Prioritizing Sanitary and Phytosanitary (SPS) Investments for Market Access in Kenya

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Contents

Acronyms

CAADP	Comprehensive Africa Agriculture Development Programme
CBOs	Capacity Building Options
COMESA	Common Market for Eastern and Southern Africa
DVS	Department of Veterinary Services
EIF	Enhanced Integrated Facility
EU	European Union
FCM	False Codling Moths
ITC	International Trade Centre
GAP	Good Agriculture Practices
GHPs	Good Hygiene Practices
GMPs	Good Manufacturing Practices
GVPs	Good Veterinary Practices
HACCP	Hazard Analysis and Critical Control Points
HVC	Horticulture Value Chain
IPM	Integrated Pests Management
IPPC	International Plant Protection Convention
ITC	International Trade Centre
MCDA	Multi Criteria Decision Analysis
P-IMA	Prioritizing SPS Investments for Market Access
PT	Proficiency Testing
RASFF	Rapid Alert System for Food and Feed
STDF	Standards and Trade Development Facility
SPS	Sanitary and Phytosanitary
TMEA	Trademark for East Africa
USAID	United States Agency for International Development
UNOPS	United Nations Office for Project Services
WTO	World Trade Organization

Executive Summary

The Standards and Trade Development Facility (STDF)[7] has developed the framework, "Prioritizing SPS Investments for Market Access (P-IMA)"[8], based on Multi Criteria Decision Analysis (MCDA), to help inform and improve evidence-based Sanitary and Phytosanitary (SPS) capacity building planning and decision-making processes. The STDF, in collaboration with USAID and COMESA has so far piloted the framework in eleven countries in East and Southern Africa and currently being applied in East African regional trade with support from TradeMark East Africa. COMESA views the P-IMA framework as a unique planning and sector-wide resource mobilization tool and encourages its Member States to use P-IMA to take stock of SPS capacity needs, prioritize and cost investment options with the best returns, and integrate SPS investments into national investment frameworks.

COMESA Secretariat has secured funding from the STDF and Enhanced Integrated Framework (EIF)[9] and is currently implementing a regional P-IMA project, which builds on the past applications of the framework, to further expand the use of the P-IMA framework in Ethiopia, Kenya, Malawi, Uganda and Rwanda. The objective of the project is to improve SPS capacity and enhance market access through a multi-stakeholder, evidence-based approach of mainstreaming SPS capacity building into national investment frameworks for agriculture, trade, health, and/or environment. The P-IMA initiative is also building synergies with the COMESA European Union's (EU) Trade Facilitation Programme, specifically on SPS capacity building in risk-based food safety management in priority value chains.

Thus, this report is the result of the application of the P-IMA framework in Kenya. A total of 16, out of an initial proposed 24, SPS capacity building options were subjected to the P-IMA priority setting framework. In all, approximately US$37.7 million is required to implement all the 16 options that could potentially generate about US$2.3 billion worth of exports annually. However, since resources are limited a priority has to be set. The priority setting was based on a structured process of identifying SPS capacity building options that were relevant for marker access, prior agreed objectives (called decision criteria), and agreed weights assigned to the decision criteria. Based on this, the following are the options that are more desirable as first best choices for immediate investment, particularly if trade considerations are not the sole objective, as the case is in reality:

- capacity building in systems approach (Incl. PFA, IPM, GAPs, GHPs, GMPs, HACCP, etc.) along horticulture value chains.
- capacity building in system approach including GAPs, GHPs, & GMPs, and monitoring & surveillance of pathogens, allergens, pesticide residues, aflatoxins, and levels of moulds in tree nuts.
- capacity building in GAPs & GMPs for honey.

[7] www.standardsfacility.org

[8] https://www.standardsfacility.org/prioritizing-sps-investments-market-access-p-ima

[9] https://www.standardsfacility.org/PG-606

- capacity building in GAPs & procurement of fish testing kits; and
- implementation of HACCP at fish aggregation level.

While the following options are less desirable and should be considered for a later investment:

- accreditation of DVS food laboratory
- establishment or upgrading cold chain system
- establish/strengthen digital traceability system in the horticulture supply chain
- capacity building in post-harvest treatment incl. fumigation, hot water treatment, for fruits & flowers; and
- accreditation of national fish quality control laboratory

1.0 Introduction

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, and Zambia, from 2011-15, to prioritize SPS investment options and leverage resources for capacity development under relevant investment frameworks. The framework was also recently applied in Madagascar and in the East Africa region to regional trade by TradeMark East Africa (TMEA).

COMESA views the P-IMA framework as a unique planning and sector-wide resource mobilization tool and encourages its Member States to use P-IMA to take stock of SPS capacity needs, prioritize and cost investment options with the best returns, and integrate SPS investments into national agriculture sector investment plans (CAADP) and other relevant frameworks.

Consequently, the COMESA Secretariat is currently implementing a regional P-IMA project, with funding from the STDF and UNOPS, which builds on the past application of the framework, to further expand the use of the P-IMA framework in Ethiopia, Kenya, Malawi, Uganda and Rwanda. The objective of the project is to improve SPS capacity and enhance market access through a multi-stakeholder, evidence-based approach of mainstreaming SPS capacity building investment needs into national investment frameworks for agriculture, trade, health, and/or environment. The project would enable the current version of this decision-support tool to be further improved and tailored to efforts to mainstream SPS capacity building investment needs within various investment frameworks to promote safe trade in agricultural products.

Thus, this report provides the outcomes of the application of the P-IMA process in Kenya, which begun in June 2019.

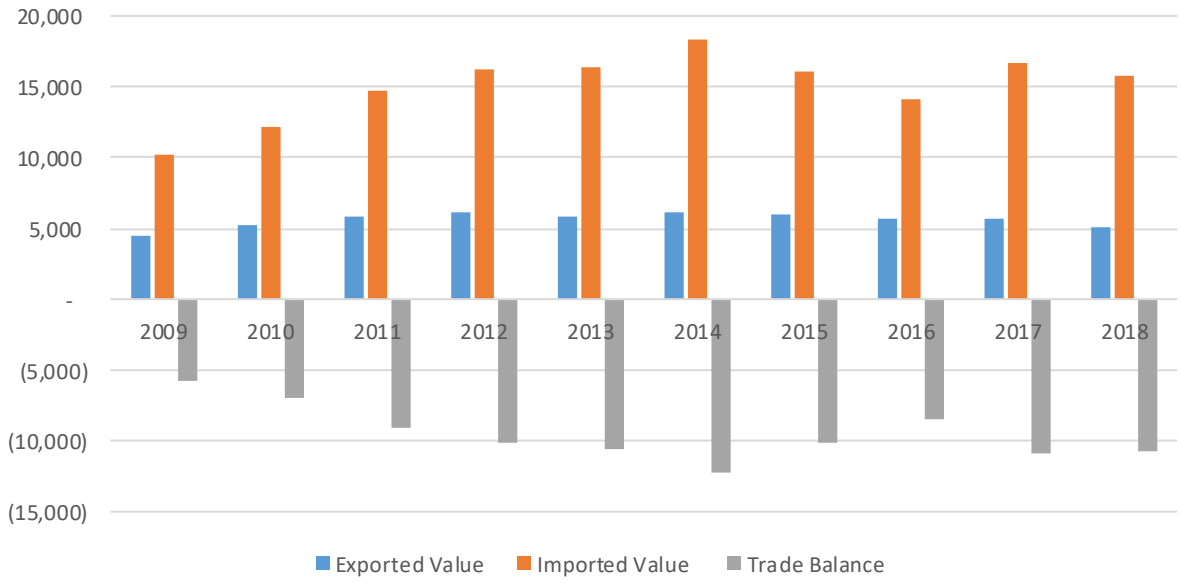
2.0 Overview of SPS Sensitive Trade

Overall, Kenya's export in value has remained largely constant over the last decade. In 2009, Kenya's overall export in value was US$4.4 billion while in 2018 she exported slightly over US$5 billion. Exports marginally rose between 2009-2012 but declined in 2013 and rose again in 2014 by the same margin of 5%. Thereafter, exports have generally been on the decline by 4% per annum in value between 2014-2018. In contrast, imports have increased fifty percent more over the last decade. In 2009, Kenya imported about US$10.2 billion and in 2018 she imported about US$15.8 billion. In effect, Kenya maintains a large trade deficit over the last ten years. On average, Kenya exports about only a third of what it imports (See Figure 1).

Kenya's top five exported products in 2018 included black fermented tea, fresh cut roses and buds, coffee, titanium ores and concentrates, and fresh or chilled beans. Titanium

ores and concentrates have emerged a significant export product since 2014. Other products of significant exports are fresh or dried avocados, fresh or dried macadamia nuts, Men's or boys' trousers, bib and brace overalls, breeches and shorts, of cotton, fresh cut flowers and buds, etc. However, most exported products, on average over 2009-2018, are black fermented tea, fresh cut roses and buds, medium oils and preparations, coffee, medicaments, which is an indication of how strong agricultural exports have emerged over the years (see figure 2). Most sectors remain in infancy after a decade except for tea, fresh cut roses, and coffee. Although, avocados, fresh or chilled beans, and fresh cut flowers and buds have also seen some growth.

Figure 1: Kenya's Trade (US$'Million; 2009-2018)



Source: ITC's Trademap data

Agricultural products, particularly black fermented tea and partly fermented tea, fresh cut roses and buds, and coffee have dominated Kenya's exports in the last decade. On average, agricultural exports constitute about 60% of total exports over the period 2009-2018, of which coffee, tea, maté and spices alone accounts for around 43%. In addition, agricultural products hold the greatest export potential from Kenya to the World. Particularly, Black tea, fresh cut flowers & buds, and coffee, not roasted, not decaffeinated shows the greatest potentials.[10] Other important agricultural exports by Kenya include fresh or chilled beans, fresh or dried avocados, fresh or dried macadamia nuts, fresh cut

[10] According to ITC Export Potential Map

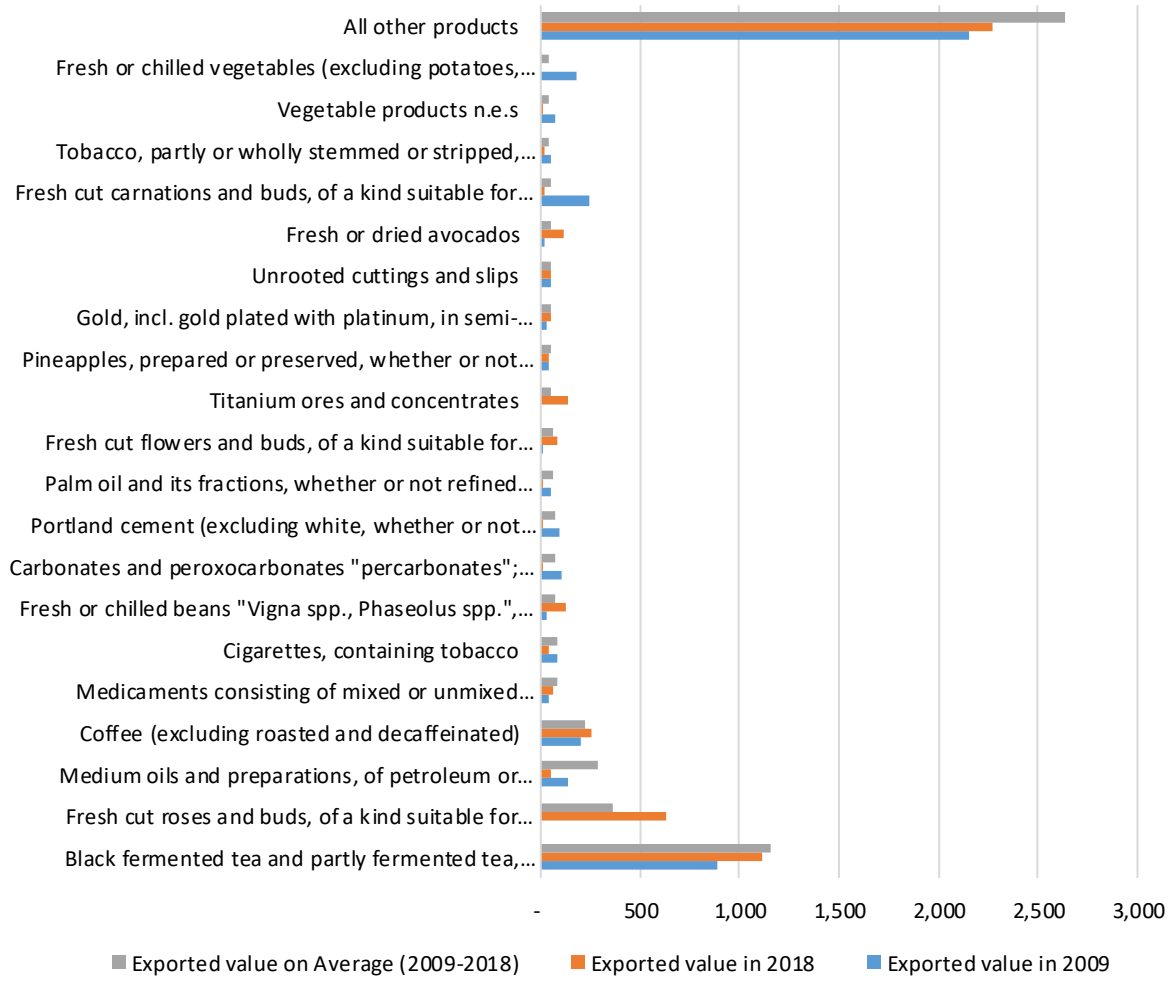
flowers and buds, unrooted cuttings and slips, unshelled beans, and pineapples, prepared or preserved.

Like many Developing Countries, SPS issues has been a bane to market access for Kenya. Kenya has suffered various export bans, border rejections, and export interceptions in the past by the EU, U.S. and South Africa due to SPS non-compliances (see table 1 in Annex…). Since 1993 till date, the EU Rapid Alert System for Food and Feed (RASFF) has listed 133 SPS notifications against Kenya, out of which 101 of such notifications occurred in the last ten years. These SPS issues range from ochratoxins/aflatoxins, salmonella, pesticide residues and other contaminants, to unauthorized substances of various nature. Over 80% of these SPS issues in the EU market are in fruits and vegetables and fish and fish products. Other products affected are dietetic foods, food supplements, fortified foods, cereals and bakery products, alcoholic beverages, food additives and flavourings, feed additives, herbs and spices, cocoa and cocoa preparations, coffee and tea, milk and milk products, cephalopods and products thereof, and feed for food-producing animals. In addition, there was 874 interceptions of harmful organisms in horticulture products-specific exported by Kenya into the EU.[11]

Similarly, the US Import Refusal Report (IRR) has listed 67 export rejections from Kenya, out of which 29 are due to SPS reasons (see table 2 in Annex…). 19 were related to pesticide chemicals, 6 related to Salmonella, 3 were due to contamination with filth and products prepared or packed under insanitary conditions and the remaining one was mycotoxins in coffee beans. The remaining 38 export refusals were mainly due to misbranding/labelling and unapproved drugs.

[11] EUROPHYT - European Union Notification System for Plant Health Interceptions

Figure 2: Products Exported (2009-2018; US$'Million)



Source: ITC's Trademap data

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 mobilization. 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 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[12]. Below in Figure 3, a relatively brief outline of the seven stages of the framework is provided, with a particular focus on how they were implemented in Kenya.

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 in Kenya 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 synthesized SPS-sensitive trade flow analysis, which covered Kenya's SPS-sensitive trade and current prevailing SPS compliance challenges, and received sector specific presentations from the various Competent Authorities based on their sector specific assessments during a High-Level inception meeting on 24th June 2019.

Stage 2: Definition of Choice Set

In order to identify the SPS capacity-building options to be considered in the priority-setting framework, a three-day stakeholder workshop was held from 25-27th June, 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 two days dedicated sessions to identify Kenya-specific SPS investment needs and Capacity Building Options (CBOs),

[12] User Guide can be found on STDF website: http://standardsfacility.org/prioritizing-sps-investments-market-access-p-ima

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 4. 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 and validated in a sector-specific working session from 4-7 November 2019. At this stage, certain capacity building options were excluded (see section…) 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 3. Stages of the P-IMA Framework

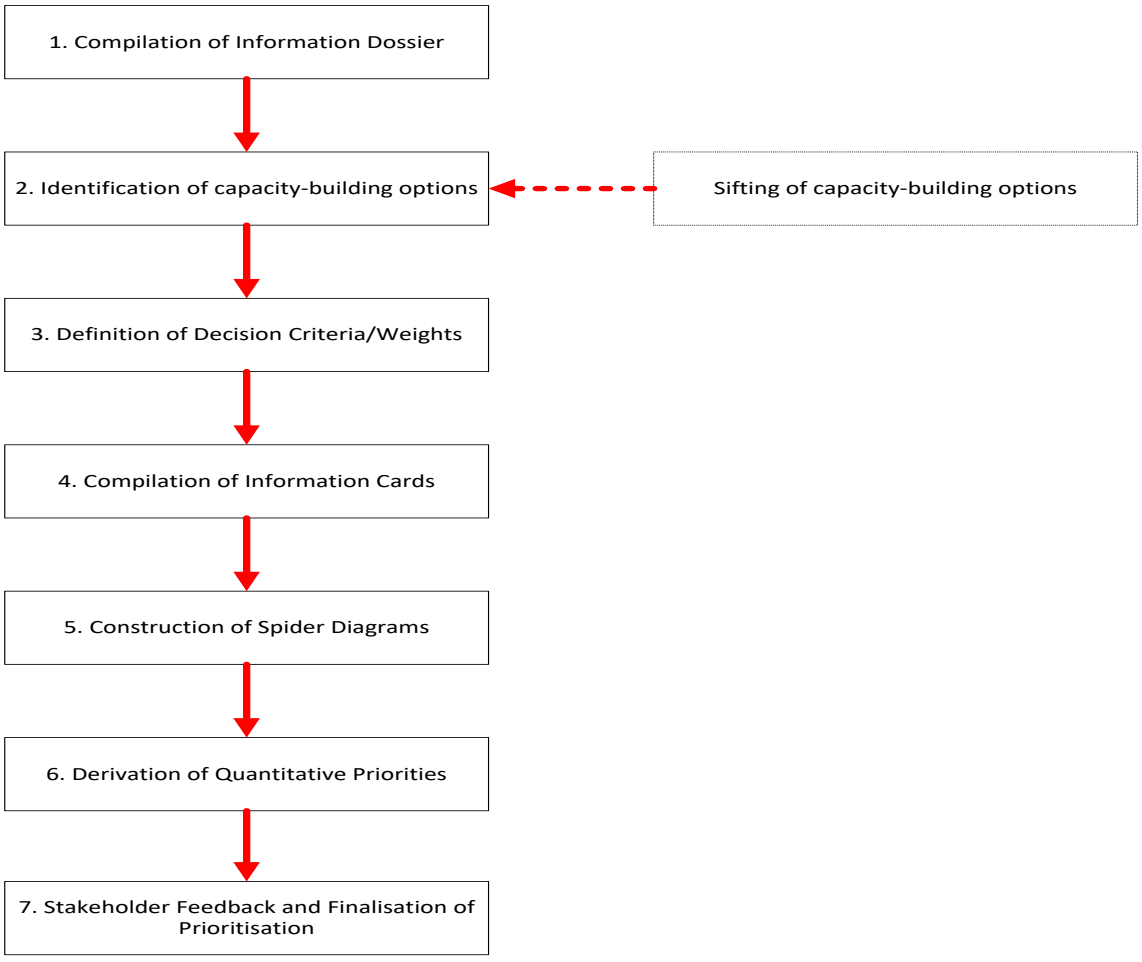
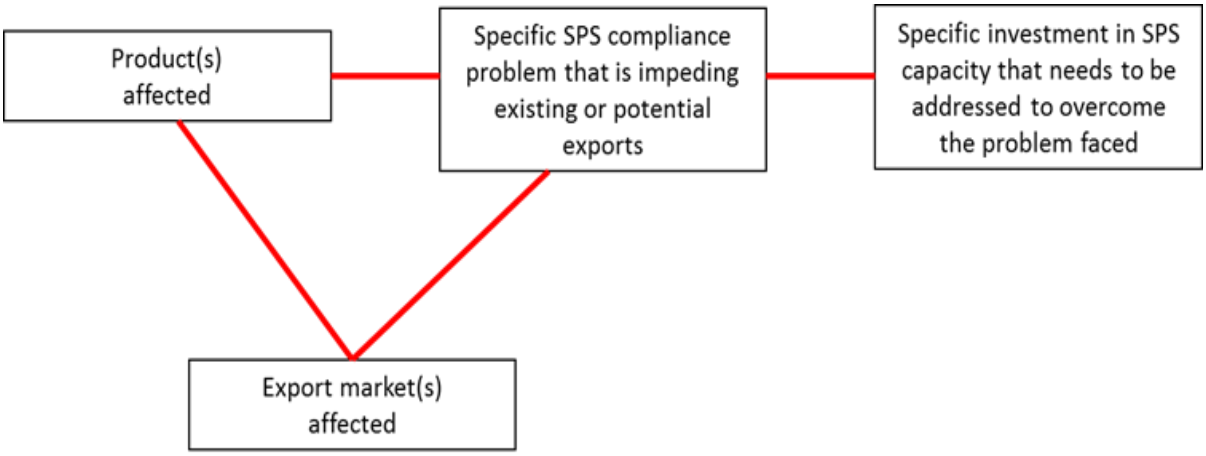


Figure 4: Definition of SPS capacity-building options



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	13.5
	Ongoing cost	8.7
Trade Impact	Change in absolute value of exports	15.7
	Export diversification	7.1
Domestic Spillovers	Agricultural productivity	12.9
	Public health	8.1
	Environmental protection	8.0
	Impact on Poverty	9.3
	Impact on Employment	7.9
	Food Security	8.8
	Total	**100.0**

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. While the cost element and trade impacts were estimated by a core team of sector players based on the component of the capacity building investment options and the lost trade and/or potential trade, respectively, other decision criterion were measured collectively by stakeholders during the working session based on available data and information. However, it is important to recognize that the aim of the framework is not to provide a final and definitive prioritization 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 3. Each card presents data for the ten 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 prioritization 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 ($)
On-going costs	Direct costs of maintaining and operating the upgraded SPS capacity	Absolute value ($)
	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 products?	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	
Impact on Employment	Impact on availability of more employment opportunities	
Food Security	Impact on availability and access to food	

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 ten decision criteria. Scrutiny of these diagrams (Section 5 Results) 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.

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 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.

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 was 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 was disseminated to stakeholders by email with a request for comments. Further, the preliminary results were presented at a stakeholder validation workshop on 1st December 2020, the participants at which are reported in Annex 4. Further validation was also solicited in terms of comments on the draft report which was finalized and distributed on 12th February 2021.

4.0 Brief Description of the Capacity Building Options (CBOs)

4.1 Capacity building in Systems Approach along Horticulture VCs

Cut-flowers is one of Kenya's biggest exports with main markets being EU taking an average of 80%. As at 2019, Kenya was ranked 4th in global cut-flowers export. Exceptional growth in shipment to Australia has seen export consignment worth US$2.7 million in 2010 to US$22 million in 2018. However, there has been an increase in interceptions in the EU and Australia markets due to thrips, False Codling Moths (FCM), and mites. Both markets have made recommendations on systems approach and post-harvest treatment particularly fumigation to manage the above pests.

Mango is the second most grown fruit in Kenya after bananas. The demand for mango is projected to keep growing into 2022 with the Government of Kenya identifying it as a priority value chain. Kenya has been identified to have the second fastest growth rate in mango production globally, second to Egypt. The product holds potential to the EU, Australia and Japan markets but has faced numerous interceptions in the EU market mainly due to fruit-flies and mango weevils with these countries requiring zero tolerance. Until the self-ban on export of mangoes by Kenyan Government in 2014, there has been 11 interceptions during the first half of the year. In addition to these interceptions, Kenyan farmers incur heavy losses due to fruit fly infestation with some studies showing up to 24% at the farm gate. During the ban, most of the exports were diverted to the Middle East. Due to persistent pest issues, the EU introduced a new rule i.e. Regulation (EU) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 which became fully effective as from 14th December 2019.

Avocado is estimated to be the 4th most important national fruit crop behind banana, mango and pineapple. Europe has been the major importer of the fruit at an average of 62% spread over the last 9 years with Saudi Arabia and UAE taking approximately 30%. ITC data shows that between 2010 and 2018 export of avocado to the EU has tripled with

latest market diversification interest by China on frozen avocadoes. However, avocado exports are also facing SPS issues of fruit-fly and scales. China's stringent requirement of freezing avocado is considered an SPS issue. Addressing this pest could also offer Kenya another opportunity to negotiate the stringent measures.

Capsicum is a common vegetable exported from Kenya mainly to the EU market. However, Kenya has experienced numerous cases of interceptions due to Harmful Organisms (HO) specifically False Codling Moth (FCM) since 2015 according to Europhyt interception reports for EU market. The total number of interceptions were 65 in 2015, 24 in 2016, 16 in 2017, 11 in 2018 and 12 in 2019. Kenya's NPPO responded by regulating the exporting companies through stringent audits and vetting of the Capsicum farms. In spite of the high market demand for the product, access remains a challenge due to the FCM. There is therefore need for capacity building for both the inspectors and producers/exporters and for carrying out monitoring and surveillance.

Beans and peas in pods remains Kenya's major export produce. Europe remains the biggest market for the products. However, ITC report show a sharp decline in global export between 2011-2018 mainly due to pesticide residues where a number of interceptions were registered at the border control of the EU importing countries. The high frequency of interceptions has prompted Kenya to be listed in EC Regulation (EU) 2019/1793 Annex I and II on increased control up to 5% (beans only) on grounds that there were insufficient guarantees on pesticide maximum residue levels control from Kenya leading to reduced export to the EU.

The sector players have been working together with the competent authorities to manage these SPS issues. However, achieving the desired objective has not been adequately met due to challenges in funding. Investment in the capacity building option will provide the regulators e.g. the NPPO and private sector with the opportunity to create synergies in employing systems approach particularly enhanced trainings in IPM, pest surveillance, and pesticides residues management in order to meet the destination markets requirements. Other contaminants e.g. heavy metals and microbial contamination are also emerging SPS issues requiring attention.

4.2 Capacity building in post-harvest treatment for fruits & flowers

Kenya is one of the biggest exporters of **cut-flowers** estimated at US$5 billion per year globally with the main market being EU. As at 2019, Kenya was ranked 4th in global export of cut-flowers. Exceptional growth in shipment to Australia has seen export consignment worth US$2.7 million in 2010 to US$22 million in 2018. However, there has been an increased in interceptions in the EU and Australia markets due to thrips, False Codling Moths (FCM) and mites. Both markets have made recommendations on systems approach and post-harvest treatment particularly fumigation to manage the mentioned pests.

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Although currently Kenya has diversified its markets to other countries e.g. United Arabs Emirates (UAE) and Saudi Arabia, the market potential in EU countries is huge, and Kenya stands to benefit more if the SPS issues are addressed. The sector players have been working together with the competent authorities to manage these SPS issues.

However, these efforts remain inadequate and achieving the desired objective has not been met due to challenges with funding. Kenya is limited in resources to actualize and sustain the implementation of these proposals. In order to comply with the mandatory market requirements, Kenya requires investment/resources to set up postharvest treatment facilities for fumigation and hot water dipping as has been recommended by some of the importing countries particularly Australia.

4.3 Capacity building in Lab. testing, diagnostics, and accreditation for horticulture products

Kenya has a lot of market potential for different fruits and vegetables most of which have been affected by pest, and diseases, pesticide residues and other contaminants. Avocado, mango, flowers, and capsicum, peas and beans in pods are currently considered as products of interest on SPS issues especially for EU and Australian markets. The objective of this capacity building is to put measures in place for early detection of existing and emerging pests of SPS concern in the destination countries which have already given guidelines on the pests and diseases of concern. It is also to address pesticide residues and other contaminants in peas and beans in pods. These tests are necessary to support pest and diseases identification, market surveillance,

inspection and risk analysis. It also helps monitor pesticide residues and other contaminants in peas and beans in pods.

Although Kenya has a number of laboratories responsible for laboratory testing and diagnostics, most of these laboratories which could be within the reach of most farmers are not adequately equipped and accredited for International recognition. There is also inadequate 'plant doctors' to be able to be reached by the farmers who may want immediate interventions. In order to have a sustainable approach to mitigating the risk posed by Quarantine Pests, there is need for investment in laboratories to be able to detect pests at an early stage and employ the necessary controls. In order to manage pesticide residues and other contaminants, it is equally important to build capacity on the labs, facilitate data collection and train the relevant staff in control of the SPS issue. Funding in these areas would help Kenya in addressing the current challenges.

4.4 Clean planting material (support plant breeding & plant propagation, Virus Cleaning)

Flowers are the key export potential products that have been faced by a myriad of SPS issues. Kenya is experiencing interceptions in the EU market due to pests and diseases arising from use of contaminated planting materials. Even though areas of pest free or low pest prevalence may be created for quarantine pest, unless clean planting materials are obtained, the issue cannot be adequately addressed. The rationale for this CB Option is in acknowledgement that certain crops are propagated from live vegetative planting materials; the risk is that pests and diseases in the parent crop may be carried to the succeeding crops. The use of in vitro technology to multiply selected horticultural crops particularly ornamentals is now a routine (Rout et al., 2006). The technique is based on micro-propagation of indexed plants and facilitates mass production of improved cultivars that are free from pests and diseases for horticultural industry. There is great need for Kenya to enhance applications of these in vitro techniques in order to ensure clean planting materials as well as improve efficiency of breeding since in vitro propagation gives a faster way of multiplication of disease –free genotypes. Virus infected propagation plants can be subjected to sanitation treatments consisting use of meristem-tip culture and thermotherapy to produce virus-free (clean planting material). Virus indexing is key to ascertain that the plants/propagation materials that have undergone virus cleaning are virus-free. Most of these materials are maintained in a temperature-controlled greenhouses and hardened while under observation and virus indexing. In many certification schemes, focus on use of certified propagation material obtained from in vitro meristem tip culture and thermotherapy (Leonhardt et al., 1998).

Seed Health: seed can carry diseases or insects that will later attack the plant or be transmitted to other plants. Therefore, it is important that seed is free of pests and diseases. Seed health may not be determined by looking at the seed and requires seed health testing or growing the seed to the seedling stage. Seed may be damaged during storage meaning it can be more easily attacked by diseases. Monitoring of seed fields to

identify and address disease problems is the main way to address seed health but seed treatment is also used.

4.5 Establish/Strengthen digital traceability system in the horticulture supply chain

Traceability systems must be able to guarantee the full traceability of the product from raw materials and packaging to the finished products and from the finished products back to the raw materials to ensure that any contamination of food safety concern or harmful organism can be traced back to the source for prompt action and in the most economical manner which also does not affect the whole consignment. This can necessitate the relevant regulatory bodies including the Ministry of public Health who are the National Notification body on Food Safety and KEPHIS who are the NPPO to be able to quickly identify the supplier and act fast in the best interest of the country. Different legislations by importing countries have been established and implemented as way of identifying the product source. For example, listing under the RASSF greatly relies on traceability.

The Horticultural Crops Directorate (HCD) of Agriculture and Food Authority (AFA), the Kenya Agriculture and Livestock Research Organization (KALRO) in collaboration with the horticulture exporters Associations of Kenya (FPEAK and KFC) and the United States Agency for International Development (USAID)- Kenya Agricultural Value chain Enterprise (KAVES) project; have developed an online National Horticulture Traceability System (HTS). This cloud-based system was intended to make it possible for any shipment that does not comply with market standards on arrival in the export market to be traced back to source, and remedial action taken immediately.

The system was developed to increase transparency and accountability in horticultural supply chains in response to recent challenges faced by the industry in complying with EU and international food safety requirements which included lack of a national traceability system for horticulture produce; frequent interceptions of exports due to excessive pesticide maximum residue levels; and the presence of regulated pests in export consignments. These challenges pose a threat to the competitiveness of Kenyan horticulture exports. The HTS was customized for Kenya's smallholder-based export industry and was able to accommodate up to one million farmers and had the capacity to identify the exact source of a shipment through its GPS coordinates, and generate online production and handling reports required by the market. An adequately deployed HTS will increase market confidence and safeguard more than 2.5 million smallholder farmers and workers involved in horticulture export. The system will increase the competitiveness of Kenyan horticulture exports through enhanced transparency in the supply chain. The aim was to facilitate a rapid response to food safety risks by providing the capacity to identify, isolate, and rectify non-compliant producers; and expedite responses to pest and disease early warning alerts by locating affected areas. This was seen to put Kenya at a leading edge of countries supplying the EU market with horticultural crops.

The challenge however has been deficient physical and technological infrastructure, spotty access to electricity and internet, poor digital literacy, and fragmented informal value chains. Additionally, traceability systems often require advanced technological and

record-keeping capacities that small-scale market actors often lack. Raw products produced by smallholder farmers are frequently combined at the collector/intermediary level, presenting the challenge traceability systems face when such produce is mixed.

For effective management of food safety issues and harmful organisms (HO) in Horticulture and Flowers, this option will focus on building and implementing a traceability system through Supply chain mapping, effective chain of custody, standardization of data collection and transmission methods (necessary gadgets needed and corresponding trainings and maintenance).

4.6 Monitoring, surveillance and animal disease control measures

For products of animal origin, including honey, to be exported to the European Union and UAE, the exporting country has to demonstrate having a residue monitoring plan in place. The exports must be accompanied by an original veterinary import permit and animal health certificate with additional declarations issued by the Director of Veterinary Services. Risk assessment of diseases in livestock and livestock products must also be carried out by importing country. A strong disease surveillance and reporting system augurs well for purposes of animal and animal products export. International trade in livestock and livestock products requires regular credible reports on a country's disease status to allow for risk assessment by trading partners. Kenya exports mainly beef and beef products, mutton and chevon into the EU and UAE and the SPS issues of concern are usually FMD, BSE, and antibiotic residues in beef and small ruminants' meat. Kenya is a net importer of pig products, though some limited amount is exported to UAE and East Africa region.

To achieve this, Kenya's Directorate of Veterinary Services requires quality, complete and timely animal resource information for planning, decision making and monitoring activities. In the recent past, the disease reporting and surveillance system has experienced major challenges resulting in unrepresentative and untimely data. Some of the challenges identified include lack of technical support at the counties, lack of a proper real-time data capture tools, inadequate data management and backstopping from the national level. The country works with importing countries risk assessors to evaluate our veterinary systems, food safety systems, and internal audit systems.

To enhance SPS capacity, accreditation of DVS lab, improvement in vaccination, monitoring and surveillance systems, and fast tracking the finalization of Disease-free zones is required. Kenya has a residue monitoring plan for Honey, Milk and Meat which outlines how pesticides and other residues will be controlled and prevented from exceeding maximum levels. Also, Kenya has developed disease control strategies for FMD, RVF and Antimicrobial resistance. A quarantine (livestock export zone) is almost 60% complete and modalities are being worked so as to run it on Public-Private partnership. At the same time a network of feedlots are being supported to supply animals for the export market. Nonetheless, these interventions remain inadequate to meet SPS compliance requirements from trading partners. Thus, this capacity building option intends to support increased and concerted efforts by focusing on monitoring and

surveillance of animal diseases, animal risk assessment, and institute and/or implement disease control measures such as Disease Free Zones and quarantine facilities, to improve export market access. The intervention will also support training of stakeholders on GAPs, GVPs, and GMPs.

4.7 Accreditation of DVS food lab

For products of animal origin, including honey, to be exported to the European Union and UAE markets, the exporting country has to have a residue plan in place. Kenya has a plan for Honey, Milk and Meat which outlines how pesticides, antibiotics and other residues will be controlled and prevented from exceeding maximum levels. Mainly, the export of beef and beef products, mutton, and chevon are faced with drug and pesticide residues, aflatoxins, and heavy metals. Kenya is able to test for pesticides residues but requires accreditations of these labs, and training of staff to carry out these tests. To address these challenges, the country requires investment into testing capacity of residues in honey, meat, milk by acquiring modern equipment, training, but most importantly acquiring accreditation for the testing labs.

4.8 Capacity building in GAPs & GMPs for Honey

For any product of animal origin to be imported into the European Union, including honey, the exporting country has to have a residue plan in place which outlines how pesticides and other residues will be controlled and prevented from exceeding maximum levels. The EU honey market requires imported honey to be certified that it is free from chemical, antibiotic and other residues. These are the most stringent criteria that are constantly updated as new contaminants are discovered in honey on the world market. Having achieved approval, sampling and testing is undertaken on an annual basis, with the results communicated to the European Commission in order to maintain approval. Kenya is implementing a honey residue monitoring plan that monitors residue levels (permitted and prohibited chemicals). Other requirements by importing countries is obtaining a veterinary Health Certificate approving quality control and processing standards in line with EU requirements and standards – primarily by having a HACCP system and every shipment of honey must be accompanied by a 'health certificate' stamped by a local veterinary officer. The main SPS concerns for the EU and USA are bee diseases like American foul brood, drug and pesticides residues.

Kenya is coming up with a monitoring and surveillance programme for bee diseases and drug and pesticides. At the same time accreditation of food lab is being undertaken. A bee disease molecular lab is under construction and needs equipping. Training of bee farmers on GAP is ongoing. The final outcome is to produce a bee disease risk Map.

4.9 Monitoring and surveillance of residues in feeds

Animal feed is a critical component of the food chain that has a direct impact on animal health and welfare and also on food safety and public health. Feed and feed ingredients are widely traded internationally and trade disruptions can severely impact economies in both developed and developing countries. All animal feeds and feed ingredients are involved. Kenya is mainly an importer of animal feeds, feed ingredients and additives. For

import approval the Veterinary Services required the exporting country to provide international veterinary certificates for feeds, ingredients and feed additives.

The SPS issue is hazards associated with animal feed, Biological: bacteria (viruses, prions, fungi, parasites), Chemical (mycotoxins, gossypol, industrial and environmental contaminants (e.g. dioxins, PCBs), residues of veterinary drugs and pesticides, radionuclides. The use of antibiotics in feed for growth promoting purposes is not allowed. Kenya is in the process of improving capacity to test residues in feed by improving the labs, training of staff and implementing the feed residue surveillance plan. Currently aflatoxin testing is done by feed manufacturers and competent authority is training the stakeholders on feed safety assurance systems. These are Good Agricultural Practices & Good Manufacturing Practices (including Good Hygienic Practices) and Hazard Analysis and Critical Control Point (HACCP) principles to control hazards. The Competent Authorities in consultation with stakeholders in developing policies and programmes to support quality assurance and obtaining stakeholder commitment to self-regulation to secure compliance.

4.10 Accreditation of national fish quality control laboratory

The State Department for Fisheries Aquaculture and the Blue Economy has completed the construction of three Fish Quality Control Laboratories in Kisumu, Nairobi and Mombasa. The main products for analysis will be fresh water species (Nile perch, Tilapia and Catfish) and marine water species (Tuna, Octopus, Shrimps/prawns, Squids. Lobster, and marine fin fishes). The laboratories will also analyse sediments (from harvest areas), heavy metals and water (processing) for microbiological and physico-chemical parameters.

The markets involved are domestic, regional and global for fish and fishery products. The SPS issues will cover all food safety issues from primary production areas, fish landing stations, transportation, and at the fish processing enterprises. Related weaknesses is mainly the capacity on the part of the industry especially on new entrants to meet the requirements for compliance to place fish and fishery products on the market.

4.11 Capacity building in GAPs & procurement of testing kits

The SDFA&BE has placed indents for recruitment, once recruited the officers will require hand-on-training to be capable to carry out specific analysis. It will also be critical to procure rapid testing kits for various analysis.

4.12 Strengthen Implementation of the national fish residue monitoring plan

Kenya need to strengthen the Annual Residue Monitoring Programme. One of the major challenges that the country has faced is lack of consistency from fish farmers. The list of farmers in one year is not the same as in subsequent or previous year (mainly as a result of some farmers abandoning the enterprise). The other main challenge has been the scope as a result of financial constraints this leads to lack of adequate sampling in a given region.

4.13 Implementation of HACCP at fish aggregation level

Continuous training is essential at fish aggregation level to ensure that the fish handlers comply with food safety requirements. The requirements for traceability is critical to give confidence that the products traded meet food safety requirements. It will also be useful to develop and implement self-assessment guidelines at the aggregation levels.

4.14 Establishment/upgrading cold chain system

Basic instructions on the management of cold chains is essential both at the Cluster level and the operators. The requirements for ice to fish ratios is also critical and basic hygiene requirements along the value chain.

4.15 Establishment a digital traceability system for aquaculture

The products involved are tilapia catfish. The market involved is mainly domestic and regional with prospects for the global market. The prospects for uptake for digital traceability is very high in the country and could easily be integrated with other mobile phone technologies. It is noteworthy that Kenya has a rapidly expanding middle class that is conscious of the health benefits that are associated with fish consumption.

4.16 CB in System Approach incl. GAPs, GHPs, & GMPs, and monitoring and surveillance of Pathogens, Allergens, etc. for tree nuts VC

The potential for tree nuts production in Kenya remains hugely untapped, and, with increased demand that supersedes supply, the industry remains a promising sector for Kenya's economy. The priority tree nuts of major economic value in Kenya are macadamia and cashew nuts, Kenya being the third largest macadamia producer and the second largest exporter of macadamias in the world. The main export markets for both macadamia and cashew are the American (U.S.A, Canada, Mexico, Brazil, Argentina, and Colombia), European (Germany, Netherlands, France, UK, Italy), and Asian (Japan, China, Korea, India), and Middle East as well as some African markets.

The sector is characterized by small scale farmers who own less than 2 acres of land, with an average of 6 -12 trees per grower and a total of approximately 2 million trees per sector and varying in ages from one year to 20 years, grown by over 200,000 small scale farmers. Annual macadamia production is estimated at 44,883 Mt in 2018 valued at KES 6.052 billion up from 39,821 Mt valued at KES 4.399 billion as reported in 2017. Cashew nuts, on the other hand has been generally on the decline as farmers cut down the trees. Other counties such as Lamu and Tharaka Nithi recorded marginal expansion of the planted area. The cashew nut subsector supports over 68,954 farmers. The industry directly and indirectly employs 4,000 and 50,000 people, respectively. Tree nuts offer an alternative for increased self-sufficiency, food security, improved nutrition, foreign exchange earnings and ensuring the generation of increased incomes and employment.

The main SPS issues affecting tree nuts include: insects/pests, diseases, harvesting of immature nuts which affect the quality of produce, non-compliance with standard requirements for food safety: pathogens and poor hygiene indicators (Staph aureus, Salmonella, E. Coli), allergens, pesticide residuals, aflatoxins, high levels of moulds.

Losses of about 40% of harvest due to premature harvesting, insect damage, poor postharvest practices have been reported. As such capacity building in this intervention is classified in three broad areas, although broadly part or prerequisite of the systems approach:

- **Capacity building in System approach including meeting private standards.** There is need for support to establish effective risk management practices along the value chain: at farm level, harvesting, post-harvest handling, production and post production handling as well as an effective traceability system. For effective management along the value chain there will be need for creating awareness to the relevant stakeholders, development of an effective code of practice (standard), creating awareness on the developed code of practice, training of those involved in management of implementation of good practices and coaching them on implementation of the code of practice.
- **Monitoring and surveillance of Pathogens (E.coli, Salmonella), Allergens, Pesticide residues, Aflatoxins, and levels of moulds**. For SPS issues to be adequately, effectively and sustainably addressed there will be need for baseline and periodic data on quality and safety of products that will inform status and intervention needs. There is therefore need for support for initial sampling and testing to provide the baseline data. This baseline data will inform the development of an implementation plan for necessary interventions. Thereafter, there will be need for support for periodic sampling and testing which will need to be carried out to inform effectiveness of the implemented interventions and provide confidence of quality and safety. For reliable test reports, analysis will need to be carried out in laboratories that provide confidence of measurements and results. There will be need for support with equipment, chemicals, accreditation of relevant test parameters and participation in effective Proficiency Testing (PT) schemes.
- **Capacity building in GAPs, GHPs and GMPs.** Most primary producers are small holder farmers who do not have adequate skills for good agro-practices. There will be need for awareness creation for farmers and other relevant stakeholders, training of extension service providers, providing extension services to farmers for coaching on good agro-practices including farm/plant management, harvesting and postharvest handling.

Excluded or Merged CBOs

The following capacity building options that were originally identified have either been excluded with their stated reasons or merged with other capacity building option:

	CBO	Reason
1	Establishing Disease Free Zones	Merged with “Monitoring, surveillance and animal disease control measures” as it was realised the implementation of this option encompasses this CBO

2	CB in GVPs for livestock and livestock products	Merged with "Monitoring, surveillance and animal disease control measures" as it was realised the implementation of this option encompasses this CBO
3	Risk assessment of diseases in livestock and livestock products	Merged with "Monitoring, surveillance and animal disease control measures" as it was realised the implementation of this option encompasses this CBO
4	Risk Assessment of diseases in livestock and livestock products	Merged with "Monitoring, surveillance and animal disease control measures" as it was realised the implementation of this option encompasses this CBO
5	Monitoring & Surveillance and establishment of areas of low pests	Merged with "CB in systems approach (Including FPA, IPM, GAPs, GHPs, GMPs, HACCP, etc.) along Horticulture VC". It was recognized a system approach will encompass the elements of this CBO
6	Capacity building in Private Standards incl. organic Certification	Not an SPS issue
7	Monitoring and surveillance of Pathogens (E.coli, Salmonella), Allergenes, Pesticide residues, Aflatoxins, and levels of moulds in tree nuts	Merged with "CB in System approach including meeting private standards for tree nuts VC"
8	CB in GAPs, GHPs and GMPs for tree nuts VC	Merged with "CB in System approach including meeting private standards for tree nuts VC"

5.0 Results

Figures 5-7 presents a quick overview of the relative strengths and weaknesses of the capacity building options against the decision criteria upfront investment, on-going cost, and change in the absolute value of exports. The relative strengths and weaknesses of the decision criterion measured using non-linear data, i.e. export diversification, agricultural productivity, public health, environmental protection, poverty impact, employment, and food security, has not been presented here as the spider diagrams do not show striking differences for easy visual comparisons.

Figure 5, which depicts the relative strengths and weaknesses of the CBOs against the decision criteria "up-front investment" shows the capacity building in post-harvest treatment incl. fumigation, hot water treatment, for fruits & flowers as the main outlier. That is, this option is the most expensive option, requiring over US$11.5 million of investment, and may be weaker in the pairwise comparison. Other options also requiring relatively high up-front investments include monitoring, surveillance and animal disease control measures at US$5.4 million, and establishment/upgrading cold chain system for fish at about US$4.8 million. The option with the lowest up-front investment requirement is the establishment or strengthening digital traceability system in the horticulture supply chain at US$165,000. The implications of these relative weaknesses and strengths are that the more expensive options are weaker in terms of the pairwise comparisons than

the options with relatively cheaper up-front investments, and this would influence their overall ranking.

Figure 5: CBOs & Up-Front Investment (US$'Million)

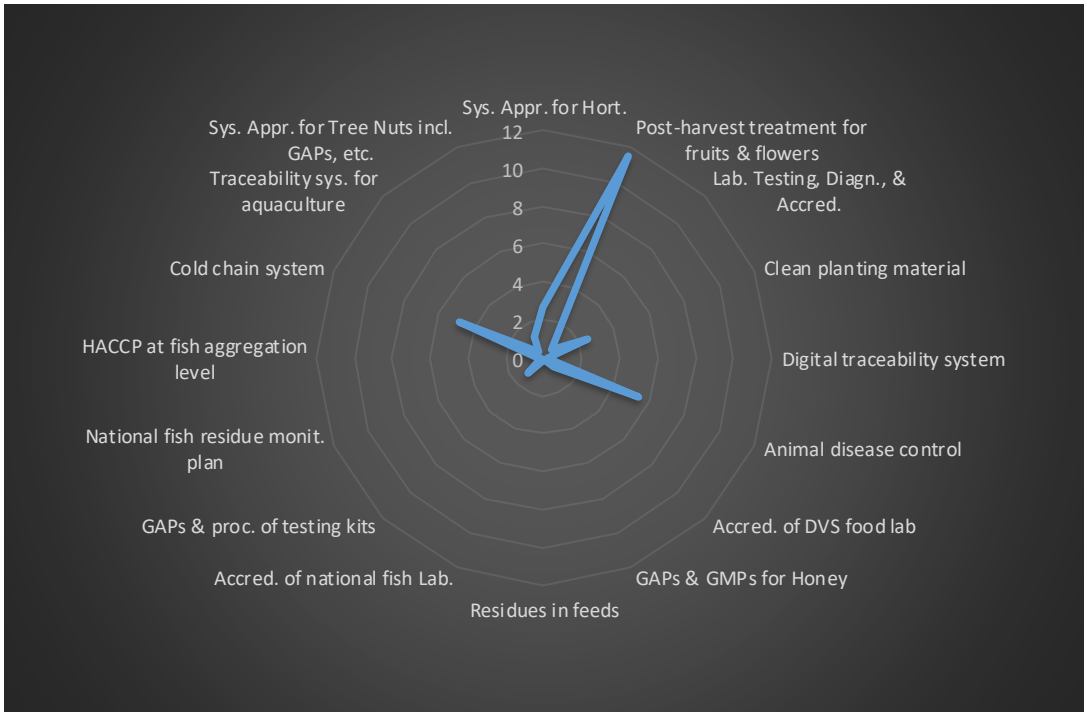
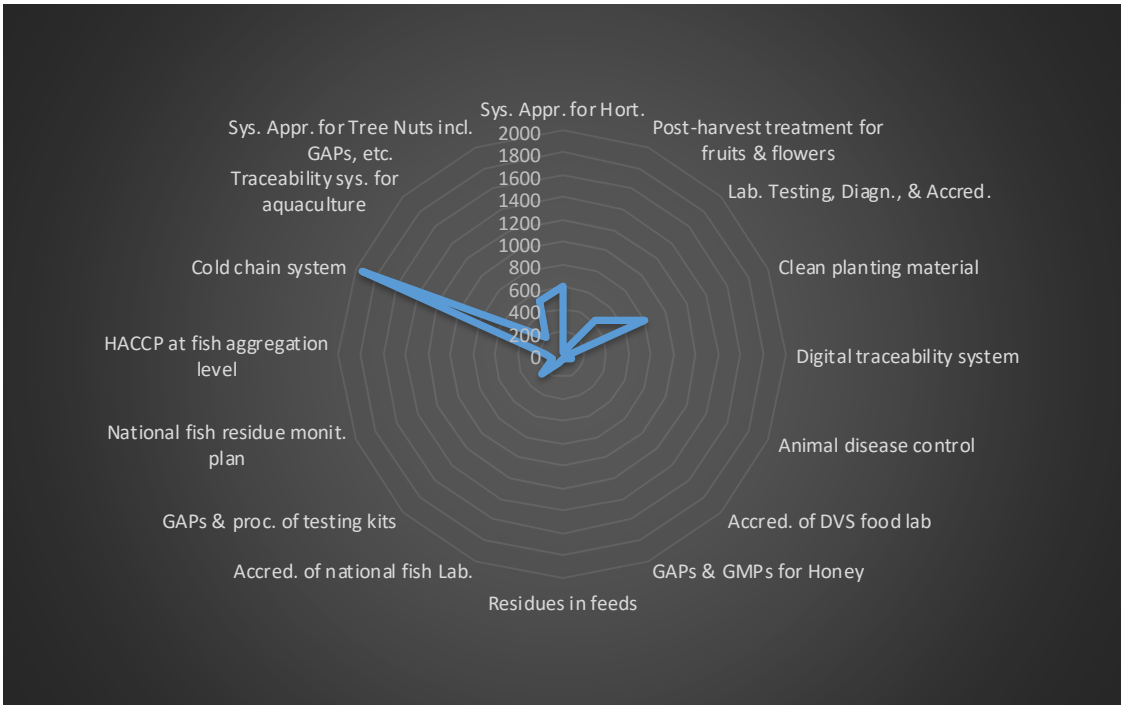


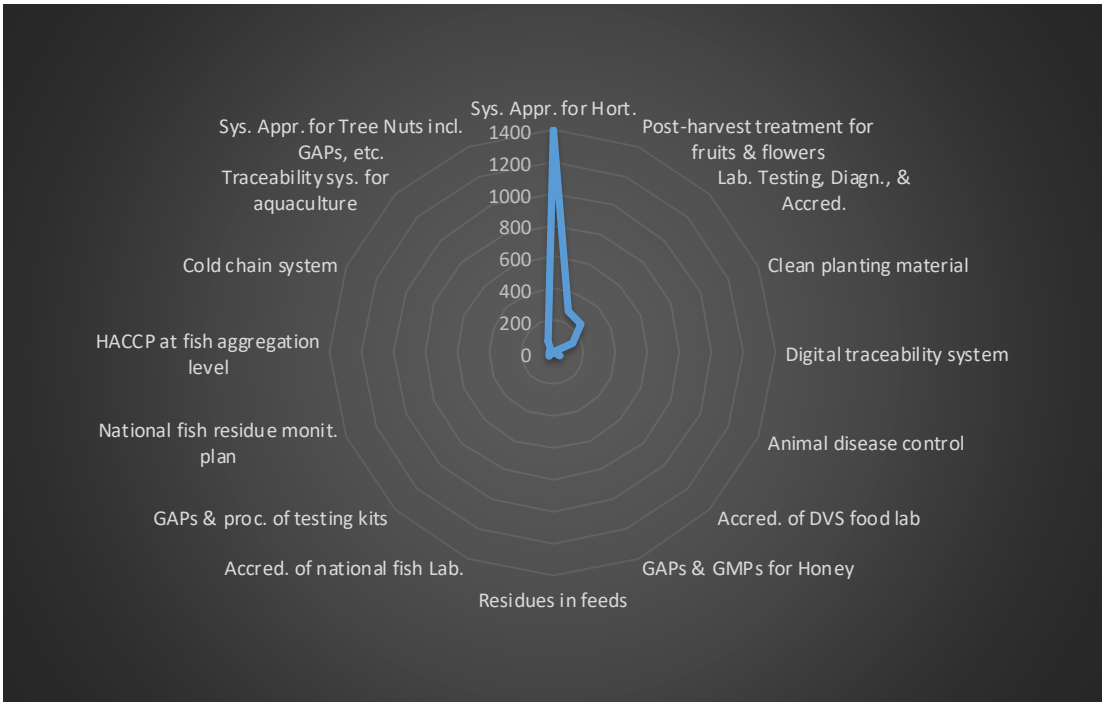
Figure 6: CBOs & On-going Cost (US$'000)



Similarly, in figure 6, the option with the highest on-going cost is establishment/upgrading cold chain system for fish at about US$1.9 million, followed by clean planting material (support plant breeding & plant propagation, virus cleaning) at US$800,000, and capacity building in systems approach for horticulture value chain at US$600,000.

In terms of impact on change in absolute value of exports (Figure 7), the most dominant outlier is the capacity building in systems approach along horticulture value chains, which is estimated to generate US$1.4 billion worth of additional exports. In general, most CBOs show strong impact on exports annually, ranging from US$890,000 for honey to US$273 million for post-harvest treatment for fruits and flowers. However, three options, i.e. establishment or strengthening digital traceability system in the horticulture supply chain, accreditation of DVS food lab, and accreditation of national fish quality control laboratory, are estimated to have no impact on change in the absolute value of exports.

Figure 7: CBOs & Change in absolute value of exports (US$'Million)



Figures 8 and 9, i.e. the baseline model, present the main result of the prioritization framework using outranking in the D-Sight software package based on the decision criteria and weights agreed by stakeholders. The result shows that capacity building in systems approach (Incl. PFA, IPM, GAPs, GHPs, GMPs, HACCP, etc.) along horticulture value chains; capacity building in system approach including GAPs, GHPs, & GMPs, and monitoring and surveillance of pathogens (E.coli, Salmonella), allergenes, pesticide residues, aflatoxins, and levels of moulds in tree nuts; capacity building in GAPs & GMPs

for honey; capacity building in GAPs & procurement of fish testing kits; and implementation of HACCP at fish aggregation level are the top five ranked CBOs. Thus, these options would yield the best value for money based on the decision criteria and measurements estimated across different options.

At the other end, accreditation of DVS food laboratory; establish/strengthen digital traceability system in the horticulture supply chain; and establishment/upgrading cold chain system for fish, ranked lowest. It should, however, be noted that these rankings do not suggest that a low ranked option is not important for implementation, but rather, it simply shows that, in terms of priority, based on assigned costs and flow of benefits, a lower ranked option is not the best option to be implemented first given limited resources.

Figure 8: Ranking of CBOs Using Baseline Model

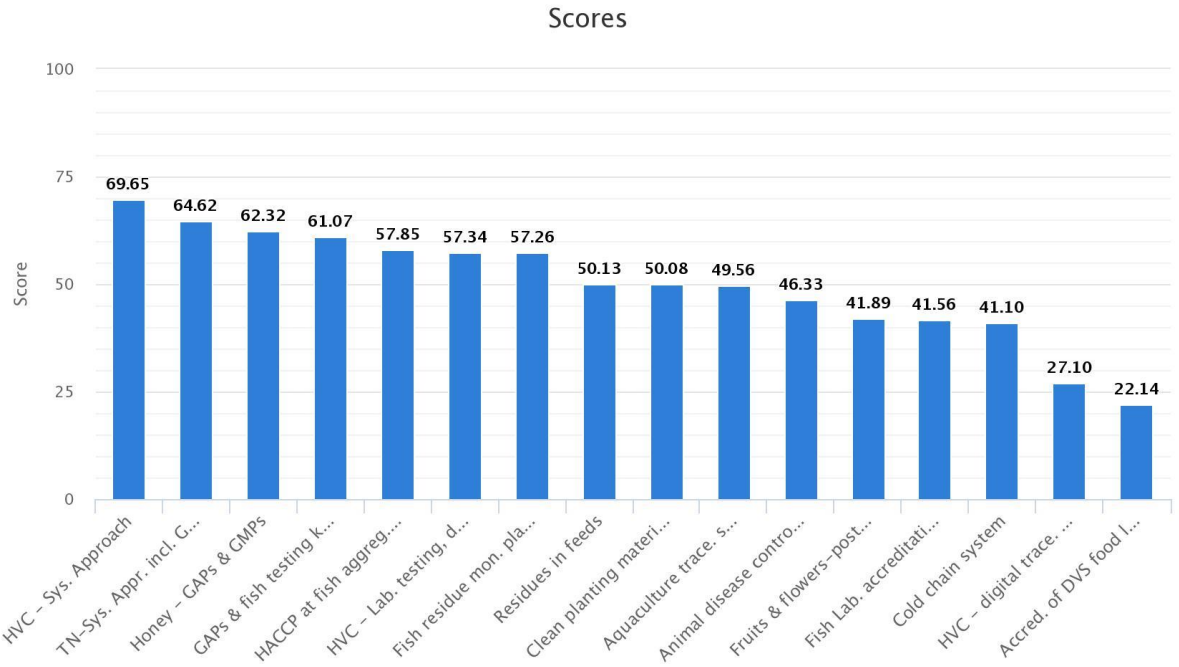
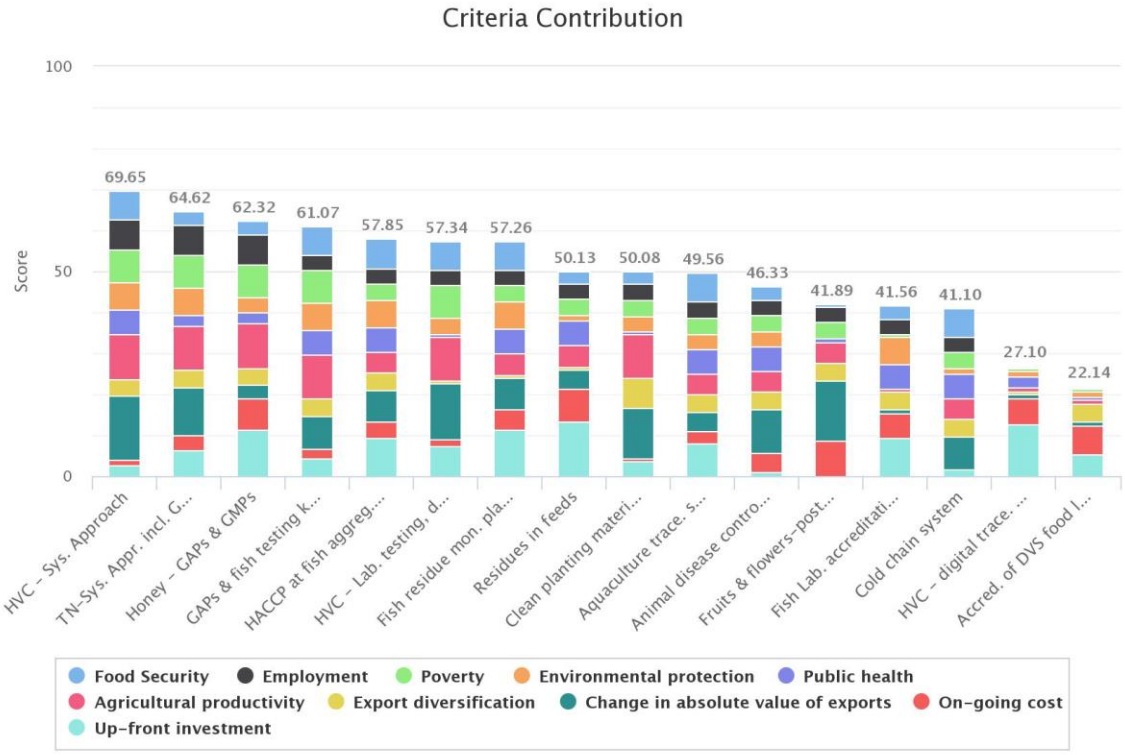


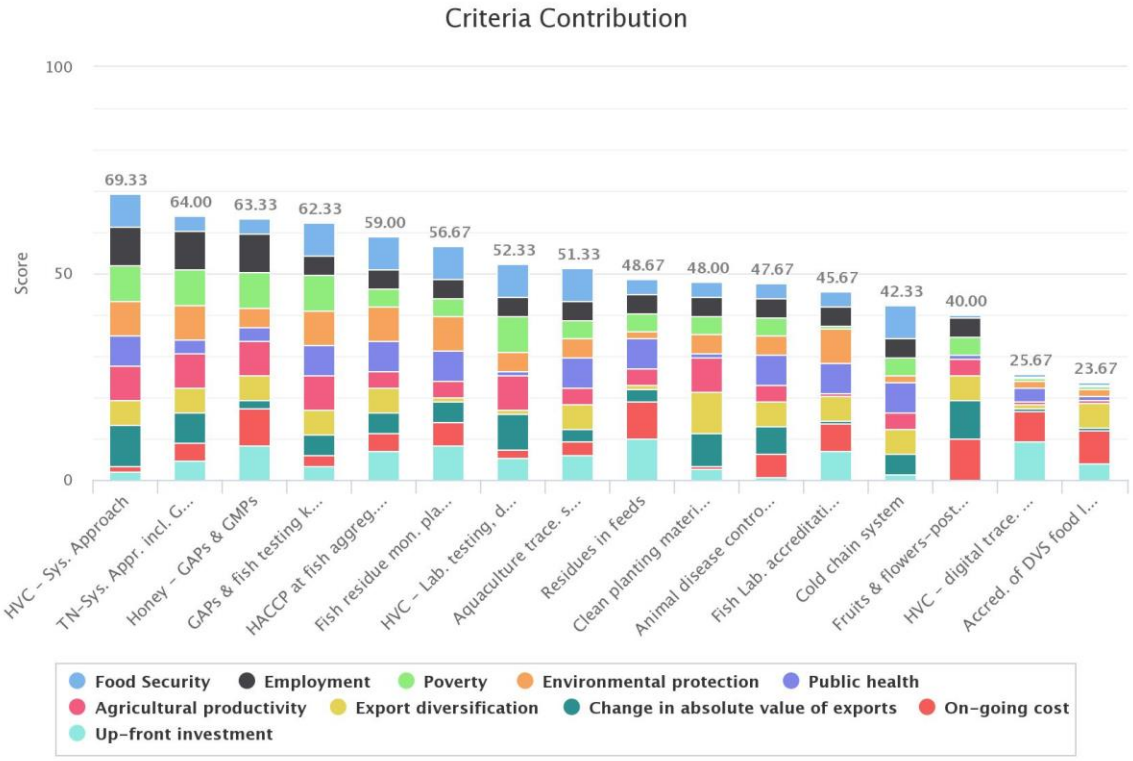
Figure 9 explains how the different decision criteria and their weights contribute to the global score of each capacity building option. In effect, it is noticeable that the top ranked options have greater contribution from almost all decision criteria than the lower ranked options. For instance, you would see that accreditation of DVS food laboratory, and establish/strengthen digital traceability system in the horticulture supply chain, which ranked lowest, had only great contributions from up-front investment and on-going cost, probably because they are relatively cheaper to implement. Similarly, you would realise that the first ranked option had very limited contributions from up-front investment and on-going cost because it is the most expensive option.

Figure 9: Baseline Model Criteria Contribution Analysis



To test the resilience of the result in the baseline model, we employ two other analyses by setting the weights on all decision criteria equal (Figure 10), and running a cost and trade impact only analysis (Figure 11). In the equal weights model, the outcome shows relatively similar findings as in the baseline model except for slight shifts in the positions of some of the options. For instance, the top five from the baseline model remained at the same positions. Similarly, in the bottom, the lowest two ranked options from the baseline model remained the same. There are, however, some slight changes. For example, the establishment or upgrading of cold chain system, and accreditation of national fish quality control laboratory have moved up a step each displacing the option capacity building in post-harvest treatment incl. fumigation, hot water treatment, for fruits & flowers from its position as the fifth lowest to third lowest.

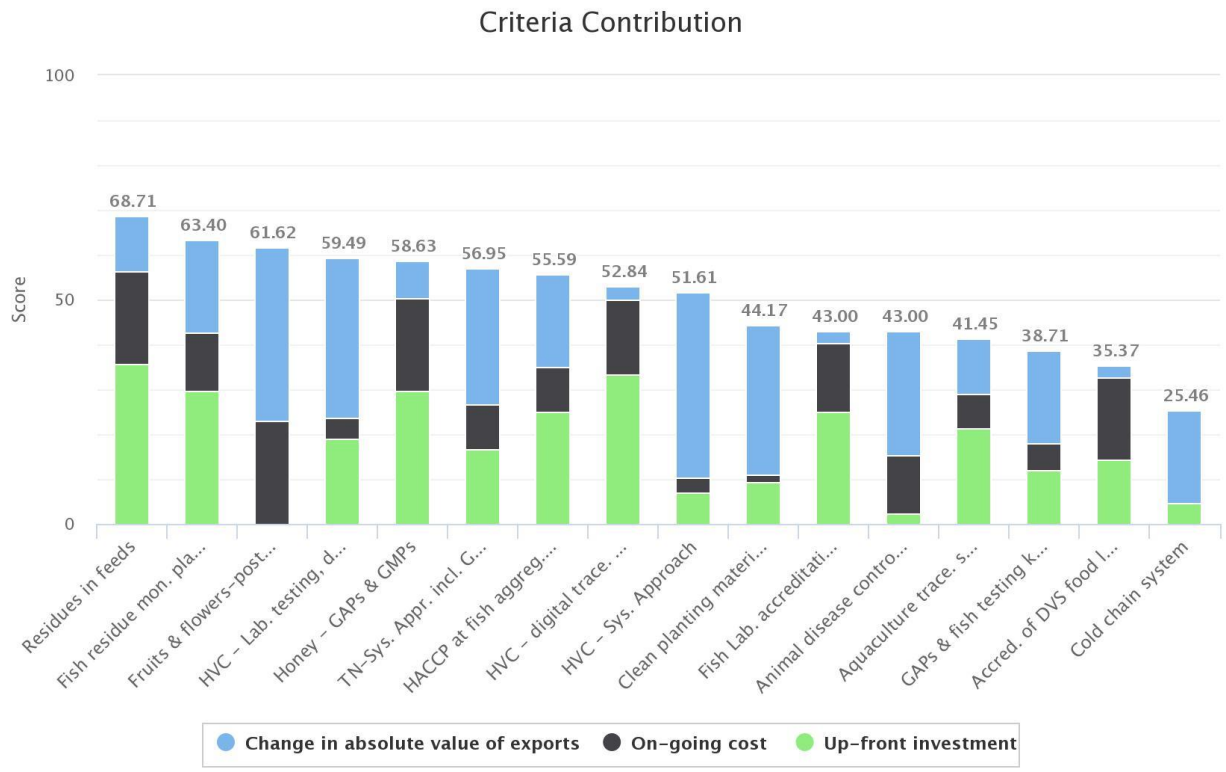
Figure 10: Ranking of CBOs when all Decision Criteria are weighted equally



In the cost and trade model, we assume the only decision criteria that matters are the cost of implementation (i.e. up-front investment and on-going cost) and change in the absolute value of exports. The result shows very drastic movements. The CBOs, "monitoring and surveillance of residues in feeds"; "strengthen implementation of the national fish residue monitoring plan"; and "capacity building in post-harvest treatment incl. fumigation, hot water treatment, for fruits & flowers" which ranked 8th, 7th, and 12th places, respectively, in the baseline model now ranked in 1st, 2nd, and 3rd places, respectively. Similarly, the establish/strengthen digital traceability system in the horticulture supply chain, which ranked in 15th place (i.e. 2nd from bottom) in the baseline model has now moved up to 8th position. Surprisingly, the "capacity building in systems approach (Incl. PFA, IPM, GAPs, GHPs, GMPs, HACCP, etc.) along horticulture value chains" and "cpacity building in GAPs & procurement of testing kits" which ranked first and fourth, respectively, in both previous scenarios now ranked at 9th and 14th places.

This notwithstanding, the options "capacity building in GAPs & GMPs for honey; capacity building in system approach including GAPs, GHPs, & GMPs, and monitoring and surveillance of pathogens (E.coli, Salmonella), allergenes, pesticide residues, aflatoxins, and levels of moulds in tree nuts; implementation of HACCP at fish aggregation level; and capacity building in laboratory testing, diagnostics (pest & diseases) & accreditation" remained in the top half of the ranking. The establishment or upgrading cold chain system, and accreditation of DVS food laboratory also still remained among the lowest ranks.

Figure 11: Ranking of CBOs based on cost and trade impact only



Thus, the analysis shows some sensitivities to changes in the parameters particularly when we ignore spill-over impacts on export diversification, agriculture productivity, public health, environmental protection, poverty impact, employment, and food security, and considered only cost of implementation and trade impact. That is, if investments are to be made solely on the basis of returns to trade, then the baseline analysis may not be the most appropriate approach but rather the cost and trade model. This is because the baseline and the equal weights models take into account impacts on all these other objectives than only trade impact given cost of implementation, which influenced the overall score of the capacity building options' in their rankings.

Despite these sensitivities, the following options are more desirable as first best choices for immediate investment, particularly if trade considerations are not the sole objective, as the case in reality is:

- capacity building in systems approach (Incl. PFA, IPM, GAPs, GHPs, GMPs, HACCP, etc.) along horticulture value chains
- capacity building in system approach including GAPs, GHPs, & GMPs, and monitoring and surveillance of pathogens (E.coli, Salmonella), allergens, pesticide residues, aflatoxins, and levels of moulds in tree nuts
- capacity building in GAPs & GMPs for honey

- capacity building in GAPs & procurement of fish testing kits; and
- implementation of HACCP at fish aggregation level

While the following options are less desirable and should be considered for a later investment:

- accreditation of DVS food laboratory.
- establishment or upgrading cold chain system
- establish/strengthen digital traceability system in the horticulture supply chain
- capacity building in post-harvest treatment incl. fumigation, hot water treatment, for fruits & flowers; and
- accreditation of national fish quality control laboratory

6.0 Conclusion

At the outset, it must be noted that the results from this framework are based on the availability and quality of data. As such, the results must be revised in an on-going basis once a better data is discovered. In this regard, as part of the COMESA P-IMA project, a minimum of two persons were trained as P-IMA National Experts to assist in subsequent revision/re-application of the framework in Kenya. In addition, over 15 people were also trained on the general understanding of the framework.

This report presents the outcomes of 16 SPS capacity building options that were ranked based on a structured process of identifying the SPS capacity building options that are relevant for market access, prior agreed objectives (called decision criteria), and agreed weights assigned to the decision criteria. If resources were not a constraint, these 16 options which costs approximately US$37.7 million to be implemented could rake in an estimated export revenue of about US$2.3 billion annually. However, due to limited resource constraints, this priority setting framework provides a necessary tool for decision making on first-best investment options. The actual priority setting was carried out using Multi-Criteria Decision Analysis (MCDA) powered by the D-Sight software package. Based on this, the following options are more desirable as first best choices for immediate investment, particularly if trade considerations are not the sole objective, as the case in reality is:

- capacity building in systems approach (Incl. PFA, IPM, GAPs, GHPs, GMPs, HACCP, etc.) along horticulture value chains
- capacity building in system approach including GAPs, GHPs, & GMPs, and monitoring and surveillance of pathogens (E.coli, Salmonella), allergens, pesticide residues, aflatoxins, and levels of moulds in tree nuts
- capacity building in GAPs & GMPs for honey
- capacity building in GAPs & procurement of fish testing kits; and
- implementation of HACCP at fish aggregation level

While the following options are less desirable and should be considered for a later investment:

- accreditation of DVS food laboratory
- establishment or upgrading cold chain system
- establish/strengthen digital traceability system in the horticulture supply chain
- capacity building in post-harvest treatment incl. fumigation, hot water treatment, for fruits & flowers; and
- accreditation of national fish quality control laboratory.

It must however be noted that the ranking of certain capacity building options low does not presuppose that they are not important. Rather, it simply meant that, based on agreed objectives and limited resource availability, they do not come as first priorities. With time and availability of resources, all these capacity building needs must be addressed. It is also important to remember that this document is a 'living document', thus, it must be revised regularly, particularly, once a new data and/or other SPS challenges emerge.

Annex 1; SPS Non-Compliance Notifications Against Kenya

Table 1: EU SPS Notifications Against Kenya (2010-2019)

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
1	alcoholic beverages	27/10/2014	information for follow-up	Finland	too high content of E 1520 - propylene glycol (5800 mg/kg - ppm) in liqueur from Canada, packaged in Norway	recall from consumers	undecided
2	cephalopods and products thereof	24/08/2011	border rejection	Spain	poor temperature control of frozen octopus (Octopus vulgaris) from Kenya	official detention	undecided
3	cereals and bakery products	6/11/2009	information	Commission Services	unauthorised genetically modified (FP 967: presence /25g) linseed in muesli from the United Kingdom, with raw material from Canada, via Belgium	withdrawal from the market	undecided
4	cereals and bakery products	15/06/2015	alert	Spain	undeclared milk ingredient (protein: 7.2; 13.5 mg/kg - ppm) in biscuits with orange jelly from Poland	withdrawal from recipient(s)	serious
5	cereals and bakery products	16/07/2015	information for attention	Belgium	deoxynivalenol (DON) (1440; 1293.8 µg/kg - ppb) in corn and soya blend from Belgium		serious
6	cocoa and cocoa preparations, coffee and tea	23/06/2006	alert	United Kingdom	Salmonella Montevideo (presence) in chocolate bars from the United Kingdom	product recall or withdrawal	undecided
7	cocoa and cocoa preparations, coffee and tea	6/3/2013	border rejection	Finland	ochratoxin A (39 µg/kg - ppb) in roasted coffee from Kenya	placed under customs seals	serious
8	dietetic foods, food supplements, fortified foods	23/03/2006	alert	United Kingdom	dioxins (2.7 pg WHO TEQ/g) in food supplement containing cod liver oil from the United Kingdom	product recall or withdrawal	undecided
9	dietetic foods, food supplements, fortified foods	13/09/2017	alert	Germany	unauthorised novel food ingredient jojoba seed in food supplement from the United States, via the United Kingdom	withdrawal from the market	undecided
10	dietetic foods, food supplements, fortified foods	23/01/2018	information for follow-up	Denmark	too high intake of curcumin (380 mg/day) from food supplement containing turmeric from the United Kingdom and Slovakia	recall from consumers	undecided
11	dietetic foods, food supplements, fortified foods	16/05/2018	alert	Netherlands	sulphite (40 mg/kg - ppm) undeclared on organic chlorella and spirulina powder from China, via the United Kingdom	informing recipient(s)	serious
12	dietetic foods, food supplements, fortified foods	28/05/2018	alert	Netherlands	sulphite undeclared in organic chlorella powder and tablets from China, via the United Kingdom	return to consignor	serious
13	dietetic foods, food supplements, fortified foods	29/08/2018	information for follow-up	Austria	unauthorised novel food ingredient Salvia hispanica in food supplement from the United States, via the Netherlands	informing recipient(s)	undecided

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
14	dietetic foods, food supplements, fortified foods	24/12/2018	information for follow-up	United Kingdom	incorrect labelling (label does not emphasise allergens soy, celery and sulphite) on food supplement from the United States		not serious
15	feed additives	19/07/2013	alert	Belgium	prohibited substance chloramphenicol (0.13; 9.07; 1.35; 672.07 µg/kg - ppb) in enzyme preparations for feed and food use from Belgium, with raw material from Denmark, France, India and Japan	informing recipient(s)	undecided
16	feed for food-producing animals - (obsolete)	8/10/2008	information	Belgium	aflatoxins (24 to 296 µg/kg - ppb) in white sunflower seeds from Egypt and Kenya, via the United Kingdom	withdrawal from the market	undecided
17	fish and fish products	17/09/1993	alert	Spain	Salmonella in Perch of the Nile		undecided
18	fish and fish products	24/11/1997	alert	Italy	Salmonella typhimurium in Fish fillets	import not authorised	undecided
19	fish and fish products	16/10/1998	information	Germany	Salmonella in Perch of the Nile fillets – chilled	product recall or withdrawal	undecided
20	fish and fish products	25/03/1999	alert	Germany	pesticide residues in Perch of the Nile	product recall or withdrawal	undecided
21	fish and fish products	1/2/1999	information	Germany	Salmonella in Perch of the Nile fillets – chilled	seizure	undecided
22	fish and fish products	1/2/1999	information	Germany	Salmonella in Perch of the Nile fillets – chilled	seizure	undecided
23	fish and fish products	26/03/2003	information	Italy	Salmonella enterica (presence) in Frozen fillets of Nile perch from Kenya	import not authorised	undecided
24	fish and fish products	6/8/2003	information	Portugal	too high count of mesophiles (3.5x10E8 CFU/g) in Nile perch	no stock left	undecided
25	fish and fish products	21/08/2003	information	Italy	Salmonella (presence /25g) in refrigerated fillets of nile perch	destruction	undecided
26	fish and fish products	28/12/2006	information	Germany	Salmonella enterica (presence /25g) in Nile perch fillets (Lates niloticus) from Kenya	reinforced checking	undecided
27	fish and fish products	19/01/2007	alert	Germany	Salmonella enterica (presence /25g) in Nile perch fillets from Kenya		undecided
28	fish and fish products	22/09/2008	information	Italy	Salmonella (presence /25g) in Nile perch (Lates niloticus) from Kenya	reinforced checking	undecided
29	fish and fish products	20/11/2008	information	Germany	Salmonella enterica in fresh chilled perch of the Nile fillets from Kenya	destination of the product identified	undecided
30	fish and fish products	29/09/2008	border rejection	Italy	Salmonella in chilled Nile perch fillets (Lates niloticus) from Kenya	destruction	undecided
31	fish and fish products	11/6/2010	information	Poland	Salmonella in frozen Nile perch fillets from Kenya	informing authorities	undecided
32	fish and fish products	13/07/2010	information	Italy	Listeria monocytogenes (presence /25g) and Salmonella (presence /25g) in frozen nile perch (Lates niloticus) fillets from Kenya	withdrawal from the market	undecided
33	fish and fish products	9/9/2010	border rejection	Italy	Salmonella Newport in frozen perch fillets from Kenya	re-dispatch or destruction	undecided

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
34	fish and fish products	24/06/2011	information for attention	Germany	Salmonella enterica (presence /25g) in chilled perch of the nile fillets from Kenya	informing recipient(s)	undecided
35	fish and fish products	6/5/2011	border rejection	Germany	altered organoleptic characteristics (chlorine smell) of chilled perch of the nyle (Lates niloticus) from Kenya	destruction	undecided
36	fish and fish products	28/02/2012	information for follow-up	Germany	high count of Pseudomonas spp. (3800000 CFU/g) in and high aerobic plate count (3200000 CFU/g) for nile perch (Lates niloticus) from Kenya		undecided
37	fish and fish products	7/4/2015	alert	Italy	fraud - expiry dates changed of fish products from Italy	withdrawal from the market	serious
38	fish and fish products	16/04/2015	border rejection	Spain	poor temperature control (-1°C to -17.1°C) of frozen headless and gutted Nile perch (Lates niloticus) from Kenya	informing authorities	serious
39	fish and fish products	25/07/2016	alert	Slovenia	mercury (2.2 mg/kg - ppm) in frozen blue shark (Prionace glauca) cutlets from Portugal, with raw material from Kenya, via Spain	withdrawal from the market	serious
40	food additives and flavourings	10/4/2007	alert	Italy	arsenic (4.3 mg/kg - ppm) in bentonite from Argentina	withdrawal from recipient(s)	undecided
41	food additives and flavourings	11/7/2014	information for follow-up	Belgium	arsenic (5.5 mg/kg - ppm) in E 331 - trisodium citrate from China, via the Netherlands	withdrawal from the market	undecided
42	fruits and vegetables	15/06/1998	information	Netherlands	Vibrio cholerae in avocado		undecided
43	fruits and vegetables	10/2/2005	alert	Belgium	chlorothalonil (0,54 mg/kg - ppm) and unauthorised substance dithiocarbamates (0,3 mg/kg - ppm) in passion fruit from Kenya	no action taken	undecided
44	fruits and vegetables	15/03/2005	information	United Kingdom	unauthorised substances endosulfan (1.3 mg/kg - ppm) and monocrotophos (2.1 mg/kg - ppm) in fresh okra from Kenya	no action taken	undecided
45	fruits and vegetables	19/06/2006	alert	Denmark	cadmium (0.065 mg/kg - ppm) in crushed pineapple in its own juice from Kenya via Sweden	product recall or withdrawal	undecided
46	fruits and vegetables	28/08/2006	alert	Norway	cadmium (0.087 mg/kg - ppm) in sliced pineapple in its own juice from Kenya via Sweden	product recall or withdrawal	undecided
47	fruits and vegetables	13/10/2006	alert	Belgium	cadmium (0.062; 0.067; 0.093 mg/kg - ppm) in canned sliced pineapple from Kenya	public warning - press release	undecided
48	fruits and vegetables	21/11/2006	alert	United Kingdom	cadmium (0.1 mg/kg - ppm) in canned pineapple from Kenya	withdrawal from the market	undecided
49	fruits and vegetables	18/09/2006	information	Finland	cadmium (0.10 mg/kg - ppm) in canned pineapple tidbits in own juice from Kenya via Belgium	re-dispatch	undecided
50	fruits and vegetables	23/04/2007	alert	Spain	cadmium (0.07-0.1 mg/kg - ppm) in sliced pineapple in its own juice from Kenya via Spain	withdrawal from the market	undecided

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
51	fruits and vegetables	23/08/2007	alert	Denmark	unauthorised substance ethion (1.4 mg/kg - ppm) in passion fruit from Kenya, via France	recall from consumers	undecided
52	fruits and vegetables	23/05/2008	information	Luxembourg	thiabendazole (0.81 mg/kg - ppm), imazalil (0.25 mg/kg - ppm) and dimethoate (0.12 mg/kg - ppm) in green beans from Kenya, via Belgium	no stock left	undecided
53	fruits and vegetables	3/6/2009	alert	Norway	Shigella sonnei in fresh sugar peas from Kenya, via Denmark	withdrawal from the market	undecided
54	fruits and vegetables	15/03/2010	border rejection	Spain	spoilage of vegetables from Kenya	destruction	undecided
55	fruits and vegetables	11/7/2011	alert	Denmark	foodborne outbreak suspected (E. coli ETEC O27:H7 STp (estAp)) to be caused by sugar peas from Kenya, via the Netherlands	no stock left	undecided
56	fruits and vegetables	23/09/2011	information for attention	United Kingdom	dimethoate (0.4 mg/kg - ppm) in valore beans from Kenya		undecided
57	fruits and vegetables	3/11/2011	information for attention	Denmark	Campylobacter spp. (presence in 4 of 5 samples /25g) in sugar snaps from Kenya	withdrawal from the market	undecided
58	fruits and vegetables	1/12/2011	information for attention	United Kingdom	dimethoate (0.3 mg/kg - ppm) in valore beans from Kenya	no action taken	undecided
59	fruits and vegetables	12/1/2012	information for attention	United Kingdom	dimethoate (0.09 mg/kg - ppm) and unauthorised substance omethoate (0.06 mg/kg - ppm) in gourd from Kenya	no action taken	undecided
60	fruits and vegetables	1/6/2012	information for attention	Denmark	benzalkonium chloride (0.12 mg/kg - ppm) and didecyldimethylammonium chloride (0.08 mg/kg - ppm) in fresh snow peas from Kenya	no action taken	undecided
61	fruits and vegetables	26/06/2012	alert	Germany	Bacillus cereus (280000 CFU/g) in organic radish sprouts from Germany, with raw material from Hungary, via the Netherlands	withdrawal from the market	undecided
62	fruits and vegetables	10/1/2013	border rejection	United Kingdom	unauthorised substances methamidophos (0.03 mg/kg - ppm) and acephate (0.06 mg/kg - ppm) in green beans from Kenya	informing recipient(s)	undecided
63	fruits and vegetables	28/01/2013	border rejection	United Kingdom	methomyl (0.05 mg/kg - ppm) in beans from Kenya	destruction	undecided
64	fruits and vegetables	28/01/2013	border rejection	United Kingdom	dimethoate (0.06 mg/kg - ppm) in chilled mangetout (Pisum sativum) from Kenya	destruction	undecided
65	fruits and vegetables	29/01/2013	border rejection	Belgium	chlorpyrifos (0.58 µg/kg - ppb) in beans from Kenya	destruction	undecided
66	fruits and vegetables	12/2/2013	border rejection	United Kingdom	dimethoate (0.05 mg/kg - ppm) in chilled sugarsnap peas (Pisum sativum) from Kenya	import not authorised	undecided
67	fruits and vegetables	20/02/2013	border rejection	France	chlorpyrifos (0.204 mg/kg - ppm) in fresh green beans from Kenya	destruction	undecided
68	fruits and vegetables	9/4/2013	border rejection	Ireland	dimethoate (0.047 mg/kg - ppm) in fresh mangetout from Kenya	destruction	undecided
69	fruits and vegetables	24/04/2013	border rejection	France	chlorpyrifos (0.85 mg/kg - ppm) in green beans (haricots verts) from Kenya	destruction	undecided

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
70	fruits and vegetables	24/04/2013	border rejection	France	unauthorised substances methamidophos (0.88 mg/kg - ppm) and acephate (2.36 mg/kg - ppm) in green beans from Kenya	destruction	serious
71	fruits and vegetables	24/04/2013	border rejection	France	dimethoate (0.09 mg/kg - ppm) in green bean from Kenya	destruction	undecided
72	fruits and vegetables	25/04/2013	border rejection	France	azaconazole (0.026 mg/kg - ppm) in green peas from Kenya	destruction	not serious
73	fruits and vegetables	6/6/2013	border rejection	France	dimethoate (0.069 mg/kg - ppm) in non shelled peas from Kenya	destruction	undecided
74	fruits and vegetables	14/06/2013	border rejection	Belgium	methoxyfenozide (0.08 mg/kg - ppm) in fresh peas from Kenya	destruction	undecided
75	fruits and vegetables	1/7/2013	border rejection	Germany	dimethoate (0.086 mg/kg - ppm) in snowpeas (mangetout) from Kenya	destruction	undecided
76	fruits and vegetables	3/7/2013	border rejection	Belgium	chlorpyrifos (0.4 mg/kg - ppm) and dimethoate (0.05 mg/kg - ppm) in fresh beans from Kenya	informing authorities	undecided
77	fruits and vegetables	8/8/2013	border rejection	France	methomyl (0.034 mg/kg - ppm) and unauthorised substance omethoate (0.064 mg/kg - ppm) in unshelled beans from Kenya	destruction	undecided
78	fruits and vegetables	21/08/2013	border rejection	France	dimethoate (0.12 mg/kg - ppm) in chilled peas from Kenya	destruction	not serious
79	fruits and vegetables	4/9/2013	border rejection	Belgium	famoxadone (029 mg/kg - ppm) in fresh snow peas (mangetout) from Kenya	informing authorities	undecided
80	fruits and vegetables	4/9/2013	border rejection	United Kingdom	dimethoate (2.0 mg/kg - ppm) in beans from Kenya	official detention	undecided
81	fruits and vegetables	8/10/2013	border rejection	Ireland	dimethoate (0.15 mg/kg - ppm) in unshelled peas from Kenya	destruction	not serious
82	fruits and vegetables	29/10/2013	border rejection	Germany	chlorpyrifos (0.389 mg/kg - ppm) in beans with pods from Kenya	destruction	serious
83	fruits and vegetables	4/11/2013	border rejection	United Kingdom	methomyl (0.10 mg/kg - ppm) and dimethoate (sum: 0.63 mg/kg - ppm) and unauthorised substance omethoate in green beans from Kenya	informing authorities	undecided
84	fruits and vegetables	11/3/2014	alert	Greece	Listeria monocytogenes (1 out of 5 subsamples /25g) in chilled enoki mushrooms from South Korea, via the Netherlands	destruction	serious
85	fruits and vegetables	15/10/2014	information for attention	Finland	bifenthrin (11 mg/kg - ppm) in rucola from Kenya, via the Netherlands	official detention	serious
86	fruits and vegetables	4/3/2014	border rejection	Belgium	famoxadone (0.25 mg/kg - ppm) in peas from Kenya	destruction	not serious
87	fruits and vegetables	7/3/2014	border rejection	France	diphenylamine (0.12 mg/kg - ppm) in unshelled peas from Kenya	destruction	undecided
88	fruits and vegetables	7/3/2014	border rejection	France	chlorpyrifos (0.18 mg/kg - ppm) in green peas from Kenya	destruction	not serious

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
89	fruits and vegetables	16/04/2014	border rejection	Belgium	dimethoate (0.22 mg/kg - ppm) in fresh peas from Kenya	destruction	undecided
90	fruits and vegetables	22/04/2014	border rejection	France	unauthorised substance methamidophos (0.061 mg/kg - ppm) in green beans from Kenya	destruction	undecided
91	fruits and vegetables	2/5/2014	border rejection	United Kingdom	dimethoate (sum: 0.92 mg/kg - ppm) and unauthorised substance omethoate in fresh green beans from Kenya	destruction	serious
92	fruits and vegetables	16/06/2014	border rejection	France	unauthorised substance carbendazim (0.75 mg/kg - ppm) in fresh green beans from Kenya	destruction	undecided
93	fruits and vegetables	16/06/2014	border rejection	France	chlorpyrifos (0.14 mg/kg - ppm) and unauthorised substance hexaconazole (0.033 mg/kg - ppm) in chilled green beans from Kenya	destruction	undecided
94	fruits and vegetables	8/7/2014	border rejection	France	etoxazole (0.13 mg/kg - ppm) in green beans (haricots verts) from Kenya	destruction	undecided
95	fruits and vegetables	8/7/2014	border rejection	France	chlorothalonil (7.32 mg/kg - ppm) in snow peas from Kenya	destruction	undecided
96	fruits and vegetables	31/07/2014	border rejection	Ireland	unauthorised substances methamidophos (0.015 mg/kg - ppm) and acephate (0.027 mg/kg - ppm) in French beans with pods from Kenya	destruction	undecided
97	fruits and vegetables	31/07/2014	border rejection	France	unauthorised substance methamidophos (0.251 mg/kg - ppm) in green beans from Kenya	destruction	undecided
98	fruits and vegetables	31/07/2014	border rejection	France	dimethoate (0.082 mg/kg - ppm) in mangetout peas from Kenya	destruction	not serious
99	fruits and vegetables	18/08/2014	border rejection	United Kingdom	dimethoate (1.1 mg/kg - ppm) in green beans from Kenya	import not authorised	serious
100	fruits and vegetables	19/08/2014	border rejection	France	unauthorised substance carbendazim (0.69 mg/kg - ppm) in green beans from Kenya	destruction	undecided
101	fruits and vegetables	6/10/2014	border rejection	Luxembourg	dimethoate (sum: 0.066 mg/kg - ppm) and unauthorised substance omethoate in fresh peas (Pisum sativum) from Kenya	informing authorities	not serious
102	fruits and vegetables	8/10/2014	border rejection	France	methomyl (0.318 mg/kg - ppm) in fresh green beans from Kenya	destruction	serious
103	fruits and vegetables	21/10/2014	border rejection	Belgium	trifloxystrobin (0.050 mg/kg - ppm) in fresh sugar snap peas (Pisum sativum) from Kenya	destruction	undecided
104	fruits and vegetables	26/12/2014	border rejection	Belgium	chlorantraniliprole (0.072 mg/kg - ppm) in peas from Kenya	destruction	undecided
105	fruits and vegetables	4/6/2015	alert	Iceland	methomyl (0.277 mg/kg - ppm) and dimethoate (0.277 mg/kg - ppm) in green beans from Kenya, via the Netherlands		serious
106	fruits and vegetables	3/11/2015	alert	Germany	unauthorised substance carbofuran (0.018 mg/kg - ppm) in aubergines from Kenya		serious
107	fruits and vegetables	2/1/2015	border rejection	Belgium	metalaxyl (0.29 mg/kg - ppm) in peas from Kenya	destruction	undecided

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
108	fruits and vegetables	12/1/2015	border rejection	Ireland	dimethoate (0.049 mg/kg - ppm) and unauthorised substance profenofos (0.02 mg/kg - ppm) in mangetout peas from Kenya	informing authorities	undecided
109	fruits and vegetables	20/02/2015	border rejection	France	lufenuron (0.089 mg/kg - ppm) in green beans from Kenya	placed under customs seals	undecided
110	fruits and vegetables	20/02/2015	border rejection	France	methomyl (0.2 mg/kg - ppm) in green beans from Kenya	destruction	undecided
111	fruits and vegetables	10/3/2015	border rejection	Netherlands	oxydemeton-methyl (0.14 mg/kg - ppm) in fresh beans from Kenya	placed under customs seals	serious
112	fruits and vegetables	2/4/2015	border rejection	France	unauthorised substance carbendazim (1.2 mg/kg - ppm) in peas from Kenya	destruction	undecided
113	fruits and vegetables	2/4/2015	border rejection	France	unauthorised substance hexaconazole (0.021 mg/kg - ppm) in green beans from Kenya	destruction	undecided
114	fruits and vegetables	18/06/2015	border rejection	France	mandipropamid (0.052 mg/kg - ppm) in fresh pea pods from Kenya	destruction	undecided
115	fruits and vegetables	24/07/2015	border rejection	France	unauthorised substance methamidophos (0.067 mg/kg - ppm) in green beans with pods from Kenya	destruction	undecided
116	fruits and vegetables	27/07/2015	border rejection	France	unauthorised substance methamidophos (0.3 mg/kg - ppm) in green beans from Kenya	destruction	undecided
117	fruits and vegetables	30/07/2015	border rejection	France	unauthorised substance carbendazim (0.45 mg/kg - ppm) in fresh beans with pods from Kenya	destruction	undecided
118	fruits and vegetables	24/08/2015	border rejection	France	dimethoate (0.18 mg/kg - ppm) in pea pods from Kenya	destruction	undecided
119	fruits and vegetables	2/9/2015	border rejection	France	dimethoate (0.09 mg/kg - ppm) in pea pods from Kenya	destruction	not serious
120	fruits and vegetables	13/11/2015	border rejection	Belgium	propamocarb (0.22 mg/kg - ppm) and fluopicolide (0.034 mg/kg - ppm) in peas (Pisum sativum) from Kenya	destruction	not serious
121	fruits and vegetables	26/11/2015	border rejection	France	unauthorised substance carbendazim (1.5 mg/kg - ppm) in peas from Kenya	destruction	not serious
122	fruits and vegetables	22/01/2016	information for follow-up	Denmark	unauthorised substance carbofuran (0.01 mg/kg - ppm) in physalis from Colombia, via the Netherlands	recall from consumers	not serious
123	fruits and vegetables	11/5/2016	border rejection	Netherlands	unauthorised substance carbofuran (0.14 mg/kg - ppm) in fresh snowpeas from Kenya	official detention	serious
124	fruits and vegetables	9/9/2016	border rejection	United Kingdom	unauthorised substance acephate (0.03 mg/kg - ppm) in snow peas from Kenya	destruction	undecided
125	fruits and vegetables	12/3/2018	border rejection	Netherlands	unauthorised substance carbofuran (0.14 mg/kg - ppm) in mangetout peas from Kenya	import not authorised	serious
126	fruits and vegetables	21/09/2018	information for attention	Denmark	unauthorised substance carbofuran (0.015 mg/kg - ppm) in organic avocado from Kenya, via the Netherlands, packaged in Denmark	informing recipient(s)	serious

	Product category	Date	Notification Type	Notified By	Subject	Action Taken	Risk Decision
127	fruits and vegetables	6/5/2019	border rejection	France	unauthorised substance dimefuron (0.042 mg/kg - ppm) in green beans from Kenya	destruction	undecided
128	fruits and vegetables	30/08/2019	border rejection	France	unauthorised substance hexaconazole (0.053 mg/kg - ppm) in green beans from Kenya	destruction	undecided
129	fruits and vegetables	3/1/2020	information for attention	Norway	foodborne outbreak suspected to be caused by Shigella sonnei in fresh sugar snap peas from Kenya, via the Netherlands	withdrawal from the market	serious
130	fruits and vegetables	16/03/2020	border rejection	United Kingdom	unauthorised substance acephate (0.05 mg/kg - ppm) in beans from Kenya	import not authorised	not serious
131	herbs and spices	18/08/2008	information	Germany	methomyl (1.0 mg/kg - ppm) in fresh chillies from Kenya	no stock left	undecided
132	herbs and spices	22/03/2013	border rejection	United Kingdom	dimethoate (0.08 mg/kg - ppm) in sugar snap peas (Pisum sativum) from Kenya	import not authorised	undecided
133	milk and milk products	27/02/2013	alert	Germany	shigatoxin-producing Escherichia coli (presence /25g) in raw milk cheese from France	withdrawal from the market	serious

Table 2: Export Rejections from Kenya by U.S. due to SPS Reasons (2011-2019)

	REFUSAL DATE	MANUFACTURE	PRODUCT	REASONS FOR REJECTION
1	3-Jun-14	Pisu & Company	BEANS, CORN, AND PEA, N.E.C. (VEGETABLE)	It appears to be adulterated because it contains a pesticide chemical
2	24-May-18	Tropical Heat	MIXED SPICE AND SEAONINGS, WITHOUT SALT, N.E.C.	It appears to contain Salmonella, a poisonous and deleterious substance which may render it injurious to health.
3	1-Aug-17	Kenya Nut Company Ltd	MACADAMIA, SHELLED	It appears to contain Salmonella, a poisonous and deleterious substance which may render it injurious to health.
4	1-Aug-17	Kenya Nut Company Ltd	MACADAMIA, SHELLED	It appears to contain Salmonella, a poisonous and deleterious substance which may render it injurious to health.
5	22-Aug-16	Deepa Industries Ltd	MIXED SPICES AND SEASONING WITH SALT, N.E.C.	It appears to contain Salmonella, a poisonous and deleterious substance which may render it injurious to health.
6	21-Nov-14	Kenya Nut Co.	MACADAMIA, SHELLED	Article appears to have been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health.
7	17-Aug-18	UNGA LIMITED	CORN, BOLTED MEAL OR FLOUR	Article appears to have been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health.
8	3-Mar-15	Pisu & Company	SPICES AND SEASONING, GROUND, CRACKED, WITH SALT, N.E.C.	It appears to contain Salmonella, a poisonous and deleterious substance which may render it injurious to health.
9	4-Jun-14	Unilever Kenya Ltd	BEEF BROTH, PLAIN (MEAT AND/OR VEGETABLE STOCK)	Article appears to be, or to bear or contain a color additive which is unsafe

	REFUSAL DATE	MANUFACTURE	PRODUCT	REASONS FOR REJECTION
10	4-Jun-14	Nestle (K) Ltd	BEEF CONSOMME AND BOUILLION, CONCENTRATED, PLAIN	Article appears to be, or to bear or contain a color additive which is unsafe
11	4-Jun-14	Nestle (K) Ltd	CHICKEN CONSOMME AND BOUILLION, PLAIN, CONCENTRATED	Article appears to be, or to bear or contain a color additive which is unsafe
12	13-Jan-14	FFSL Fast Freight Services LTD.	FLOURS AND MEALS N.E.C.	It appears to be adulterated because it contains a pesticide chemical
13	21-Nov-13	galley import&export company ltd	SESAME OIL, REFINED, SINGLE INGREDIENT	It appears to be adulterated because it contains a pesticide chemical
14	12-Sep-12	Et Cetera Limited	BLACK BEAN, DRIED OR PASTE	It appears to be adulterated because it contains a pesticide chemical
15	19-Sep-13	KEAT VENTURES LTD.	MUD FISH, HOT SMOKED, FISH	It appears to have been prepared, packed or held under insanitary conditions whereby it may have been rendered injurious to health
16	2-Mar-11	Wondernuts Kenya Ltd	MACADAMIA, SHELLED	It appears to contain Salmonella, a poisonous and deleterious substance which may render it injurious to health.
17	4-Sep-13	Aleeley & Company LTD	COFFEE, BEANS	Article appears to contain a mycotoxin, a poisonous and deleterious substance which may render it injurious to health.
18	21-Sep-11	Day To Day Center	MUNG BEAN, DRIED OR PASTE	It appears to be adulterated because it contains a pesticide chemical
19	21-Sep-11	Day To Day Center	LENTILS, DRIED OR PASTE	It appears to be adulterated because it contains a pesticide chemical
20	21-Sep-11	Unilever Kenya Ltd	MIXED SPICES AND SEASONING WITH SALT, N.E.C.	It contains a pesticide chemical. Article appears to be, or to bear or contain a color additive which is unsafe
21	21-Sep-11	Kenafric Ind. Ltd	MIXED SPICES AND SEASONING WITH SALT, N.E.C.	Article appears to be, or to bear or contain a color additive which is unsafe
22	21-Sep-11	Kenafric Ind. Ltd	MIXED SPICES AND SEASONING WITH SALT, N.E.C.	It contains a pesticide chemical. Article appears to be, or to bear or contain a color additive which is unsafe
23	21-Sep-11	Day To Day Center	PINTO BEAN, DRIED OR PASTE	It appears to be adulterated because it contains a pesticide chemical
24	21-Sep-11	Triclover Ind	VINEGAR, N.E.C.	Article appears to be, or to bear or contain a color additive which is unsafe
25	21-Sep-11	Njoro Canning Factory Ltd	CUSTARD, REGULAR, VANILLA OR VANILLIN FLAVORED	Article appears to be, or to bear or contain a color additive which is unsafe
26	21-Sep-11	Day To Day Center	PEPPER, HOT, DRIED OR PASTE	It appears to be adulterated because it contains a pesticide chemical
27	21-Sep-11	Day To Day Center	SPICES, FLAVORS AND SALT NOT MENTIONED ELSEWHERE, N.E.C.	It appears to be adulterated because it contains a pesticide chemical
28	21-Sep-11	Day To Day Center	SESAME OIL, REFINED, SINGLE INGREDIENT	It appears to be adulterated because it contains a pesticide chemical
29	21-Sep-11	Galaiya Gfood	FD&C YELLOW #5	Article appears to be, or to bear or contain a color additive which is unsafe

Annex 3: Capacity Building Options (CBOs) Information Cards

Horticulture Products

1.0 CB in systems approach (Including IPM, GAPs, GHPs, GMPs, HACCP, etc). along Horticulture VC

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	US$2,675,000	Investment in digital Technologies (and training on its application) including sensors and data analytics for identifying pests This can be helpful in giving small scale farmers advice and make timely decision US$ 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 (eg 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 • Development of training materials and training of personnel US$ 60,000 • Systems approach-Creating **four** pest free area/areas of low pest prevalence – US$ 230, 000 per area. • Training – Ongoing training by STDF on SPS (5 People) ToT on systems approach by (PPO) and private sector representatives through Center for Phytosanitary Excellence (COPE) – 25 Persons training in 5 sessions, to be extended to producers – US$100, 000	High
On-going cost	US$ 600, 000 per year	Maintenance cost for per area of low pest and Refresher trainings - US$ 150, 000	Medium
Trade Impacts			

Change in absolute value of exports	US$ 1.4 billion	The following products based on the interceptions were found to have export potentials in US$ according to ITC; **Flowers** - Export potential of –-816.1m if FCM and Leafminer (Liriomyza spp) are managed. **Mango** - potential – 38.2m - if fruitfly and weavils are managed. Kenya has been on self-ban since 2014 due to fruit fly **Avocado** - potential – 191.9m - if fruitflies and scales are addressed. **Capsicum** - potential – 1.3m if FCM is addressed. **Beans in pods** – 64.7m if pathogenic microorganisms and pesticide residues are addressed through GAP. **Peas in pods** – 25.5m USD -Management of pathogenic bacteria and pesticide residues.	medium
Export Diversification (product & market)	+1	• temperature requirement for e.g. avocado is a skill that requires CB. Once CB happens, Kenya can export frozen avocado for example to China.	Medium
Domestic Spillovers			
Agricultural productivity	+2	• Reduce losses (rejections) • Increased production per unit area and more land allocation for production	High
Public health	+2	• Improved compliance to food safety requirements which will lead to reduced incidence of foodborne disease resulting to a healthy population	high
Environmental Protection	+2	• Improved environmental practices – (good practices lead to minimizing detrimental environmental impacts of farming operations, reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety as well as animal welfare). • With pest risk analysis, it becomes possible to propose adaptations to cropping systems in advance or to conduct research on the ecological requirements and/or control options related to pest origins	high
Social Impacts			
Impact on poverty	+2	• Improved income through increased productivity	medium
Employment	+2	• Improved company/farm income hence need for more hands	medium

Food Security	+2	• Increased income and improved accessibility (Increased productivity will lead to increase income and accessibility to food)	high

2.0 Capacity building in post-harvest treatment incl. fumigation, hot water treatment, for fruits & flowers

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	US$ 11.505m	• Australia requires fumigation and hot water treatment for flowers and mangoes. • Flowers- fumigation plant at US$ 5,000,000. • Hot water Dipping plant and equipment – US$ 6,000,000 • Cost of research both fumigation and hot water dipping US$ 500,000 • Initial inspection and approval of facilities US$ 5, 000	high
On-going cost	US$ 20, 000 per year	Cost of maintaining equipment and inspections US$ 20, 000	Medium
Trade Impacts			
Change in absolute value of exports	US$ 273.2 million	• The predominant market for Kenya is the EU but Australia offers alternative market if Kenya complies (flowers). Australia offers a Global market share of US$ 2.7 B. Kenya can compete for a bigger share if it complies (e.g. 5%- equivalent to US$ 135 million • Other markets are Japan and China while efforts are ongoing to access promising markets e.g. Russia, Turkey, South Korea and India for flowers (approx. US$100, 000 million) • Kenya is currently under a self-ban on mangoes due to fruit flies and addressing the problem will not only open new markets but also bring more confidence to the traditional markets US$ 38.2 million-(ITC)	medium

Export Diversification	+1	Other markets like Russia, Turkey, South Korea and India would be interested. Mangoes can be used to make juice, pickles, chutney, fresh fruit, jam/jelly, canned and/or dried fruit and much more. More markets and products can thus be created.	High
Domestic Spillovers			
Agricultural productivity	+1	Increased productivity as a result of increased demand after compliance. Leeds to more commercialized production	medium
Public health	0	No impact	high
Environmental Protection	-1	Use of fumigants may cause environmental pollution	Medium
Social Impacts			
Impact on poverty	+1	Increased household income due to increased production	medium
Employment	+1	Job creation when more products are accepted. Source of employment for a considerable seasonal labour force, more suppliers/vendors of chemicals will be established.	medium
Food Security	0	Fruits is not a major food for Kenyan population.	High

3.0 Capacity building laboratory testing, diagnostics (pest & diseases) & accreditation

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	US$ 620, 000	Lab Testing- equipment cost and upgrade and adoption of Modern Technology (Biochemical and Molecular Techniques) - US$500,000 Cost of training-20 people US$50,000 - on the following areas; • Plant pests and diagnostic technology training • Pest diagnostic data management and networking	medium

		• Train the trainer (ToT) program • Biosafety and biosecurity • Sanitary and phytosanitary issues Lab Validation and accreditation – US$ 70,000	
On-going cost	US$ 935, 000 per year	Equipment maintenance and ongoing training costs (pest and diseases); US$-50, 000 and US$ 25, 000 respectively. Consumables US$ 250, 000; Staff overhead expenses US$ 100, 000 **<u>Pesticide residue and other contaminants control</u>** Monitoring of pesticides residues in beans and peas in pods and other contaminants (microorganisms and heavy metals) in fresh produce (data/sample collection and analysis), and trainings of the same. Pesticide residue sampling and analysis - US $306,000; Heavy metals sampling and analysis - US$116,000; Food microbiology sampling and analysis - US$30,000; and Training - US$ 60,000	medium
Trade Impacts			
Change in absolute value of exports	US$ 252.325 million	Diagnostics can help identify pests and diseases at early stage keeping the pest and diseases levels low and therefore increasing productivity. There is a bigger market potential (Being able to utilize at-least 25% of US$ 1009.3= 252.325 of market value of products mainly affected by pests and diseases).	medium
Export Diversification	0	no direct link	high
Domestic Spillovers			
Agricultural productivity	+2	Earlier diagnosis of pests can help mitigate the escalation leading to increased productivity directly for export products and secondary benefit to non-export/domestic crops.	medium
Public health	0	No impact	High
Environmental Protection	+1	Detecting pests and diseases at early stage can minimize use of chemicals to eradicate the problem which could have otherwise had negative impact on the environment.	High
Social Impacts			

Impact on poverty	+2	Earlier diagnosis and subsequent mitigation arrangements can lead to high yields increasing farmer income.	high
Employment	+1	Early pest diagnosis can lead to increased productivity thus creating more employment	medium
Food Security	+2	Early diagnostics can lead to pest mitigation measures leading to reduced food loses.	medium

4.0 Clean planting material (support plant breeding & plant propagation, Virus Cleaning)

Decision Criterion	**Estimated Value**	**Details**	**Level of Confidence**
Cost			
Up-front investment	US$ 2,535,000	**<u>Plant Quarantine section.</u>** US$ 2,050,000 -Construction of new greenhouses and upgrade of the existing for holding plants propagation undergoing virus indexing and clean up and for trials**.** US$**500,000** -Upgrade of Tissue culture laboratory for more space to accommodate plants undergoing virus clean up and indexing as well as support germplasm genebank US$**500,000** -Purchase of additional Thermotherapy chambers for virus clean up US$**100,000** -Reagents and consumables for virus clean, genotyping of germplasm for variety identification and virus indexing US$ **150,000** - Training of staff on advanced methods for virus clean up US$**50,000** - Upgrade of existing diagnostic laboratories US$. **300,000** - Adoption of new pest diagnosis technologies such as Next Generation Sequencing and lab automation these will include acquiring new equipment and consumables for sequencing, bioinformatics, and field-deployable RPA (Recombinase Polymerase Amplification Assays) for rapid on-field diagnostic applications US$**. 250,000**	High

		- Establish a robust reference collection of plant pests to enhance accurate diagnosis US$ **200,000** **Breeders** US$**485, 000** Trials and planting materials – ➢ Conservation of clean planting materials to enhance DUS testing for plant protection purposes (Gene bank/reference collections including botanical descriptions); US$ 300,000 ➢ Genetic purity testing; US$ 50, 000 ➢ Seed systems efficiencies US$ 25,000 ➢ Conversion of existing visual field disease standards to laboratory standards US$ 75, 000 ➢ True potato seed 'TPS Testing (protocol development and testing procedures) US$ 35,000	
On-going cost	US$ 800,000	➢ Reference collection infrastructure maintenance. ➢ Genetic purity equipment maintenance and reagents. ➢ Laboratory maintenance for Quarantine section.	High
Trade Impacts			
Change in absolute value of exports	US$ 133.5 million	There is also a bigger market potential for cut flower cuttings, bulbs & grafted plants) – ITC Research US$1.7 million Seeds, vegetables, nes for sowing (US$25.0 million)	Medium
Export Diversification	+2	Although the main market destination, U.S offers a potential option for propagation materials for cut flowers according to the US End market analysis for cut flower from Kenya) of market share US$ 395 Million approx. 10% of the market share - US$ 39.5 million. 10% of the market share 39.5 million	Medium
Domestic Spillovers			
Agricultural productivity	+2	Materials that are free from pests and diseases thus improving productivity	High
Public health	0	No impact	Medium

Environmental Protection	+1	Use of clean planting materials reduces the levels of chemicals used to manage pests and diseases thus reducing environmental pollution	Medium
Social Impacts			
Impact on poverty	+1	Increased income (economic gain) due to improved productivity	High
Employment	+1	Better livelihood of farmers leading to increased employment	High
Food Security	+1	High yield due to crops with increased resistance to pests & diseases	High

5.0 Establish/Strengthen digital traceability system in the horticulture supply chain

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	US$ 165,000	Cost of acquiring the gadget (US$ 1650) per gadget Setup fee (training and Technical support). Approximately 100 pcs	medium
On-going cost	US$ 70,000	Annual subscription fee for 100 gadgets -US$ 500 per user and refresher trainings - US$ 20,000	
Trade Impacts			
Change in absolute value of exports	US$ 0	Although it is projected that digital traceability can advance producer access to markets and improve transparency to consumers and the supply chain as a whole, no market has given restrictions of shipment of products without digitalized traceability from Kenya. Most regulations insist on Business operators keeping records to guarantee traceability. Furthermore Certification against GFSI approved Schemes is highly valued among the EU Countries and does not insist on Digitalized traceability (ITC-Trade Impact for Food-Traceability in Food and Agricultural products Bulletin No 91/2015).	high

Export Diversification	0	Although transparency is increasing and the world is headed in that direction, the future of traceability is still in evolving; there is no sufficient evidence of market diversification for Kenya.	medium
Domestic Spillovers			
Agricultural productivity	0	No impact	medium
Public health	+1	Digitalized traceability can help in hastening the tracking of any unsafe product already released to the market hence facilitating withdrawal/recall	high
Environmental Protection	0	No impact	medium
Social Impacts			
Impact on poverty	0	No impact	high
Employment	0	No impact	high
Food Security	0	No impact	high

Livestock and Livestock Products

6. Monitoring, surveillance and animal disease control measures

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$5.4 million	Sample collection and testing – $200,000 Training of counties on disease reporting, Vet Practitioners (100 per county for 47 counties), and other stakeholders on GAP and GHP - $200,000 Establishing disease free zones including muscling (livestock finishing yards) equipment - $5 million	Medium
On-going cost	$ 100,000	Reagents, Maintenance, and Running cost e.g. extra labour	
Trade Impacts			
Change in absolute value of exports	$52.2 million	Based on ITC export potential estimates, Kenya holds about $52.2 million untapped export potential of live animals and products (Bovine, sheep, goat, sheep, swine and poultry) to the world	High
Export Diversification	1	New markets can be assessed	Medium
Domestic Spillovers			
Agricultural productivity	1	Net effect will be increased productivity due to consistent GVP	High
Public health	2	Improved food safety, reduced AMR and incidence of zoonoses	High
Environmental Protection	1	Improved environmental management practices	
Social Impacts			
Impact on poverty	1	Improved income through moderate increase in productivity	High
Employment	1	More employment once productivity increased although technological advancement may turn to machinery	High
Food Security	1	Improved food safety and incomes	High

7. Accreditation of DVS food lab

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$710,500	Accreditation process = $ 420,000; Procurement of equipment and reagents for BSE = $ 120,000; Procurement of equipment and reagents for FMD = $ 120,000; Staff training = $ 50,500; Source: Uganda 2020 P-IMA	Medium
On-going cost	$60,000	Equipment maintenance = $ 10,000; Procurement of reagents = $ 50,000; Source: Uganda P-IMA	Medium
Trade Impacts			
Change in absolute value of exports	$0	There would be no direct impact because tests for exports already happens in other labs. The only impact would be the cost of testing	High
Export Diversification	1	International reputation. It is a requirement by certain markets.	Medium
Domestic Spillovers			
Agricultural productivity	0	No impact	Medium
Public health	0	No impact	High
Environmental Protection	0	No impact	High
Social Impacts			
Impact on poverty	0	No impact	High
Employment	0	No impact	High
Food Security	0	No impact	High

8. CB in GAPs & GMPs for Honey

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$200,000	Purchase of molecular lab equipment, establishments of sentile apiary, training of bee keepers on bee disease recognition and prevention	Medium
On-going cost	$50,000	Honey analysis reagents	
Trade Impacts			
Change in absolute value of exports	$890,800	Based on ITC export potential estimates, Kenya holds about $890,800 million untapped export potential of Beewaxes to the world. There is no potential estimates for honey.	Medium
Export Diversification	1	New products and markets can be accessed	Medium
Domestic Spillovers			
Agricultural productivity	2	More efficient production techniques	High
Public health	1	More safe products	High
Environmental Protection	1	Improved environmental friendly production methods	High
Social Impacts			
Impact on poverty	2	Improved income to large number of poor involved in this VC	High
Employment	2	Improvement in income would result in expansion and employment	High
Food Security	1	Improved income to allow for affordability	High

9. Monitoring and Surveillance of residues in feeds

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$100,000	Training of stakeholders on feed hazards prevention and control and SPS requirements and Purchase kits and reagents for lab analysis	High
On-going cost	$50,000	On-going sampling and testing	Medium
Trade Impacts			
Change in absolute value of exports	$2.6 million	Based on ITC export potential estimates, Kenya holds about $2.6 million untapped export potential of preparations used in animal feed	High
Export Diversification	0	No impact	Medium
Domestic Spillovers			
Agricultural productivity	1	Net effect will be increased productivity due to reduction in growth retardation and loss of animals due to diseases	High
Public health	2	Improved food safety, reduced AMR and incidence of zoonoses	High
Environmental Protection	0	No impact	
Social Impacts			
Impact on poverty	1	Moderate impact	Medium
Employment	1	Moderate impact	Medium
Food Security	1	Reduction in losses	Medium

Fish and Fish Products

10. Accreditation of national fish quality control Lab.

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$300,000	Per lab $100,000 for 3 Labs (Source: Proposal Doc)	High
On-going cost	$80,000	reagents & maintenance	High
Trade Impacts			
Change in absolute value of exports	$0	No impact. Tests already takes place. The only change would be the cost of testing	High
Export Diversification	1	Access to new markets	Medium
Domestic Spillovers			
Fish productivity	0	No impact	Medium
Public health	2	Improved food safety	High
Environmental Protection	2	High environmental requirement as part of accreditation process	High
Social Impacts			
Impact on poverty	0	No impact	High
Employment	1	Specialized employment to ensure compliance with standards	Medium
Food Security	1	Improved food safety	High

11. Capacity Building in GAPs & procurement of testing kits

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$1,215,200	1) Training $840,000 2) Testing kits $375,200	High
On-going cost	$252,000	M&E twice in a year	High
Trade Impacts			
Change in absolute value of exports	$25.9 million	Based on ITC export potential estimates, Kenya holds untapped export potential of $25.9 million in fish and fish products export to the world	High
Export Diversification	1	Improved capacity and enhanced quality and safety	High
Domestic Spillovers			
Agriculture/fish productivity	2	Increased efficiency	High
Public health	2	Improved food safety and nutrition security	High
Environmental Protection	2	Improved practices	High
Social Impacts			
Impact on poverty	2	Improved income	High
Employment	1	Increased job opportunities	High
Food Security	2	Increase availability and food safety	High

12. Strengthen Implementation of the national fish residue monitoring plan

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$200,000	Expansion of coverage to 100 farms country-wide	High
On-going cost	$100,000	Expansion of coverage to 100 farms country-wide	High
Trade Impacts			
Change in absolute value of exports	$25.9 million	Based on ITC export potential estimates, Kenya holds untapped export potential of $25.9 million in fish and fish products export to the world	High
Export Diversification	0	No impact	Medium
Domestic Spillovers			
Agricultural/fish productivity	1	Minimize losses	Medium
Public health	2	Improved food safety	High
Environmental Protection	2	Improved biosecurity and environmental measures	Medium
Social Impacts			
Impact on poverty	1	Improved income through minimal losses	Medium
Employment	1	Improved income through minimal losses	Medium
Food Security	2	Improved food safety	High

13. Implementation of HACCP at fish aggregation level

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$300,000	Enhance compliance at aggregation level	High
On-going cost	$150,000	Enhance compliance at aggregation level	High
Trade Impacts			
Change in absolute value of exports	$25.9 million	Based on ITC export potential estimates, Kenya holds untapped export potential of $25.9 million in fish and fish products export to the world	High
Export Diversification	1	Some market requirements is a HACCP cert	High
Domestic Spillovers			
Agricultural productivity	1	Demand pull effect and decreased wastage	Medium
Public health	2	Improved food safety	High
Environmental Protection	2	Improved practices	
Social Impacts			
Impact on poverty	1	Improved income	Medium
Employment	1	More job opportunities	Medium
Food Security	2	Improved food safety	High

14. Establishment/upgrading cold chain system

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$4,830,000	Construction works for 42 Ice plant $1,050,000; Procure Ice plants capacity 250Kgs $1,260,000; Procure Insulated vans $1,680,000; Operational cost$840,000	High
On-going cost	$1,932,000	Sustain the operations of cold chain based on 40% of the upfront cost.	High
Trade Impacts			
Change in absolute value of exports	$25.9 million	Based on ITC export potential estimates, Kenya holds untapped export potential of $25.9 million in fish and fish products export to the world	High
Export Diversification	1	Market & product diversification	High
Domestic Spillovers			
Agricultural productivity	1	Minimize losses	Medium
Public health	2	Improved food safety	High
Environmental Protection	0	No impact	High
Social Impacts			
Impact on poverty	1	Minimize losses and improved income	Medium
Employment	1	Improved output hence more income and more employment opportunity	Medium
Food Security	2	Improved food safety	High

15. Establishment a digital traceability system for aquaculture

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$375,000	CB and Bar Coding kits (2 per sub-county @ $700 for 268 sub-counties) = $375,200	High
On-going cost	$200,000		High
Trade Impacts			
Change in absolute value of exports	$2.6 million	Based on ITC export potential estimates, Kenya holds untapped export potential of $25.9 million in fish and fish products export to the world. However, only probably 10% of fish exports comes from aquaculture, which is roughly $2.6 million	Medium
Export Diversification	1	Improved confidence in the system	Medium
Domestic Spillovers			
Agricultural/fish productivity	1	Minimize losses	High
Public health	2	Improved food safety system	High
Environmental Protection	1	Good fishing practices that enhances the environment	medium
Social Impacts			
Impact on poverty	1	Improved income through improved output	Medium
Employment	1	Job opportunities through improved income	Medium
Food Security	2	Improved food safety	High

Tree Nuts

16. CB in System Approach incl. GAPs, GHPs, & GMPs, and monitoring and surveillance of Pathogens, Allergenes, etc. for tree nuts VC

Decision Criterion	Estimated Value	Details	Level of Confidence
Cost			
Up-front investment	$1,210,500	- Sampling and testing, accreditation of test parameters - TC workshops for development of standards, Training of Trainers, awareness creation forums, workshops for development of risks management plan and affiliated documentation (procedures)	High
On-going cost	$505,000	Reagents and fees for on-going sampling testing	High
Trade Impacts			
Change in absolute value of exports	$72.4 million	Based on ITC export potential estimates, Kenya holds untapped export potential of $72.4 million in nuts export to the world	High
Export Diversification	1	Likely to enter new markets	Low
Domestic Spillovers			
Agricultural productivity	2	Minimize losses	Medium
Public health	1	Improved food safety and nutrition	High
Environmental Protection	2	Improved handling of e.g. pesticide residue	High
Social Impacts			
Impact on poverty	2	About 600,000 small scale farmers involved in tree nuts VC	High
Employment	2	Improved output and therefore opportunity for job creation	Medium
Food Security	1	More income for farmers to access food	Medium

Annex 4: Workshops Participants' List

LIST OF PARTICIPANTS AT THE KENYA HIGH-LEVEL STAKEHOLDER DIALOGUE/PROJECT INCEPTION MEETING FOR THE MAINSTREAMING SPS PRIORITIES INTO NATIONAL POLICY AND INVESTMENT, 24 JUNE 2019, NAIROBI, KENYA

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