiene controls for dry fish.
- Monitoring and management of fruit fly in fresh fruits.

Uganda:

- Monitoring and testing of heavy metals in cane sugar.
- Hygiene, pesticide residues and aflatoxins in milk.
- Residue monitoring and control of antibiotics use in eggs.
- Disease monitoring and controls in chicken meat.
- Aflatoxin control and management in maize.

Burundi:

- Hygiene controls and monitoring of heavy metals in vegetable oil.
- Pesticide residue monitoring and controls in coffee.
- Monitoring and management of fruit fly in fresh fruits.

Kenya:

- Harmonization of standards for Avian Influenza in day-old chicks.
- Mycotoxin and antibiotics monitoring in animal feeds.
- Hygiene, pesticide residue, and aflatoxin monitoring and controls in milk.

South Sudan:

- Monitoring and controls of contaminants in Gum Arabic.
- Disease and hygiene controls in hides and skins.

Rwanda:

- Disease and hygiene controls in hides and skins.

The analysis had to contend with considerable difficulties obtaining data for the compilation of the information cards in all countries. Attention, therefore, needs to be given over time to improving the data in the information cards. The analysis is dependent on the decision criteria and weights; over time, it is important to reflect on if and how these might change.

ANNEX 1 – Capacity Building Options Information Sheets

Tanzania

1. Hygiene and pesticide residue monitoring and controls in fish

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$380,000	Training on GHP in 4 main fishing ports - $200,000 Facilitate policy review on pesticide regulation - $50,000 Disseminating awareness on proper use of herbicides in catchment areas - $30,000. Sampling and testing - $100,000.	High
On-going cost	$50,000	On-going sampling and testing - $50,000.	High
Ease of implementation	+1	Relatively easy to implement, although requires changes in practices amongst significant numbers of producers.	High
Trade impacts			
Change in absolute value of exports	$6.3 million	Based on ITC export potential estimates, Tanzania has an untapped export potential of $6.3 million of fish.	High
Impact on export diversification	+2	Ban on DDT has great support from different stakeholders hence will be easy to implement.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Reduced rejections will increase the return on sales.	High
Domestic public health	+2	Reduced contamination will improve community health.	High
Environmental protection	+2	Improved environment conservation through adoption of GHP among stakeholders in fish subsector.	High
Social impacts			
Poverty impact	+2	Improved household income and livelihood.	High
Gender impacts	1	Improved income will enhance child education and reduce women's burden.	Medium
Impact on youth	+3	Fish sector is mostly occupied by youth; improvement will definitely reach the youth.	High

2. Hot water treatment for mango

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$210,000	Baseline survey in 9 regions with intensive mango production - $110,000. Awareness training in 9 regions - $ 10,000. Research, consultancy, design and construction of high temperature forced air equipment - $90,000.	Medium
On-going cost	$30,000	Follow up - $30,000.	High
Ease of implementation	+2	Easy to implement.	Medium
Trade impacts			
Change in absolute value of exports	$7 million	If fruit fly are managed, shading and waste will be reduced. Surplus mango will be diverted to Kenya market	High
Impact on export diversification	+2	Dodo mango has a unique rare taste. There is a potential EU market	High
Domestic agri-food impacts			
Agricultural productivity	+2	Increase in fruits production. Increase number of trees planted.	High
Domestic public health	+2	Improved due to enhanced income.	High
Environmental protection	+2	Mango trees have many environments benefits apart from its fruits.	High
Social impacts			
Poverty impact	+2	Improved income.	High
Gender impacts	+2	Women and children are involved in mango trade.	High
Impact on youth	+2	Income will support child education.	Medium

3. Pesticide residue monitoring and management in fresh beans

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$80,000	Training on GAPs, GMPs, GHPs, PHH, analytical skills in pesticide and implementation of inspection system - $30,000. Sampling and testing - $50,000.	High
On-going cost	$30,000	On-going sampling and testing - $30,000.	High
Ease of implementation	-2	Difficult to implement as involves engagement with large numbers of small-scale producers.	Medium
Trade impacts			
Change in absolute value of exports	$1.7 million	Based on ITC export potential estimates, Tanzania has an untapped export potential of $1.7 million of fresh beans.	High
Impact on export diversification	+2	EU market has already shown interest in expanding green beans business .	High
Domestic agri-food impacts			
Agricultural productivity	+2	Sustainability in production and profit.	High
Domestic public health	+1	May be some spillover into supply chains to local markets.	High
Environmental protection	+1	Environmental conservation. Reduced downstream contamination.	High
Social impacts			
Poverty impact	+1	Improved incomes.	High
Gender impacts	+1	Green beans farms mostly employ women and youths	High
Impact on youth	+1	Employment in the industry	Medium

4. Aflatoxin control and management in maize, groundnut and sorghum

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$410,000	Sampling and testing to establishing aflatoxin contamination database in 20 districts - $140,000. Training and capacity building in 20 regions - $200,000. Carry out policy and regulatory review on aflatoxin control - $10,000. Subsidy on the price of Aflasafe in 3 pilot districts for 3 years - $60,000.	Medium
On-going cost	$15,000	Follow up and supervision	High
Ease of implementation	-2	Difficult to implement as involves engagement with large numbers of small-scale producers.	Medium
Trade impacts			
Change in absolute value of exports	$3.7 million	Based on ITC export potential estimates, Tanzania has an untapped export potential of $3.2 million of maize and maize flour, $50,400 for sorghum, and $433,200 for groundnuts	High
Impact on export diversification	0	Minimal. Tanzania already exports maize.	High
Domestic agri-food impacts			
Agricultural productivity	+1	Some improvements in productivity.	high
Domestic public health	+2	Reduced mortality and other health impacts related to aflatoxin contamination.	High
Environmental protection	0	Minimal.	Medium
Social impacts			
Poverty impact	+2	Increased income.	High
Gender impacts	+2	Women and disadvantaged groups employed .	High
Impact on youth	+2	Employment opportunities.	High

5. Hygiene controls and monitoring of heavy metals in vegetable oil

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$395,000	Awareness creation on oil standards (TBS) to stakeholders - $40,000. Strengthening farmer associations in Singida, Manyara and Dodoma - $200,000. Developing guideline for storage facilities and extraction machines - $5,000. Training processors on GHP - $20,000. Sampling and testing - $130,000.	High
On-going cost	$100,000	On-going sampling and testing.	High
Ease of implementation	-1	Difficult to implement as involves interventions in small-scale producers but via producer organisations.	High
Trade impacts			
Change in absolute value of exports	$7 million	Based on ITC export potential estimates, Tanzania has an untapped export potential of $0.53 million of vegetable oil from sunflower and palm oil. These two constitutes about 72% on average of Tanzanian's exports of vegetable oil to the world between 2014-2018. Thus, we could adjust this figure upward by 30%.	Medium
Impact on export diversification	+2	Other ECA countries already a lucrative oil market.	High
Domestic agri-food impacts			
Agricultural productivity	+1	May be some improvement in productivity if leads to higher prices.	Medium
Domestic public health	+1	May be some improvement if spillovers into supply chains to domestic markets.	High
Environmental protection	0	Minimal.	High
Social impacts			
Poverty impact	+1	Improved household income.	Medium
Gender impacts	+1	Some women and disadvantaged groups will be employed.	Low
Impact on youth	+1	Improved education to youth.	Low

6. Monitoring and management of fruit fly in fresh fruits

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$300,000	Surveillance in 9 regions - $200,000. Procurement of traps, bio-agents and lures - $30,000. Setting traps and lures to eliminate male flies by traps and lures - $30,000. Awareness and capacity building to farmers and extension staffs - $40,000.	High
On-going cost	$30,000	On-going surveillance - $30,000	High
Ease of implementation	-2	Difficult to implement as involves engagement with large numbers of small-scale producers.	High
Trade impacts			
Change in absolute value of exports	$4,500,000	Based on ITC export potential estimates, Tanzania has an untapped export potential of $0.53 million of fresh fruits (Pineapple, oranges, banana, avocado, melons, and grapes)	High
Impact on export diversification	+2	Significant scope to enhance export diversity.	High
Domestic agri-food impacts			
Agricultural productivity	+2	Improved due to less damage due to pests and potentially higher prices.	High
Domestic public health	0	No impact	High
Environmental protection	+1	Improved due to increased fruit trees and less environmental damage from pests.	High
Social impacts			
Poverty impact	+2	Improved incomes	High
Gender impacts	+2	Women and disadvantaged groups involved	High
Impact on youth	+2	Opportunity for employment amongst youth.	High

7. Hygiene control for dry fish

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$280,000	Awareness creation in fishing ports - $30,000. Consultancy, design and construction of 5 hot air-drying facilities - $250,000.	Medium
On-going cost	$0	No ongoing cost	High
Ease of implementation	+2	Easy to implement as involves small number of centralised control points.	High
Trade impacts			
Change in absolute value of exports	$3,500,000	Estimate shows that Tanzania has a potential of exporting $3,500,000 worth of dry fish.	High
Impact on export diversification	+2	EU market	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Reduced rejections will improve profit	High
Domestic public health	+1	May be some impact if spillovers into supply chain to domestic market.	high
Environmental protection	0	Minimal.	High
Social impacts			
Poverty impact	+2	Improved income	High
Gender impacts	+2	Improved livelihood	High
Impact on youth	+2	The sector is attractive to youth	High

8. Monitoring and management of bacteria wilts in Potatoes

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$50,000	Bacteria wilt surveillance in three regions - $50,000.	High
On-going cost	$10,000	Ongoing surveillance.	High
Ease of implementation	+2	Easy to implement.	Medium
Trade impacts			
Change in absolute value of exports	$46,600	Tanzania exports inconsistent amount of potatoes ranging from $2,000-$10.9 million between 2014-2018. However, ITC estimated $46,600 untapped export potential of potatoes.	
Impact on export diversification	0	Minimal given scale of predicted exports.	High
Domestic agri-food impacts			
Agricultural productivity	+1	Some impact.	High
Domestic public health	0	Minimal.	High
Environmental protection	0	Minimal.	High
Social impacts			
Poverty impact	+1	Some impact.	High
Gender impacts	+1	Some impact.	Medium
Impact on youth	+1	Some impact.	High

9. Mycotoxin and antibiotics monitoring in animal feeds

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$100,000	Identify and list animal feed processors countrywide - $20,000. Train animal feed processors on control of mycotoxin and antibiotics in animal feeds - $50,000. Developing and disseminating National guideline for mycotoxin and antibiotics control in animal feeds - $30,000.	High
On-going cost	$0	No ongoing cost.	High
Ease of implementation	+1	Relatively easy to implement.	High
Trade impacts			
Change in absolute value of exports	$195,400	Based on ITC export potential estimates, Tanzania has an untapped export potential of $195,400 of preparations used in animal feeds	Medium
Impact on export diversification	+1	Quality animal feed can fetch market in ECA.	high
Domestic agri-food impacts			
Livestock productivity	+1	Increased if leads to higher prices and reduced wastage.	High
Domestic public health	+1	May be some impact if spillovers into supply chain to domestic market.	High
Environmental protection	0	Minimal	High
Social impacts			
Poverty impact	+1	Some impact.	High
Gender impacts	+1	Some impact.	High
Impact on youth	+1	Some impact.	High

10. Monitoring of cyanide in beverages

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$130,000	Training border plant health inspectors on Sampling and testing for cyanide - $40,000. Procure and install cyanide testing equipment for 7 border posts, 3 airports and 3 harbours - $90,000.	Medium
On-going cost	$30,000	On-going sampling and testing	Medium
Ease of implementation	+2	Easy to implement	Medium
Trade impacts			
Change in absolute value of exports	$4 million	Based on ITC export potential estimates, Tanzania has an untapped export potential of $4 million of Beverages (alcoholic & non-alcoholic)	High
Impact on export diversification	+2	Safety guaranteed will expand beverage export beyond the region	High
Domestic agri-food impacts			
Agricultural productivity	0	Minimal impact.	High
Domestic public health	0	Minimal impact.	High
Environmental protection	0	Minimal impact.	High
Social impacts			
Poverty impact	0	Minimal impact.	High
Gender impacts	0	Minimal impact.	High
Impact on youth	+1	May lead to some youth employment opportunities.	High

11. Traceability system for maize seed

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1,292,000	Identify and establish a list of maize seed manufacturers' and validate their activities $2,000 Establishing maize seed traceability system- $1,000,000. Consultancy and training - $290,000.	Medium
On-going cost	$0	No on-going cost.	Medium
Ease of implementation	+1	Moderate.	High
Trade impacts			
Change in absolute value of exports	$2.8 million	Based on ITC export potential estimates, Tanzania has an untapped export potential of $4 million of maize seed exports.	High
Impact on export diversification	+2	ECA countries.	High
Domestic agri-food impacts			
Agricultural productivity	+2	Improved productivity from use of better-quality seeds.	High
Domestic public health	0	None.	High
Environmental protection	0	Minimal.	High
Social impacts			
Poverty impact	+2	Increased income due to enhanced productivity.	High
Gender impacts	0	Minimal.	High
Impact on youth	0	Minimal.	High

12. Hygiene and pesticide residue monitoring and controls in honey

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$330,000	Training of honey producers and processors on GHP and pesticide use $200,000 Regular sampling and testing - $80,000. Pesticide Policy review - $50,000	Medium
On-going cost	$50,000	On-going sampling and testing .	Medium
Ease of implementation	+2	Easy to implement.	Medium
Trade impacts			
Change in absolute value of exports	$145 million	Estimated potential of production of honey based on forestry area is 138,000 Metric tons of honey worth $145 million and 9,200 tons of beeswax per year.	High
Impact on export diversification	+2	UE and Middle East market are willing to buy honey from Tanzania	High
Domestic agri-food impacts			
Honey productivity	+2	Higher prices from honey production.	High
Domestic public health	+1	Some impacts if spillovers into supply chain to domestic markets.	High
Environmental protection	+2	Significant improvements.	High
Social impacts			
Poverty impact	+2	Significant impact on small-scale producers.	High
Gender impacts	+2	Improve. Currently a good proportion of honey business is performed by marginalized groups.	High
Impact on youth	+2	Opportunities for youth employment.	Medium

13. Monitoring and management of fusarium wilt in banana

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$340,000	Training on GAP to farmers, extension officers and banana traders $150,000 Conducting surveillance in 7 banana growing zones - $180,000. Updating the National banana pest list - $10,000.	High
On-going cost	$50,000	Follow up trainings - $50,000.	High
Ease of implementation	+1	Relatively easy to implement.	High
Trade impacts			
Change in absolute value of exports	$2.2 million	It is estimated that Tanzania has a potential of exporting banana worth of $2,200,000 annually.	High
Impact on export diversification	+2	Middle East has a potential market for banana from Tanzania	High
Domestic agri-food impacts			
Agricultural productivity	+2	Increased due to diminished losses.	High
Domestic public health	0	No impact.	High
Environmental protection	-1	May be negative impacts from increased banana production.	Medium
Social impacts			
Poverty impact	+1	Improved employment opportunities.	High
Gender impacts	0	Minimal.	High
Impact on youth	0	Minimal.	High

14. Hygiene and Cyanide monitoring and controls in cassava

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$200,000	Training on GAP $70,000 Collaborating in research on cassava $30,000 Sampling and testing to establishing cassava cyanide baseline data for Tanzania- $70,000. Policy review on cassava cyanide - $30,000	High
On-going cost	$0	No ongoing cost.	High
Ease of implementation	+2	Easy to implement.	High
Trade impacts			
Change in absolute value of exports	$1.8 million	Tanzania exports very minimal value of cassava over the last ten years of between $0-108,000 except in 2017 where it exported close to $1.8 million. In the absence of real time data as to the potential, we could assume that this intervention may re-instate the past performance in 2017.	High
Impact on export diversification	+1	UNCDF has engaged to provide TZS 420 million to boost the cassava-processing factory in Tanzania's western region.	High
Domestic agri-food impacts			
Agricultural productivity	+1	Since cassava is an arid crop land that was once unproductive will add value.	High
Domestic public health	+1	Some impact if spillovers to supply chains to domestic markets.	High
Environmental protection	+1	Arid land likely to be turned into farms.	High
Social impacts			
Poverty impact	+2	Income opportunities for smallholder producers especially in arid areas.	High
Gender impacts	0	Minimal.	High
Impact on youth	+1	Improved	High

15. Residue monitoring and control of contaminants in spices

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$62,000	Sampling and testing spices for contamination - $40,000. Training on GAP to spice farmers - $10,000. Reviewing national policy on spices quality - $12,000.	High
On-going cost	$0	No ongoing cost.	High
Ease of implementation	-2	Involves intervention with large numbers of small producers.	
Trade impacts			
Change in absolute value of exports	$537,900	Based on ITC export potential estimates, Tanzania has an untapped export potential of $537,900 of spices exports, consisting of cloves, vanilla, pepper, and spices.	High
Impact on export diversification	+1	Middle East, South Africa and EU.	High
Domestic agri-food impacts			
Agricultural productivity	0	Minimal.	High
Domestic public health	0	Minimal.	High
Environmental protection	0	Minimal.	High
Social impacts			
Poverty impact	+1	Some impact.	High
Gender impacts	+1	Some impact.	Medium
Impact on youth	+1	Some impact.	Medium

16. Monitoring and control of antibiotics in eggs

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$80,000	Carry out survey in all veterinary drug stores - $40,000. Training on withdrawal period to poultry farmers and drug dealers - $35,000. Policy review with regulatory authority - $5,000.	High
On-going cost	$0	No ongoing cost.	High
Ease of implementation	-1	Involves intervention with relatively large numbers of small producers.	high
Trade impacts			
Change in absolute value of exports	$87,400	Tanzania exports virtually no eggs except from 2016 ($56,000), 2017 ($105,000) and 2018 ($162,000). Without real time data on potential, we can project using the growth between 2017-2018 of 54% which is about $87,400 annually.	Low
Impact on export diversification	0	Minimal.	Low
Domestic agri-food impacts			
Agricultural productivity	+1	Some impact if higher prices and/or reduced rejections.	Low
Domestic public health	+1	Some impact if spillovers to supply chains to domestic markets.	High
Environmental protection	0	Minimal.	High
Social impacts			
Poverty impact	0	Minimal.	Medium
Gender impacts	0	Minimal.	Medium
Impact on youth	0	Minimal.	Medium

17. Disease monitoring and controls for hides and skins of cattle and sheep

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$200,000	Developing, install and operationalize digital platform system for disease monitoring and information transfer from local and regional government to the ministry veterinary unit - $200,000.	High
On-going cost	$50,000	Follow up and supervision - $50,000.	High
Ease of implementation	+2	Easy to implement.	High
Trade impacts			
Change in absolute value of exports	$4.5 million	Based on ITC export potential estimates, Tanzania has an untapped export potential of hides and skins of $4.5 million.	High
Impact on export diversification	+2	There is a huge market potential in Comoro and the Middle East.	High
Domestic agri-food impacts			
Livestock productivity	+1	May be higher prices for hides that feed through to returns to livestock producers.	Low
Domestic public health	0	No impact.	High
Environmental protection	+1	May be positive impacts from improved abattoir practices.	Medium
Social impacts			
Poverty impact	+1	May lead to higher income for poor producers	Low
Gender impacts	0	Minimal.	Low
Impact on youth	+1	Income-earning opportunities.	Low

Merged capacity-building options

Option	Reason
Aflatoxin control and management in sorghum	CBO merged with aflatoxin control in Maize as most areas that are prone to aflatoxin contamination grow both crops.
Disease and hygiene controls in hides and skins	CBO merged with disease monitoring and control in live cattle and beef as any measure towards disease control in live animals also addresses disease issues in hides and skins
Aflatoxin controls and management in groundnuts	CBO merged with aflatoxin control in Maize as most areas that are prone to aflatoxin contamination grow both crops.
Disease monitoring and controls in sheep meat	CBO merged with disease monitoring and control in live cattle and beef as the intervention targets the same farmers

Uganda

1. Hygiene and pesticide residue monitoring and controls in fish

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	130,000	Training $50,000; Sampling and testing $80,000	Medium
On-going cost	30,000	On-going sampling and testing	Medium
Ease of implementation	-1	Involves training of a significant number of fish farmers.	Medium
Trade impacts			
Change in absolute value of exports	$2.6 million	Based on ITC export potential estimation, Uganda has $2.6 million untapped export potential of fish to the East African region	High
Impact on export diversification	+1	Increases diversification, although projected additional exports are quite minimal	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Stimulated by increased exports	Medium
Domestic public health	0	Little or no impact unless spillovers to domestic supply chains	Medium
Environmental protection	-1	Likely to enhance scale of fish farming with potentially negative environmental impacts	Low
Social impacts			
Poverty impact	+1	Some impact on in come of poor employed on fish farms	Medium
Gender impacts	+1	Likely to be employment opportunities for youth	Medium
Impact on youth	0	Little or no impact	Medium

2. Aflatoxin control and management in maize

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.3 million	A total of $5.2 million was estimated for aflatoxin control in the document "Concept for immediate action on Aflatoxin Control in Uganda" by National Aflatoxin TWG, which covers all crops susceptible to aflatoxin. Here we assume a quarter of this cost could apply to maize alone.	Medium
On-going cost	$0	No on-going cost	Medium
Ease of implementation	-1	Involves engagement with potentially significant numbers of small-scale producers	Medium
Trade impacts			
Change in absolute value of exports	$76.3 million	Based on ITC export potential estimation, Uganda has $76.3 million untapped export potential of maize and maize flour to the East African region	Medium
Impact on export diversification	+2	Significant impact on export diversity given projected additional exports	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Increased returns from maize seed production	Medium
Domestic public health	0	No impact	High
Environmental protection	0	Little or no impact	Medium
Social impacts			
Poverty impact	+1	May be enhanced income opportunities for small farmers	Medium
Gender impacts	+1	May be employment opportunities for youth	Low
Impact on youth	0	Little or no impact	Low

3. Hygiene, pesticide residue, and aflatoxin monitoring and controls in milk

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$2.1 million	Source: Uganda National P-IMA 2020	High
On-going cost	$48,000	Source: Uganda National P-IMA 2020	High
Ease of implementation	-2	Involves engagement with significant numbers of small producers	Medium
Trade impacts			
Change in absolute value of exports	$100 million	$20 million more export can be realised per year. Source: DDA, Also, ITC estimates untapped export potential for milk at $103.5 million	High
Impact on export diversification	+2	Significant expansion of high-value exports	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Opportunities for enhanced farm income	Medium
Domestic public health	+2	May be spillovers to supply chains to domestic markets	Medium
Environmental protection	0	Little or no impact	Medium
Social impacts			
Poverty impact	+2	Significant opportunities to enhance income of small producers	Medium
Gender impacts	+2	May be significant employment opportunities for youth	Medium
Impact on youth	+2	Opportunities fort economic empowerment of women	Medium

4. Aflatoxin control and management in sorghum

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.3 million	A total of $5.2 million was estimated for aflatoxin control in the document "Concept for immediate action on Aflatoxin Control in Uganda" by National Aflatoxin TWG, which covers all crops susceptible to aflatoxin. Here we assume a quarter of this cost could apply to sorghum alone.	Medium
On-going cost	$0	No on-going cost	Medium
Ease of implementation	+2	Involves engagement with significant numbers of small producers	Medium
Trade impacts			
Change in absolute value of exports	$3.3 million	Based on ITC export potential estimation, Uganda has $3.3 million untapped export potential of sorghum to the East African region	High
Impact on export diversification	0	Minimal	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Some enhancement of returns to sorghum production	Medium
Domestic public health	0	Minimal impact given scale	Medium
Environmental protection	0	Minimal impact	Medium
Social impacts			
Poverty impact	+1	Some impact although likely to be small	Medium
Gender impacts	0	Minimal impact	Medium
Impact on youth	0	Minimal impact	Medium

5. Aflatoxin control and management in groundnuts

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.3 million	A total of $5.2 million was estimated for aflatoxin control in the document "Concept for immediate action on Aflatoxin Control in Uganda" by National Aflatoxin TWG, which covers all crops susceptible to aflatoxin. Here we assume a quarter of this cost would apply to groundnuts alone.	Medium
On-going cost	$0	No on-going cost	Medium
Ease of implementation	-2	Involves engagement with significant numbers of small producers	Medium
Trade impacts			
Change in absolute value of exports	$157,800	Based on ITC export potential estimation, Uganda has $157,800 untapped export potential of groundnuts (excluding roasted or cooked groundnuts) to the East African region	Medium
Impact on export diversification	0	Minimal	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	May be some enhanced returns to producers	Medium
Domestic public health	+1	May be some spillovers to supply chains to domestic markets	Medium
Environmental protection	0	Minimal impact	Medium
Social impacts			
Poverty impact	+1	Some impact although scale is small	Medium
Gender impacts	0	Minimal	Medium
Impact on youth	0	Minimal	Medium

6. Aflatoxin control and management in soya beans

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.3 million	A total of $5.2 million was estimated for aflatoxin control in the document "Concept for immediate action on Aflatoxin Control in Uganda" by National Aflatoxin TWG, which covers all crops susceptible to aflatoxin. Here we assume a quarter of this cost could apply to Soya beans alone.	
On-going cost	$0	No on-going cost	
Ease of implementation	-2	Involves engagement with significant numbers of small producers	Medium
Trade impacts			
Change in absolute value of exports	$518,700	Based on ITC export potential estimation, Uganda has $518,700 untapped export potential of soya beans, flour and oil to the East African region	Medium
Impact on export diversification	0	Minimal	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	0	Minimal given scale	Medium
Domestic public health	+1	May be some spillovers to supply chains to domestic markets	Medium
Environmental protection	0	Little or no impact	Medium
Social impacts			
Poverty impact	+1	Some impact although scale is small	
Gender impacts	0	Minimal	Medium
Impact on youth	0	Minimal	Medium

7. Disease monitoring and controls in live cattle and beef

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.73 million	Source: Uganda National P-IMA 2020	High
On-going cost	$250,000	On-going surveillance	High
Ease of implementation	+2	Easy given focused on centralised controls	Medium
Trade impacts			
Change in absolute value of exports	$4.278 million	Based on ITC estimates, untapped export potential for live animals and livestock products could stand at $12.834 million (i.e., Live bovine animal export could be $4.18 million, all meat products could be $7.4 million, plus other live animals export $1.254 million) We assume that a third of this untapped potential could come from live cattle and beef.	Medium
Impact on export diversification	+2	Significant expansion of high-value animal exports	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Opportunities to enhance farm incomes	Medium
Domestic public health	0	No impact	High
Environmental protection	-1	May be detrimental impacts from expanded animal production	Medium
Social impacts			
Poverty impact	+1	Some opportunities fort small producers	Medium
Gender impacts	+1	May be employment 0pportuynitis for youth	Medium
Impact on youth	0	Minimal	Medium

8. Pesticide residue monitoring and management in fresh vegetables

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$678,000	Baseline studies consultancy $50,000; Developing residue monitoring plans and guidelines for four value chains @ 67,000 = $268,000; Training on GAPs, GMPs, GHPs, PHH, analytical skills in pesticide use including Piloting the plan and guidelines - $100,000; Sampling and testing (including procuring equipment - $120,000, procuring reagents - $90,000) - $260,000	Medium
On-going cost	$50,000	On-going sampling and testing	Medium
Ease of implementation	-1	Involves engagement with small producers	Medium
Trade impacts			
Change in absolute value of exports	$545,600	Based on ITC export potential estimation, Uganda has $545,600 untapped export potential of fresh vegetables to the East African region	Medium
Impact on export diversification	+1	Some impact although scale limited	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	May be some opportunities ft enhanced farm incomes	Medium
Domestic public health	0	Minimal	Medium
Environmental protection	0	Minimal	Medium
Social impacts			
Poverty impact	+1	Limited opportunities to enhance livelihood of small producers	Medium
Gender impacts	0	Minimal	Medium
Impact on youth	0	Minimal	Medium

9. Training on biosecurity to reduce AI in day-old chicks

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$100,000	Training to be targeted at major poultry industry players exporting or export ready	Medium
On-going cost	$0	No on-going cost	Medium
Ease of implementation	-1	Involves engagement with small producers	Medium
Trade impacts			
Change in absolute value of exports	$473,600	Uganda's export of live chicken in the last ten years has not exceeded $538,000 in 2015. Exports in 2019 is only $100,000. However, ITC export potential estimation suggests that Uganda has $35,600 untapped export potential of live chicken to the East African region. Thus, we could assume a potential of the trade gap and untapped trade, which amounts to about $473,600	Medium
Impact on export diversification	+1	Some impact but limited scale	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Limited opportunities to enhance farm incomes.	Medium
Domestic public health	0	No impact	Medium
Environmental protection	0	Minimal	Medium
Social impacts			
Poverty impact	+1	Enhanced income for small producers although limited scale	Medium
Gender impacts	+1	May be some employment opportunities for youth.	Medium
Impact on youth	+1	May be some employment opportunities for women.	Medium

10. Mycotoxin and antibiotics monitoring in animal feeds

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$662,900	Surveillance and data collection = $76,900; Testing capacity upgrade [Equipment and reagents = (Procurement of HPLC (150,000), Charm II immunoassay equipment (100,000); 5 mobile Lab vans ($550,000) & testing kits ($150x120x2 = $36,000)] = $586,000	Medium
On-going cost	$50,000	On-going sampling and testing	Medium
Ease of implementation	-2	Involves engagement with potentially significant numbers of small-scale producers	Medium
Trade impacts			
Change in absolute value of exports	$1.4 million	Based on ITC export potential estimation, Uganda has $1.4 million untapped export potential of preparations used in animal feed to the East African region	High
Impact on export diversification	+1	Limited scale but does enhance export diversity.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Likely to enhance producer income and/or enhance productivity.	Medium
Domestic public health	0	No impact	Medium
Environmental protection	0	Minimal	Medium
Social impacts			
Poverty impact	+1	May enhance income of small producers	Medium
Gender impacts	+1	May be employment opportunities for youth	Medium
Impact on youth	0	Minimal	Medium

11. Monitoring and testing of heavy metals in cane sugar

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$80,000	Sampling and testing	Medium
On-going cost	$30,000	On-going Sampling and testing	Medium
Ease of implementation	+2	Largely focused on centralised controls	Medium
Trade impacts			
Change in absolute value of exports	$44.6 million	Based on ITC export potential estimation, Uganda has $44.6 million untapped export potential of cane sugar to the East African region	Medium
Impact on export diversification	+2	Significant increase in processed food exports	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Likely to in increase returns from cane sugar production with significant scale.	Medium
Domestic public health	+1	May be spillovers to supply chains to domestic markets	Medium
Environmental protection	-1	Likely to encourage production of cane sugar with potentially significant environmental impacts	Medium
Social impacts			
Poverty impact	+2	Likely to create significant income opportunities for the poor	Medium
Gender impacts	+2	Likely to create significant employment opportunities for youth	Medium
Impact on youth	0	Minimal	Medium

12. Hygiene and pesticide residue monitoring and controls in honey

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$160,000	Training and awareness creation $50,000; Development of SoP and standards - $30,000, support of modern equipment - $50,000, and sampling and testing $30,000	Medium
On-going cost	$30,000	On-going sampling and testing	Medium
Ease of implementation	-2	Involves engagement with significant numbers of honey producers	Medium
Trade impacts			
Change in absolute value of exports	$213,000	According to an internal report cited from the Uganda Department of Animal Health, Uganda exported about UGX782,577,349 in 2018, which comes to about US$213,000 in current 2020 exchange rate. We assume this intervention to safeguard this export.	Medium
Impact on export diversification	+1	Enhanced high-value exports but limited scale	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Enhanced incomes for producers but limited scale	Medium
Domestic public health	0	Minimal	Medium
Environmental protection	+1	Some benefits from enhanced honey production but limited scale	Medium
Social impacts			
Poverty impact	+1	Significant opportunities fort enhanced income among poor producers but limited scale	Medium
Gender impacts	+1	Opportunities for women but limited scale	Medium
Impact on youth	+1	Opportunities for poor women but limited scale	Medium

13. Disease monitoring and controls in chicken meat

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$350,000	Training of stakeholders on disease reporting and syndromic surveillance of PPR,RVF and other priority diseases-$50,000; Collecting samples for testing, procuring reagents and equipment-$300,000	Medium
On-going cost	$50,000	On-going disease monitoring and surveillance -$50,000	Medium
Ease of implementation	-2	Involves engagement with producers, many of which will be smaller in scale	Medium
Trade impacts			
Change in absolute value of exports	$3.5 million	According to ITC export potential map, Uganda has untapped export potential of $10.5 million of poultry. We assume a third of this could constitute chicken meat.	Medium
Impact on export diversification	+2	Increases exports of high-value quite significantly.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Opportunity to enhance income amongst producers.	Medium
Domestic public health	+1	May be some spillovers into supply chains to domestic markets	Medium
Environmental protection	0	Minimal	Medium
Social impacts			
Poverty impact	+2	Opportunities to increase income amongst small producers	Medium
Gender impacts	+1	May be employment opportunities for youth	Medium
Impact on youth	+1	May be employment opportunities for women	Medium

14. Residue monitoring and control of antibiotics use in eggs

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$80,000	Training on correct antibiotic use - $50,000; Sampling and testing - $30,000	Medium
On-going cost	$30,000	On-going sampling and testing	Medium
Ease of implementation	-2	Engagement with significant numbers of small producers.	Medium
Trade impacts			
Change in absolute value of exports	$1.3 million	According to an internal report cited from the Uganda Department of Animal Health, Uganda exported about UGX4,676,094,323 in 2018, which comes to about US$1.3 million in current 2020 exchange rate. We assume this intervention to safeguard this export.	High
Impact on export diversification	+2	Increases exports of high-value quite significantly.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Opportunity to enhance income amongst producers.	Medium
Domestic public health	+1	May be some spillovers into supply chains to domestic markets	Medium
Environmental protection	0	Minimal	Medium
Social impacts			
Poverty impact	+2	Opportunities to increase income amongst small producers	Medium
Gender impacts	+1	May be employment opportunities for youth	Medium
Impact on youth	+1	May be employment opportunities for women	Medium

Burundi

1. Hygiene and pesticide residue monitoring and controls in fish

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$130,000	Similar estimates for Uganda Training - $50,000. Sampling and testing - $80,000.	Medium
On-going cost	$30,000	On-going sampling and testing.	Medium
Ease of implementation	-1	Involves training of significant numbers of small fishers.	Medium
Trade impacts			
Change in absolute value of exports	$323,000	Burundi's highest export of fish in the last ten years (2010-2019) was 323,000 in 2013 and 2014. All factors hold constant, we can assume to salvage this lost through this intervention.	Low
Impact on export diversification	+1	Increases export diversity although scale of predicted exports is quite small.	Low
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Will be some positive impact if increases market demand and/or prices.	Medium
Domestic public health	+1	May be spillovers into supply chain to domestic markets.	Medium
Environmental protection	+1	May be environmental benefits from better use of pesticides, etc.	Medium
Social impacts			
Poverty impact	0	Likely to lead to increased income for poor fishers, although scale quite limited.	Medium
Gender impacts	0	Minimal.	Medium
Impact on youth	+1	May create more employment opportunities for the young.	Medium

2. Monitoring and management of fruit fly in fresh fruits (mango, orange, malacouja, avocadoes, pineapple, and banana)

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.655 million	Similar cost from Kenya. It involves investment in digital technologies (and training on its application) including sensors and data analytics for identifying pests. $900,000; Hiring consultants for pest risk and cost–benefit analysis, development of strategic and action plans and guidelines US$25,000; Investment in survey including drafting methodology, detection tools (e.g., traps, light, pheromones etc.), awareness (public awareness materials), data collection etc. - US$ 70, 000; Facilities and equipment including for laboratories, vehicles computers and other means of communication - US$100,000; Consumables and utilities for operating and maintaining laboratory activities, safety equipment (Entomology lab, plant pathology lab) - US$500,000; and Development of training materials and training of personnel US$ 60,000	Medium
On-going cost	US$ 55, 000	Similar estimation by Kenya. It involves Refresher trainings US$5,000; Facilitating periodic review workshops for experts and public/private engagement on the progress. US$ 50,000	Medium
Ease of implementation	-2	Involves intervention with large number of small-scale producers.	Medium
Trade impacts			
Change in absolute value of exports	$585,000	Burundi Exports about $231,000, on average over 2010-2019, the highest being $585,000 in 2018. We can assume that this intervention would help prevent the loss of this market in the future	Low
Impact on export diversification	+2	Will increase diversity of higher-value exports.	Low
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Increased by reductions in losses and/or higher prices.	Medium
Domestic public health	0	No impact	High
Environmental protection	+2	Better environmental protection if reduced use of pesticides, damage to vegetation, etc.	Medium
Social impacts			
Poverty impact	+2	Could be significant impact on incomes of poor producers.	Medium
Gender impacts	+1	Could be opportunities for the economic empowerment of women.	Medium
Impact on youth	+1	Could be employment and livelihood opportunities for the young.	Medium

3. Disease and hygiene controls in hides and skins

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$250,000	Best practice investment $240,000 and accreditation $10,000 Source: South Sudan estimate	Medium
On-going cost	$15,000	Annual maintenance cost. Source: South Sudan estimate	Medium
Ease of implementation	-1	Involves engagement with abattoir owners who have to adopt improved practices.	Medium
Trade impacts			
Change in absolute value of exports	$3.7 million	Burundi exported as much as almost $7 million worth of hides and skins to the world in 2012, and $3.7 million to the EAC region in 2011. These have drastically reduced to merely $1 million and $2,000 to the world and EAC region, respectively in 2019. Assuming this reduction is due to SPS issues, we can envisage to recover this loss of $3.7 million through this intervention.	Medium
Impact on export diversification	0	Minimal due to scale of predicted exports	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	May be higher prices for hides that feed through to returns to livestock producers.	Low
Domestic public health	0	No impact	High
Environmental protection	+1	May be positive impacts from improved abattoir practices.	Medium
Social impacts			
Poverty impact	+1	May lead to higher income for poor producers	Low
Gender impacts	0	Little or no impact	Low
Impact on youth	0	Little or no impact	Low

4. Monitoring of cyanide in beverages

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$130,000	Training border plant health inspectors on Sampling and testing for cyanide - $40,000. Procure and install cyanide testing equipment for 7 border posts, 3 airports and 3 harbours - $90,000. Source: Tanzania estimate	Medium
On-going cost	$30,000	On-going surveillance and testing Source: Tanzania estimate	Medium
Ease of implementation	+2	Easy to implement	Medium
Trade impacts			
Change in absolute value of exports	$1.1 million	Based on ITC export potential estimates, Burundi has untapped export potential of $1.1 million in beer made from malt	High
Impact on export diversification	+2	Significant growth in high-value exports.	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	0	Minimal impact.	High
Domestic public health	0	Minimal impact.	High
Environmental protection	0	Minimal impact.	High
Social impacts			
Poverty impact	0	Minimal impact.	High
Gender impacts	0	Minimal impact.	High
Impact on youth	+1	May lead to some youth employment opportunities.	High

5. Monitoring and testing of heavy metals in tea

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$120,000	Similar estimates in Malawi MCDA in 2012	Medium
On-going cost	$120	Similar estimates in Malawi MCDA in 2012	Medium
Ease of implementation	-2	Involves intervention with significant numbers of small-scale producers.	Medium
Trade impacts			
Change in absolute value of exports	$643,800	Based on ITC export potential estimates, Burundi has untapped export potential of $643,800 in Black tea	Medium
Impact on export diversification	0	Minimal given predicted scale of export growth.	Low
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Improvements if leads to higher prices.	Low
Domestic public health	+1	May be spillovers to supply chains to domestic markets.	Medium
Environmental protection	+1	May be benefits from better use of pesticides.	Medium
Social impacts			
Poverty impact	+1	May be improved incomes for small-scale coffee producers.	Medium
Gender impacts	0	Minimal	Low
Impact on youth	+1	May be employment opportunities for the young.	Low

6. Pesticide residue monitoring and controls in coffee

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$120,000	Sampling and testing	Medium
On-going cost	$30,000	Ongoing sampling and testing	Medium
Ease of implementation	-2	Involves intervention with significant numbers of small-scale producers.	Medium
Trade impacts			
Change in absolute value of exports	$3.7 million	Burundi exported $6.1 million to the EAC region in 2019. We assume a 10% annual increase in exports if this intervention takes place, which should yield a total change in export by $3.7 million in 5 years.	Low
Impact on export diversification	0	Minimal given predicted scale of export growth.	Low
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Improvements if leads to higher prices.	Low
Domestic public health	+1	May be spillovers to supply chains to domestic markets.	Medium
Environmental protection	+1	May be benefits from better use of pesticides.	Medium
Social impacts			
Poverty impact	+1	May be improved incomes for small-scale coffee producers.	Medium
Gender impacts	0	Minimal	Low
Impact on youth	+1	May be employment opportunities for the young.	Low

7. Hygiene controls and monitoring of heavy metals in vegetable oil

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$150,000	Training processors on GHP - $20,000. Sampling and testing - $130,000 Source: Tanzania estimate	Medium
On-going cost	$50,000	On-going sampling and testing	Medium
Ease of implementation	+2	Easy as involves upgrading of centralised controls.	High
Trade impacts			
Change in absolute value of exports	$9.7 million	Burundi exports some amount of vegetable oil, majorly of palm oil, the highest being $9.7 million in 2015. This has been reducing since then to less than $300,000. All factors constant, we may assume to redeem this lost by this intervention.	Low
Impact on export diversification	+2	Significant expansion of high-value exports.	Low
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	May be some improvement in productivity if leads to higher prices.	Medium
Domestic public health	+1	May be some improvement if spillovers into supply chains to domestic markets.	High
Environmental protection	0	Minimal.	High
Social impacts			
Poverty impact	+1	Improved household income.	Medium
Gender impacts	+1	Some women and disadvantaged groups will be employed.	Low
Impact on youth	+1	Improved education to youth.	Low

Excluded capacity-building options

	Option	Reason for exclusion
1	Hygiene controls for dry fish	Merged with CBO "Hygiene and pesticide residue monitoring and controls in fish"
2	Aflatoxin control and management in sorghum	Burundi exports virtually no sorghum. Stakeholders confirmed that they are importers rather exporters of the product. This CBO is therefore not economically viable.
3	Traceability system for maize seed	Burundi exports virtually no maize. Stakeholders confirmed that most of the improved maize seed used in the country comes from Tanzania and Uganda. This CBO is therefore not economically viable.
4	Monitoring and management of bacteria wilts in Potatoes	Burundi exports virtually no potatoes. Stakeholders confirmed that they are importers rather exporters of the product. This CBO is therefore not economically viable.
5	Pesticide residue monitoring and management in fresh beans/vegetables	This CBO is not economically viable as production capacity is limited resulting in inconsistent export in the past.

Kenya

1. Harmonization of standards & documentations on AI in day-old chicks

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$32,000	Technical Committee (TC) for drafting std and documents and review meeting -15 People for 3 days + conference room = $10,500 2-Regional meeting by experts (2 from every member country) – 10 experts for 5 days. Transport -$4,000; Accommodation -$10,000; Conference room hire -$2,500; Stationery including publication -$5,000	Medium
On-going cost	$2,000	Review of the harmonized standard and documents once in the 5 years of project duration – 10 Expert meeting 2 days ($10,000 – for 5 years)	Medium
Ease of implementation	+2	Number of difficulties: • Inadequate data to support harmonization. Some EAC members do not adequately research and prepare which makes the process relatively long and costly. • Inadequate involvement of private sector in the process due to financial implications • Conflict of interest between the private and the public sector making it hard to reach a consensus. • Tanzania banned importation of chicks in order to protect the local markets and it could be a challenge to convince them to be part of the harmonization process	Medium
Trade impacts			
Change in absolute value of exports	$896,600	Based on ITC export potential estimation, Kenya has $896,600 untapped export potential of live chickens. We assume this as a proxy for day-old chickens to the EAC region.	Medium
Impact on export diversification	+1	According to ITC, there is limited export diversification of up to $US 21.0k for live fowl <=185 grams for live fowl excluding chicken and turkey.	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	More farmers will embrace chick rearing and the organic manure derived from the Avian rearing increases productivity of crops.	Medium
Domestic public health	0	Little or no impact	Medium
Environmental protection	+1	Poultry production has a relatively small impact on the environment and may substitute for other more negative animal products.	Medium
Social impacts			
Poverty impact	+1	Creates employment in SMEs and larger companies. The production cycle is short hence creating quick cash flow to farmers. More trade means more employment opportunities for Kenyans	Medium
Gender impacts	+1	Impact on poultry farmers particularly women, it also offers opportunities for SMEs especially women owned. Also creates employment in larger companies.	Medium

Impact on youth	+1	Young people can draw upon their education and digitalise literacy to modernise and professionalise the sector.	Medium

2. Hygiene, pesticide residue, and aflatoxin monitoring and controls in milk

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$200,000	Capacity building of stakeholders on milk quality, safety, standards, traceability and SPS issues. $50,000. Inspection and licensing of milk handling premises, processes and equipment protocol development (consultancy and workshops)-$50,000. Laboratory capacity improvement-$ 100,000	Medium
On-going cost	$50,000	On-going Sampling and testing	Medium
Ease of implementation	-1	Involves working with significant numbers of smallholder producers in terms of training. Implementation of laboratory upgrades and inspection and licencing is relatively easy.	Medium
Trade impacts			
Change in absolute value of exports	$305,400	Based on ITC export potential estimation, Kenya has $305,400 untapped export potential of milk and milk powder to the EAC region	High
Impact on export diversification	+1	Some impact on export diversification but overall scale of potential exports is limited.	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Will be some improvement in the productivity of milk production due to lower residues levels which may enhance returns through higher prices.	Medium
Domestic public health	+1	May be some spillovers into the supply chain of milk and dairy products into domestic markets	Medium
Environmental protection	0	Minimal	High
Social impacts			
Poverty impact	+1	70% of the 5.2 billion litres are produced by small holder farmers mainly in the rural areas and therefore this impacts positively on them. The dairy sector is therefore crucial for rural development, poverty reduction and food and nutrition security. Provides livelihood to estimated 1.8 million to smallholder dairy farmers. However, scale of potential exports is small and so this intervention would impact only a small proportion.	High
Gender impacts	+1	Women are engaged in milk production and so this option could enhance opportunities for economic empowerment of women.	Medium

Impact on youth	0	Likely to be minimal.	Medium

3. Mycotoxin and antibiotics monitoring in animal feeds

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.2 million	New equipment in food laboratory - $1.09 million Sampling and testing of feeds products-$ 50,000 Training of staff on analysis - $10,000 Stakeholders training on feed safety and analysis $50,000	Medium
On-going cost	$50,000	Sampling and analysis of samples -$50,000	Medium
Ease of implementation	+2	Relatively easy to implement – involves laboratory upgrades and implementation of sampling regimes.	High
Trade impacts			
Change in absolute value of exports	$310,200	Based on ITC export potential estimation, Kenya has $310,200 untapped export potential of preparations used in animal feed to the EAC region	High
Impact on export diversification	+1	Some impact on export diversity, although scale of predicted exports quite minimal.	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	May be some improvements in returns to farmers due to lower levels of contaminants leading to higher prices.	Medium
Domestic public health	+1	May be some spillovers into supply chains to domestic markets.	High
Environmental protection	0	Minimal	High
Social impacts			
Poverty impact	+1	Some role of smaller farmers in production of animal feed.	Medium
Gender impacts	0	Minimal.	Medium

Impact on youth	0	Minimal	Medium

4. Disease monitoring and controls in live cattle and beef

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$1.73 million	Source: Uganda National P-IMA 2020. It includes surveillance and establishment of FMD-free compartments.	Medium
On-going cost	$250,000	On-going Surveillance	Medium
Ease of implementation	-2	Large-scale intervention. Current status of livestock sector likely to make this intervention difficult to implement.	Medium
Trade impacts			
Change in absolute value of exports	$5 million	Based on ITC export potential estimation, Kenya has about $5 million untapped export potential of live bovine animals and meat to the EAC region	High
Impact on export diversification	+2	Significant impact on export diversity given predicted scale of exports.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Likely to lead to increased productivity of livestock production due to better controls on animal diseases.	Medium
Domestic public health	0	None – livestock disease	Medium
Environmental protection	-2	May have detrimental impacts is leads to increased livestock production.	Medium
Social impacts			
Poverty impact	+2	Could be significant if benefits small-scale livestock producers	Medium
Gender impacts	0	Minimal	Medium
Impact on youth	0	Minimal	Medium

5. Disease monitoring and controls in sheep meat

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$95,000	Training of stakeholders on disease reporting and syndromic surveillance of PPR,RVF and other priority diseases-$30,000 Establish sentinel 4 herds to monitor diseases $15,000 Disease monitoring and surveillance -$50,000	High
On-going cost	$50,000	Disease monitoring and surveillance $50,000	High
Ease of implementation	-2	Current status of livestock sector likely to make this intervention difficult to implement.	Medium
Trade impacts			
Change in absolute value of exports	$125,800	Based on ITC export potential estimation, Kenya has about $125,800 untapped export potential of sheep meat to the EAC region	High
Impact on export diversification	+1	Some impact on export diversity although scale of predicted exports is limited.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+2	Likely to lead to increased productivity of livestock production due to better controls on animal diseases.	Medium
Domestic public health	0	None – livestock disease	Medium
Environmental protection	-1	May have detrimental impacts if leads to increased livestock production.	Medium
Social impacts			
Poverty impact	+2	Could be significant if benefits small-scale livestock producers	Medium
Gender impacts	0	Minimal	Medium
Impact on youth	0	Minimal	Medium

6. Disease monitoring and controls in pig meat

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$120,000	Training of stakeholders on Biosecurity, Good agricultural practices (GAP) to control African swine fever and Porcine cysticercosis, GMP and Hygiene$50,000. Surveillance of swine disease field and slaughterhouses $50,000 Purchases of lab equipment's (triniloscopes) $20,000	High
On-going cost	$50,000	Ongoing surveillance.	High
Ease of implementation	+1	Intervention mainly involves upgrading within slaughterhouses.	Medium
Trade impacts			
Change in absolute value of exports	$311,000	Based on ITC export potential estimation, Kenya has about $311,000 untapped export potential of pig meat to the EAC region	High
Impact on export diversification	+1	Some impact on export diversity although scale of predicted exports is limited.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	0	Minimal	Medium
Domestic public health	0	Minimal	Medium
Environmental protection	-1	May be some detrimental impacts if leads to increased production.	Medium
Social impacts			
Poverty impact	+1	May be some benefits if increases small-scale production and/or enhances productivity.	Medium
Gender impacts	0	Minimal	Medium
Impact on youth	0	Minimal	Medium

Excluded capacity-building options

Option	Reason
Aflatoxin control and management in maize	Kenya is the largest importer of maize within the EAC region. The EAC, and Kenya in particular, have made a lot of strides in controlling aflatoxin in maize.

South Sudan

1. Disease and hygiene controls in hides and skins

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$260,000	Best practice investment - $240,000 Accreditation - $10,000 Transport and capacity-building- $10,000	High
On-going cost	$15,000	Annual maintenance cost - $15,000	High
Ease of implementation	-2	Involves engagement with many small-scale producers.	Medium
Trade impacts			
Change in absolute value of exports	$1.8 million	The pick of South Sudan's exports of hides and skins was in 2012 and 2013 where she exported about $1.8 million and $1.7 million respectively. Since then, exports have drastically reduced and to a mere $31,000 in 2018. Based on this and assuming SPS issues were the result of the fall in exports, we can assume to recover the past exports through this intervention.	Low
Impact on export diversification	+1	Positively improved.	Low
Domestic agri-food impacts			
Agricultural/fisheries productivity	0	None.	Low
Domestic public health	0	No impact.	Low
Environmental protection	-1	Negative of increased animal production.	low
Social impacts			
Poverty impact	+2	Employment will increase.	medium
Gender impacts	0	None.	Low
Impact on youth	+2	More opportunities for employment.	Medium

2. Monitoring and controls of contaminants in Gum Arabic

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$180,000	Initial investment in modern storage facilities, testing and accreditation - $160,000. Capacity-building on Good Practices in three regions - $20,000.	High
On-going cost	$ 20,000	Annual cost based on areas of production - $20,000.	Medium
Ease of implementation	+1	Relatively easy to implement.	Medium
Trade impacts			
Change in absolute value of exports	$328,400	South Sudan's highest export of Gun Arabic was $396,000 in 2016. Exports have since then dwindled to just $70,000 in 2018. ITC export potential estimates untapped export potential of $2,400 for Natural Gum Arabic. Assuming SPS issues were responsible for the decline, this intervention could salvage the decline from the 2016 level plus the untapped potential.	High
Impact on export diversification	+2	Increased diversity in context of minimal exports overall.	Medium
Domestic agri-food impacts			
Agricultural/fisheries productivity	+1	Increased if leads to higher prices and/or reduced losses.	Low
Domestic public health	0	No impact.	Low
Environmental protection	0	Little or no impact.	Low
Social impacts			
Poverty impact	+2	Increased incomes amongst small producers.	Medium
Gender impacts	0	None.	Low
Impact on youth	+2	Will increase employment opportunity in winter and dry season.	Medium

Rwanda

1. Disease and hygiene controls in hides and skins

Decision Criterion	Value	Details	Confidence
Cost and Ease of Implementation			
Up-front investment	$240,000	Best practice investment (taken from South Sudan estimates).	Medium
On-going cost	$15,000	Annual maintenance cost.	Medium
Ease of implementation	-2	Involves interventions in large numbers of small-scale producers.	High
Trade impacts			
Change in absolute value of exports	$7.1 million	Based on ITC export potential estimates, Rwanda has an untapped export potential of $7.1 million of hides and skins.	High
Impact on export diversification	+2	Diseases control granted, trade partners confidence will increase resulting in new and diversification of products at markets.	Medium
Domestic agri-food impacts			
Agricultural/fish productivity	+2	Losses due to animal diseases especially skin diseases such LSD will be reduced.	High
Domestic public health	0	Minimal.	Medium
Environmental protection	+2	Regular control of hygiene at hides and skins handling, collection and/ or processing centers will result in environment protection.	High
Social impacts			
Poverty impact	+1	Reduced losses will impact the poverty.	Medium
Gender impacts	0	Minimal.	Medium
Impact on youth	+1	Employment opportunities for youth.	Medium

ANNEX 2 - Regional Exports of Agri-food Products

Table A1: Regional exports of agri-food products from Kenya, 2018

Product Code	Product	Uganda	Tanzania	Rwanda
01	Live animals	261	507	8
02	Meat and edible meat offal	1,439	2,330	249
03	Fish, crustaceans, molluscs, aquatic invertebrates, nes	3,962	128	179
04	Dairy products, eggs, honey, edible animal product, nes	28	1,083	90
05	Products of animal origin, nes	27	0	0
06	Live trees, plants, bulbs, roots, cut flowers etc.	231	10	140
07	Edible vegetables and certain roots and tubers	4,374	2,146	44
08	Edible fruit, nuts, peel of citrus fruit, melons	1,639	48	119
09	Coffee, tea, mate and spices	2,810	704	275
10	Cereals	11,647	1,166	5,043
11	Milling products, malt, starches, inulin, wheat gluten	560	484	54
12	Oil seed, oleagic fruits, grain, seed, fruit, etc., nes	3,839	2,506	756
13	Lac, gums, resins, vegetable saps and extracts ne	19	77	2
14	Vegetable plaiting materials, vegetable products, nes	8	0	0
15	Animal, vegetable fats and oils, cleavage products, etc.	64,106	8,754	6,884
16	Meat, fish and seafood food preparations, nes	1,553	1,134	152
17	Sugars and sugar confectionery	16,226	4,903	8,227
18	Cocoa and cocoa preparations	183	128	38
19	Cereal, flour, starch, milk preparations and products	11,169	2,923	1,384
20	Vegetable, fruit, nut, etc. food preparations	2,765	1,043	603
21	Miscellaneous edible preparations	16,461	2,424	4,329
22	Beverages, spirits and vinegar	17,869	585	1,710
23	Residues, wastes of food industry, animal fodder	3,205	985	58
24	Tobacco and manufactured tobacco substitutes	5,724	380	3,987
41	Raw hides and skins (other than fur skin) and leather	253	13	22
44	Wood and articles of wood, wood charcoal	770	683	109
46	Manufactures of plaiting material, basketwork, etc.	2	0	0
47	Pulp of wood, fibrous cellulosic material, waste, etc.	625	41	112
Product Code	**Product**	**Uganda**	**Tanzania**	**Rwanda**
48	Paper & paperboard, articles of pulp, paper and board	21,376	7,548	9,092
50	Silk	0	0	0
51	Wool, animal hair, horsehair yarn and fabric thereof	3	0	0
52	Cotton	2,090	399	97
53	Vegetable textile fibres nes, paper yarn, woven fabric	21	0	4
TOTAL		173,890	43,132	43,767

Table A2: Regional exports of SPS-sensitive products from Uganda, 2018

Product Code	Product	Kenya	Tanzania	Rwand
01	Live animals	111	0	542
02	Meat and edible meat offal	2,523	0	0
03	Fish, crustaceans, molluscs, aquatic invertebrates, nes	1,883	0	1,48
04	Dairy products, eggs, honey, edible animal product, nes	62,192	3,125	2,04
05	Products of animal origin, nes	0	0	0
06	Live trees, plants, bulbs, roots, cut flowers etc.	641	1	27
07	Edible vegetables and certain roots and tubers	75,361	337	8,34
08	Edible fruit, nuts, peel of citrus fruit, melons	4,599	0	1,04
09	Coffee, tea, mate and spices	86,617	0	614
10	Cereals	79,928	0	16,64
11	Milling products, malt, starches, inulin, wheat gluten	0	249	4,83
12	Oil seed, oleagic fruits, grain, seed, fruit, etc., nes	5,201	1,335	1,00
13	Lac, gums, resins, vegetable saps and extracts ne	0	0	0
14	Vegetable plaiting materials, vegetable products, nes	0	0	0
15	Animal, vegetable fats and oils, cleavage products, etc.	2,176	1,017	17,74
16	Meat, fish and seafood food preparations, nes	0	0	0
17	Sugars and sugar confectionery	31,291	0	7,85
18	Cocoa and cocoa preparations	46	0	204
19	Cereal, flour, starch, milk preparations and products	560	0	1,47
20	Vegetable, fruit, nut, etc. food preparations	13	0	2,10
21	Miscellaneous edible preparations	77	0	1,43
22	Beverages, spirits and vinegar	1,163	10	7,86
23	Residues, wastes of food industry, animal fodder	78,347	0	2,31
24	Tobacco and manufactured tobacco substitutes	50,235	9,546	371
41	Raw hides and skins (other than fur skin) and leather	224	0	0
44	Wood and articles of wood, wood charcoal	26,889	501	4,80
46	Manufactures of plaiting material, basketwork, etc.	0	0	0

Product Code	Product	Kenya	Tanzania	Rwand
47	Pulp of wood, fibrous cellulosic material, waste, etc.	93	0	0
48	Paper & paperboard, articles of pulp, paper and board	1,694	4,277	7,569
50	Silk	0	0	0
51	Wool, animal hair, horsehair yarn and fabric thereof	0	0	0
52	Cotton	4,532	0	260
53	Vegetable textile fibres nes, paper yarn, woven fabric	0	0	0
TOTAL		516,396	20,398	90,57

Table A3: Regional exports of SPS-sensitive products from Tanzania, 2018[41]

Product Code	Product	Kenya	Uganda	Rwanda
01	Live animals	7,768	0	41
02	Meat and edible meat offal	88	0	0
03	Fish, crustaceans, molluscs, aquatic invertebrates, nes	1,975	2,244	48
04	Dairy products, eggs, honey, edible animal product, nes	160	87	5
05	Products of animal origin, nes	1	0	0
06	Live trees, plants, bulbs, roots, cut flowers etc.	117	0	0
07	Edible vegetables and certain roots and tubers	6,548	651	29
08	Edible fruit, nuts, peel of citrus fruit, melons	2,077	0	0
09	Coffee, tea, mate and spices	19,076	0	0
10	Cereals	14,880	27,291	6,333
11	Milling products, malt, starches, inulin, wheat gluten	9,381	7	107
12	Oil seed, oleagic fruits, grain, seed, fruit, etc., nes	231	58	70
13	Lac, gums, resins, vegetable saps and extracts ne	0	0	0
14	Vegetable plaiting materials, vegetable products, nes	122	0	0
15	Animal, vegetable fats and oils, cleavage products, etc.	0	201	75
16	Meat, fish and seafood food preparations, nes	1	0	0
17	Sugars and sugar confectionery	6	309	1,864
18	Cocoa and cocoa preparations	0	17	0
19	Cereal, flour, starch, milk preparations and products	92	2	429
20	Vegetable, fruit, nut, etc. food preparations	183	0	376
21	Miscellaneous edible preparations	180	65	331
22	Beverages, spirits and vinegar	9,264	133	2,468
23	Residues, wastes of food industry, animal fodder	13,008	865	79
24	Tobacco and manufactured tobacco substitutes	1,447	75	0

[41] Data for South Sudan are missing.

Product Code	Product	Kenya	Uganda	Rwanda
41	Raw hides and skins (other than fur skin) and leather	334	15	0
44	Wood and articles of wood, wood charcoal	7,289	0	1,413
46	Manufactures of plaiting material, basketwork, etc.	0	0	7
47	Pulp of wood, fibrous cellulosic material, waste, etc.	22	0	0
48	Paper & paperboard, articles of pulp, paper and board	30,599	8,120	3,464
50	Silk	0	0	0
51	Wool, animal hair, horsehair yarn and fabric thereof	0	0	0
52	Cotton	2,506	1	0
53	Vegetable textile fibres nes, paper yarn, woven fabric	44	0	0
TOTAL		127,399	40,141	17,139

Table A4: Regional exports of SPS-sensitive products from Rwanda, 2018[42]

Product Code	Product	Kenya	Tanzania	Uganda
01	Live animals	1	0	47
02	Meat and edible meat offal	0	0	1
03	Fish, crustaceans, molluscs, aquatic invertebrates, nes	0	0	0
04	Dairy products, eggs, honey, edible animal product, nes	103	0	3,084
05	Products of animal origin, nes	0	0	0
06	Live trees, plants, bulbs, roots, cut flowers etc.	0	0	0
07	Edible vegetables and certain roots and tubers	312	34	16,018
08	Edible fruit, nuts, peel of citrus fruit, melons	0	0	17
09	Coffee, tea, mate and spices	3,714	0	4,647
10	Cereals	0	0	20
11	Milling products, malt, starches, inulin, wheat gluten	3	0	15
12	Oil seed, oleagic fruits, grain, seed, fruit, etc., nes	0	0	0
13	Lac, gums, resins, vegetable saps and extracts ne	0	0	0
14	Vegetable plaiting materials, vegetable products, nes	0	0	0
15	Animal, vegetable fats and oils, cleavage products, etc.	0	0	0
16	Meat, fish and seafood food preparations, nes	0	0	0
17	Sugars and sugar confectionery	0	0	196
18	Cocoa and cocoa preparations	0	0	0
19	Cereal, flour, starch, milk preparations and products	290	416	2,568
20	Vegetable, fruit, nut, etc. food preparations	10	0	1
21	Miscellaneous edible preparations	0	409	444
22	Beverages, spirits and vinegar	37	0	15
23	Residues, wastes of food industry, animal fodder	1,394	117	13,940
24	Tobacco and manufactured tobacco substitutes	0	0	0

[42] Data for South Sudan are missing.

Product Code	Product	Kenya	Tanzania	Uganda
41	Raw hides and skins (other than fur skin) and leather	3,080	0	4,002
44	Wood and articles of wood, wood charcoal	3	0	5
46	Manufactures of plaiting material, basketwork, etc.	0	0	4
47	Pulp of wood, fibrous cellulosic material, waste, etc.	82	0	21
48	Paper & paperboard, articles of pulp, paper and board	12	0	11
50	Silk	0	0	0
51	Wool, animal hair, horsehair yarn and fabric thereof	0	0	0
52	Cotton	0	0	17
53	Vegetable textile fibres nes, paper yarn, woven fabric	0	0	0
TOTAL		9,041	976	45,073

Table A5: Regional exports of SPS-sensitive products from Burundi, 2018[43]

Product Code	Product	Kenya	Tanzania	Ugar
01	Live animals	0	2	7
02	Meat and edible meat offal	0	0	0
03	Fish, crustaceans, molluscs, aquatic invertebrates, nes	0	5	0
04	Dairy products, eggs, honey, edible animal product, nes	0	37	0
05	Products of animal origin, nes	0	2	1
06	Live trees, plants, bulbs, roots, cut flowers etc.	0	1	0
07	Edible vegetables and certain roots and tubers	0	2	0
08	Edible fruit, nuts, peel of citrus fruit, melons	0	516	0
09	Coffee, tea, mate and spices	1,822	90	3,43
10	Cereals	0	0	19
11	Milling products, malt, starches, inulin, wheat gluten	16	0	0
12	Oil seed, oleagic fruits, grain, seed, fruit, etc., nes	0	136	5
13	Lac, gums, resins, vegetable saps and extracts ne	0	0	0
14	Vegetable plaiting materials, vegetable products, nes	0	0	1
15	Animal, vegetable fats and oils, cleavage products, etc.	0	75	0
16	Meat, fish and seafood food preparations, nes	0	0	0
17	Sugars and sugar confectionery	0	0	13
18	Cocoa and cocoa preparations	0	0	0
19	Cereal, flour, starch, milk preparations and products	0	6	0
20	Vegetable, fruit, nut, etc. food preparations	0	0	0
21	Miscellaneous edible preparations	0	0	0
22	Beverages, spirits and vinegar	0	177	0
23	Residues, wastes of food industry, animal fodder	346	12	23
24	Tobacco and manufactured tobacco substitutes	0	0	0

[43] Data for South Sudan are missing.

Product Code	Product	Kenya	Tanzania	Ugar
41	Raw hides and skins (other than fur skin) and leather	0	17	0
44	Wood and articles of wood, wood charcoal	0	0	0
46	Manufactures of plaiting material, basketwork, etc.	0	0	0
47	Pulp of wood, fibrous cellulosic material, waste, etc.	0	0	0
48	Paper & paperboard, articles of pulp, paper and board	8	0	1
50	Silk	0	1	0
51	Wool, animal hair, horsehair yarn and fabric thereof	0	0	0
52	Cotton	0	1	1
53	Vegetable textile fibres nes, paper yarn, woven fabric	0	0	0
TOTAL		2,192	1,080	3,8

Table A6: Regional exports of SPS-sensitive products from South Sudan, 2017

Product Code	Product	Kenya	Tanzania	Uga
01	Live animals	0		0
02	Meat and edible meat offal	0		0
03	Fish, crustaceans, molluscs, aquatic invertebrates, nes	0		0
04	Dairy products, eggs, honey, edible animal product, nes	0		1
05	Products of animal origin, nes	0		2
06	Live trees, plants, bulbs, roots, cut flowers etc.	0		0
07	Edible vegetables and certain roots and tubers	0		0
08	Edible fruit, nuts, peel of citrus fruit, melons	0		0
09	Coffee, tea, mate and spices	0		0
10	Cereals	0		8
11	Milling products, malt, starches, inulin, wheat gluten	0		0
12	Oil seed, oleagic fruits, grain, seed, fruit, etc., nes	0		4
13	Lac, gums, resins, vegetable saps and extracts ne	59		0
14	Vegetable plaiting materials, vegetable products, nes	0		0
15	Animal, vegetable fats and oils, cleavage products, etc.	3		0
16	Meat, fish and seafood food preparations, nes	0		0
17	Sugars and sugar confectionery	0		0
18	Cocoa and cocoa preparations	0		0
19	Cereal, flour, starch, milk preparations and products	0		0
20	Vegetable, fruit, nut, etc. food preparations	0		0
21	Miscellaneous edible preparations	0		0
22	Beverages, spirits and vinegar	0		0
23	Residues, wastes of food industry, animal fodder	0		0
24	Tobacco and manufactured tobacco substitutes	0		0
41	Raw hides and skins (other than fur skin) and leather	0		0
44	Wood and articles of wood, wood charcoal	43		6
46	Manufactures of plaiting material, basketwork, etc.	0		0

Product Code	Product	Kenya	Tanzania	Uga
47	Pulp of wood, fibrous cellulosic material, waste, etc.	0		0
48	Paper & paperboard, articles of pulp, paper and board	0		1
50	Silk	0		0
51	Wool, animal hair, horsehair yarn and fabric thereof	0		0
52	Cotton	0		0
53	Vegetable textile fibres nes, paper yarn, woven fabric	0		0
TOTAL		105		8