

**Scoping Study: National Food Safety Architecture of the
Horticulture Value Chain, Kenya**

Prepared for the Voice for Change Partnership (V4CP) by:
Erastus K. Kang'ethe, Samuel Muriuki, Joseph Karugia, Paul Guthiga and Leonard Kirui

November 2018

ILRI, Nairobi

Table of Contents

List of Tables	ii
Abbreviations and acronyms	iii
Executive summary	iv
Introduction	5
Horticulture sub-sector	5
Food Safety	5
Situation analysis	5
Purpose of engagement	6
Methods	6
Results	6
Food safety Institutions	6
Food Legislation	7
Food Safety Policies	7
Regulations Standards and Codes of hygienic practices	8
Harmonization of Standards	14
Inspection	14
Food Control laboratories	15
Advisory services and consumer awareness	15
Food safety in primary production, manufacturing or processing	16
Food safety	17
Food Loss	18
Observations	19
References	20

List of Tables

Table 1: Public and Private Institutions in the horticultural sub-sector with responsibility on food safety of horticulture products	10
Table 2: Legislations targeting food safety in horticulture value chain*	12
Table 3: Inspection coverage details in the Horticulture Value Chain	15
Table 4: Advisory and extension services delivery	16

Abbreviations and acronyms

AFA	Agriculture Food Authority
CSO	Civil society organization
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross domestic Product
HACCP	Hazard Analysis Critical Control Point
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Service
MRLs	Maximum Residue Limits
NFNSP	National Food Nutrition and Security Policy
NGO	Non-governmental organization
ReSAKSS	Regional Strategic Analysis and Knowledge Support System
WHO	World Health Organization

Executive summary

The horticulture sub-sector contributes about 36% of Kenya's agricultural gross domestic product (GDP) which stands at 24%. It offers employment to over 6 million Kenyans and generates foreign exchange earnings in excess of one billion dollars (USD).

This scoping study highlights the food safety control system architecture in the horticulture value chain. An abridged questionnaire of the World Health Organization (WHO 2012)) guidelines for developing and implementing national food safety policy and strategic plan was sent to a team of experts in the horticulture value chain to provide the necessary information on the food safety landscape.

The sub-sector is regulated by several institutions and laws, served by several public and private laboratories capable of carrying out microbial and chemical analysis. Many of these are concentrated in the major urban centres. Some standards have been harmonized across the East African Community (EAC).

The food safety issues identified by the team of experts were mainly microbial and chemical hazards. There was no awareness on the role of parasitic hazards as important food safety concerns. The food loss experienced in the sub-sector arises mainly from lack of infrastructure to enhance safety and hygiene.

Introduction

Horticulture sub-sector

The horticulture sub-sector is one of the fastest growing sectors of agriculture in Kenya. It contributes about 36% of the agricultural gross domestic product (GDP) which stands at 24%. The sector grows at between 15% and 20% annually (GoK, 2012a) and employs over 6 million Kenyans directly and 3.5 million indirectly (Kangai et al, 2017). Of the total horticultural production, about 95% is destined for the local market; only 5% is exported. In terms of incomes, the export segment earns the country huge amounts of foreign exchange (KES 91.2 billion in 2011, USD 868 Million; GoK, 2012, b). Small-scale farmers account for 50–60% of the total production (PASGR, 2017).

Food Safety

Food safety is a global public health and trade concern. Microbial pathogens and chemical contaminants in food represent serious threats to health. Emerging pathogens are becoming a major food safety threat in areas where traditional hazards have been controlled. At the 53rd World Health Assembly in 2000, the World Health Organization (WHO) called upon Member States to give greater priority to food safety and urged them to initiate multi-sectoral and multi-disciplinary actions to promote the safety of food at all levels.

Kenya's horticulture industry exports depend heavily on European markets. Any disturbances in these markets would significantly disrupt the country's horticultural exports. One aspect which could cause this disturbance is the heightened stringent demand by the European and other export markets for high food safety standards of horticultural products. The horticulture export sector has been successful because it has complied with these standards. The domestic market is less stringently regulated and risks from biological (microbial and parasitic) and chemical (heavy metals and pesticides) contaminants continue to be of concern.

Situation analysis

Situation analysis is a powerful tool that uses several methods to evaluate the internal and external environment of concern, in the search for options for its resolve. Assessing the strengths, weaknesses, opportunities and threats is one way of carrying out situational analysis. In this study,

the focus was on the architecture and landscape of food safety control systems in Kenya's horticulture sub-sector

Purpose of engagement

The terms of reference were to conduct a situation analysis of the prioritized food safety and food loss issues in Kenya. This study is an engagement by the Regional Strategic Analysis and Knowledge Support System [ReSAKSS] of the International Food Policy Research Institute (IFPRI)/CGIAR to support the civil society organization (CSOs) advocacy agenda on food safety and food loss reduction policy with science-based evidence. This report therefore seeks to demonstrate how the horticulture value chain context looks like with regard to the prioritized food safety issues.

Methods

The method adopted was to administer questionnaires to a team of experts from CSOs, academia and public sector institutions attending a workshop on prioritization of food safety issues in the horticulture sub-sector. The questionnaire format was an adaptation of the WHO tool for conducting assessment of the national food safety programme (WHO, 2012). It covered institutional arrangements, food legislations and policies, regulations and standards, harmonization of national and international standards, codes of hygienic practice, food control laboratories, inspection, extension and advisory, food safety at primary production and processing and food loss. The questionnaire was supplemented with a literature review.

Results

Food safety Institutions

Several public and private institutions were identified as having a key responsibility on food safety in the sub-sector (Table 1). The industry is regulated both by statutory bodies and stakeholder associations. Despite the many institutions with varied mandates over horticultural produce, the country has no overarching agency that coordinates matters food safety and food loss.

Food Legislation

Some laws are applicable to food safety control in the horticulture sub-sector, as listed in Table 2. However, the need for a comprehensive food law is yet to be met. The Food and Drugs Substance Act Cap 254 handles aspects of food safety but it concentrates more on drugs and chemicals. The enactment of the Agriculture and Food Authority (AFA) Act no. 13 of 2013, resulted in consolidation of many agencies that dealt with horticultural issues under AFA. These agencies continue to work as autonomous/semi-autonomous entities, subject to such rationalization measures as AFA may deem necessary. The intention had been to enable the institutions to discharge their mandate and help Kenya meet the relevant international obligations, especially with respect to standards, with each recognized as a competent authority (Clause 11, 1 and 3, Act 13 of 2013) in the specific provision. New legal revisions have been made and other legislation consolidated. The AFA Board is expected to offer the required coordination for effective and efficient delivery of services.

Food Safety Policies

A policy is a set of ideas or plans that is used as a basis for making decisions. When applied to the public sector it may include laws, course of action, funding, and regulatory measures put forward by a government on a specified topic or area of concern. In relation to food safety of horticultural products, no overarching policy exists. We will assume that the definition of food security adopted by FAO (2002), which includes safe food as a component of food security, applies to all policy documents that touch on provision of food security.

In 1981, the first National Food Policy was formulated as Sessional Paper No. 4 that aimed at self-sufficiency in major foodstuffs and equitable distribution of nutritious foods to all citizens. Sessional Paper No. 2 (1994) promoted market driven food security. A 15-year timeframe outline of the Kenya Rural Development Strategy (KRDS 2002–2017) emphasized food security as the initial step of poverty alleviation/reduction to rural development.

Several strategies, including the Economic Recovery Strategy [ERS 2003–2007], Strategy to Revitalize Agriculture (GoK, 2004) Kenya Vision 2030 (GoK 2007) and the Agricultural Sector Development Strategy [GoK 2010) all focused on making agriculture a vibrant sector that attracts

private investments and promotes rural economy and development. These strategies do not focus on food security although this is implied in “increase in productivity” phrases.

The National Food, Nutrition and Security Policy (GoK, 2011) outlines the need for national nutrition and food security, information management, and coordination of ministries and agencies to achieve nutritional and food security in the country. NFNSP recognizes that food safety is essential for health status and overarching policies and sufficiently strong institutional frameworks are prerequisites for success. In chapter three of this policy, issues of food safety, standards and quality control are addressed. A National Food Safety Policy was proposed, but never enacted. Its implementation would have reduced morbidity and mortality rates due to foodborne illnesses/diseases, enhanced trade, and promoted good health among the population. The National Horticulture Policy (GoK, 2012), acknowledges the lack of a coordinated competent authority on food safety and proposes several measures to create confidence in the safety of horticultural products, especially for the domestic market. The multi-sectoral National Food Safety Coordinating Committee (NFSCC) responds to food safety alerts and is mandated to increase awareness, education and communication about the impact of food safety and quality, and initiate the revision and harmonization of all the relevant Acts of Parliament under NFNSP. Setting up the food safety authority will enhance coordination of the food safety agencies and their activities.

Regulations Standards and Codes of hygienic practices

Kenya has regulations/standards on food safety but standards on food loss reduction are yet to be developed. The Kenya Bureau of Standards (KEBS) has the mandate to develop national standards. However, private standards exist, for example, the Global Gap which has been domesticated by the industry for self-regulation through KS1758 Code of Practice for Horticultural Industry (Part 2), and the new national standard in fruits and vegetables KS1758 (Part 1). International standards such as the Hazard Analysis Critical Control Point (HACCP) system are adapted and applied by the industry to facilitate international trade, especially in export sector. In formulating standards (national and regional), KEBS consults widely through standard preparation committees composed of consumers, people/organizations representing trade interests; academia and research organizations (local and international); and CSOs. In drafting the standards, KEBS considers the internationally agreed maximum residue limits (MRLs for pesticides), sanitary facilities at the

processing plant, personnel hygiene and possible contaminants. The standards body considers international recommendations such as those of the Food and Agriculture Organization of the United Nations (FAO)/WHO Codex, regulations in other countries of similar level of development and is informed by relevant research. About 10% of the companies/stakeholders in the horticulture sector have self-regulation standards such as for French beans, snow peas and passion fruit.

Table 1: Public and private institutions responsible for food safety of horticulture products

Institution	Nature	Source of authority/mandate*	Responsibility/scope
Kenya Plant Health Inspectorate Service (KEPHIS)	Statutory Regulatory	Established in 1996 Plant Protection Act Cap 324, the Seeds and Plant Variety Act Cap 326 of 1972, the Suppression of Noxious Weeds Act Cap 325 and the Agricultural Produce (Export) Act Cap 319	Offers inspectorate services on all matters related to plant health and quality control of agricultural inputs and produce
Pest Control Products Board (PCPB)	Statutory Regulatory	Pest Control Products Cap 346	Controls the quality of manufacture, import/export, and counterfeit pest control products for use in agriculture
Kenya Agricultural and Livestock Research Organization (KALRO)	Statutory Research organization	Kenya Agricultural and Livestock Research Act 17 of 2013	Promote research in crop and livestock, crop and livestock diseases, formulate and make policy recommendations on agricultural research amongst other functions
Ministry of Agriculture, Livestock and Fisheries		Constitution—Executive arm	Coordinate agriculture, livestock and Fisheries activities and policies
Agriculture and Food Authority [AFA]	Statutory Regulatory	Agriculture and Food Authority Act 13 of 2013	Consolidates functions of the institutions of the repealed Agriculture Act and offers coordination
County governments		Constitutional—County Governments Act 17 of 2012	Responsible for any function as stipulated by Act of Parliament or Constitution

Fresh Produce Exporters Association of Kenya (FPEAK)	Private	Established in 1975	Association representing growers, exporters and service providers in the horticulture industry. Provides technical and marketing information and training, runs an active lobbying and advocacy program to enhance the sector's competitiveness.
Kenya Bureau of Standards (KEBS)	Statutory	Established under the Standards Act Cap 496	Provide for standardization in the industry and testing facilities for local, export and import goods. Develop codes of practice.
Research institutions and universities	National, international	Established under different mandates	Carry out research on all relevant areas of horticulture crop production, marketing etc.; and train essential capacity in the respective areas
Kenya Flower Council (KFC)	Statutory		Is a voluntary organization of flower growers and exporters formed in 1996 to foster safe and responsible growing of cut flowers with regard to protection of the environment, governance, good agricultural practice, human resource management and workers welfare, health & safety and post-harvest handling
National Public Health Laboratories, Ministry of Health,	Statutory	NPHL—Food safety and nutrition reference laboratory	Conducts tests on food, water and any other relevant specimens with an overall goal of preventing and controlling non-communicable diseases that arise from the consumption of food and water which are contaminated with toxic compounds or of unsatisfactory nutritional value

*Source: Kenya Law Review <http://kenyalaw.org/kl/index.php/>

Table 2: Legislations targeting food safety in horticulture sector*

Legislation/title	Scope	Date enacted/latest revision	Agency responsible for implementation
Food, Drugs and Chemical Substance Act Cap 254	Covers the sale of unwholesome, poisonous, adulterated and poor quality food, preparation of food in unsanitary conditions, adulteration of chemical substances, mislabelling and packaging	Enacted 1965 and latest revision Act 2 of 2002	Ministry of Health/Public Health
Agriculture Food Authority Act No. 13 of 2013	Provides for the consolidation of the laws on the regulation and promotion of agriculture generally	Enacted Act 13 of 2003, revised Act No. 35 of 2016	AFA—the responsible Directorate
Crops Act 16 of 2013	Improves the development of agricultural crops as export crops, promote investment in agri-business and remove unnecessary regulatory bureaucracy	Enacted in 2013 and latest revision Act No. 7 of 2016	AFA
Crop and Production and Livestock Act Cap 321	Make provision for the control and improvement of crop production and livestock, and the marketing and processing thereof	Enacted 1926, revised Act No. 8 of 1968.	Minister responsible for Agriculture and/or Livestock
Plant Protection Act, Cap 324	It is intended to make better provision for the prevention of the introduction and spread of disease destructive to plants	Act no 24 of 1937, Revised Act no 14 of 1971.	Minister for Agriculture
Pest Control Products Act Cap 346	Provides for regulation, the importation, exportation, manufacture, distribution and use of products used for the control of pests and of the organic function of plants and animals and for connected purposes	Cap 346 of 1982, revised Act No. 6 of 2009	Pest Control Products Board

Seeds and plant Varieties Act Cap 326	Regulate transactions in seeds, including provision for the testing and certification of seeds; for the establishment of an index of names of plant varieties; to empower the imposition of restriction on the introduction of new varieties; to control the importation of seeds; to authorize measures to prevent injurious cross-pollination; to provide for the grant of proprietary rights to persons breeding or discovering and developing new varieties; to establish a National Centre for plant genetic resources; to establish a Tribunal to hear appeals and other proceedings; and for connected purposes	Enacted 1972, revised Act no 53 of 2012	Minister for Agriculture
Fertilizer and Animal Feedstuffs Act 345	Regulates the importation, manufacture and sale of agricultural fertilizers and animal foodstuffs and substances of animal origin intended for the manufacture of such fertilizers and foodstuffs, and to provide for matters incidental to and connected with the foregoing	Enacted 1962, revised Act 20 of 2015	Fertilizer and Animal Foodstuffs Board
Food Security Bill 2014	Acknowledges the right of every individual to adequate and quality food as a human right. Envisages the establishment of food security authority, National and food security committee at the county governments with mandates to ensure right to food and end hunger in all its forms.		
Standards Act Cap 496	Main role is to promote standardization in the industry and commerce; and provide facilities for testing.	1974 latest amendment is Act 12 of 2012	Ministry of Trade

*Source: Kenya Law Review at <http://kenyalaw.org/kl/index.php/>

Harmonization of Standards

Kenya is a member of Codex and has established a Codex Committee with the secretariat at the KEBS. The activities of the Codex Office are funded by government budgetary allocations; inadequacy of funds is common. Kenya is also a member of the Common Market for Eastern and Southern Africa (COMESA) and EAC regional economic forums. Several standards have been harmonized at the EAC level including (pineapples, avocados, fruit juices, onions, mangoes and carrots). The regulations only cover those for consumption and not industrial use. Food safety considerations have been embedded in the standards that specifically mention the MRLs for pesticides as recommended by the Codex committee of residues for the commodity and hygienic standards as specified by the relevant Codex Alimentarius Commission/Recommended Code of Practice (CAC/RCP). Methods for analysis have been included for pesticides and metals based on the relevant ISO for the commodity. A list of harmonized fruits and vegetable standards by the EAC can be found at http://www.eac-quality.net/fileadmin/eac_quality/user_documents/3_pdf/EAS_CATALOGUE_2009.pdf.

Inspection

There are many institutions involved in the inspection of food safety in the sector. KEBS, the Ministry of Health, the Kenya Plant Health Inspectorate Service (KEPHIS) and AFA which are statutory bodies are mandated by the relevant Acts to inspect for food safety purposes while the Fresh Produce Exporters Association of Kenya (FPEAK), a farmer association, provides coordination, technical and marketing information, training for the horticulture export industry, and inspects the companies for the Kenya GAP certification to enable them to export the produce having followed the Kenya version of the Global Gap specifications. Horticulture is a food safety sensitive sector and inspection is carried out regularly. Inspection targets primary production, premises construction and sanitary aspects, hygienic handling, personnel hygiene, packaging and transportation.

Table 3: Inspection coverage details in the horticulture value chain

Category	What is checked?
Primary Production	Good agricultural practices
Premises	Construction, equipment, environmental hygiene (water, waste disposal, vermin control)
Personnel	Personal hygiene, health certificate
Process	Adherence to HACCP or other standards
Packaging	Quality of material, labelling
Transportation	Vehicle hygiene, cold chain maintenance

Food Control laboratories

Food control laboratories are an essential component of a national food control system. The number, location, equipment and the competences of the personnel are all important in the role the laboratories play of providing evidence to better the food control system.

Several laboratories that serve the sub-sector are those of the institutions which are stakeholders as regulators of the sector. These include KEBS, KEPHIS, Government Chemist, the Kenya Agricultural and Livestock Research Organization (KALRO), the Pest Control Product Board (PCPB), National Public Health laboratories and AFA. Other laboratories are private—SGS and Agriquest—and quasi government (universities and Nairobi Water and Sewerage among others). A quick examination of the location of these laboratories reveals that they are in major urban centres and only a few are in the rural areas, making their services inaccessible by smallholder farmers who produce 54% of the horticultural volume.

The laboratories have the capacity to carry out both microbiological and chemical analyses. On average, the experts estimated the turnaround of results to be about 2 weeks depending on the test. This is indicative of inadequate personnel capacity that exists to carry out the tests.

Advisory services and consumer awareness

The main service providers of information regarding food safety are government departments, industry, non-governmental organizations (NGOs) and individual consultants. The main

difference between these service providers is the type of message they deliver to farmers, transporters, processors, retailers and consumers. While government messages to all the recipients are basically on safety and compliance, industry basically sends messages on product promotion, nutrition and rarely on safety, though these are printed in the labelling. NGOs, which are mainly consumer organizations or development agencies, have a more targeted message on food safety and loss and measures to control. Table 4 shows the expert opinion on how the service providers target their message delivery.

Table 4: Advisory and extension services delivery

Recipient	Service providers			
	Government departments (national/county)	Industry	NGOs	Consultants
Farmers	✓		✓	✓
Transporters	✓			✓
Processors	✓	✓	✓	✓
Retailers	✓	✓	✓	✓
Consumers	✓	✓	✓	✓

The country may not have registered a forum specifically for flagging food safety loss issues, but the Office of the Ombudsman could serve as point of reference. The Department of Food Safety in the Directorate of Public Health in the Ministry of Health may provide such a service, but it is not mandated by law. The key consumer concerns in regard to food safety were listed as foodborne illnesses due to bacterial pathogens and to a lesser extent pesticide residues arising from inappropriate use of chemicals. Weak systems for enforcement of standards and lack of awareness of food safety issues by consumers were other concerns flagged.

Food safety in primary production, manufacturing or processing

As mentioned earlier, this was an expert elicitation, and therefore may not represent the views of the farmers. This, notwithstanding, the experts have a good idea of the issues they encounter on daily basis from the sector. Microbial contamination, pesticide residue, nitrate accumulation, heavy metals and pollution of water bodies were the main issues at primary production.

The food safety issues at manufacturing would definitely be those associated with microbial contamination and pesticide residues in raw materials. The firms are using good manufacturing practice and good hygienic practice guidelines while some are implementing HACCP.

Manufacturing firms have little or limited association with regulatory agencies on food safety and loss issues. The association that exists occurs during inspection and collection of levies and taxes. The main concern of food manufacturing firms regarding a national food control system is the lack of enforcement of legislation and low level of compliance among the firms. Those that are effectively implementing HACCP and other voluntary standards are concerned about the high cost of compliance without any incentives from government to encourage compliance.

The manufacturing firms have limited contact with primary production except in cases where they contract farmers whom they train and monitor for compliance because they mostly procure from middle level bulk suppliers. The big exporting firms also serve as manufacturers and have large farms where they supervise their own compliance. They must do this as trade rejections due to microbial issues or exceeding MRLs would be damaging to their business.

Food safety

The major causes of food safety concerns identified and prioritized by the expert team (not in order of importance) were microbial (*Escherichia coli*, *Salmonella typhi* and non-typhoidal, *Listeria monocytogenes*, *Staphylococcus aureus*, *Yersinia enterocolitica*, *Shigella* spp, *Vibrio parahaemolyticus* and *V. cholera*), parasites (*Cryptosporidium* spp and *Enteroamoeba histolytica*), viruses, (Hepatitis A) and chemicals (pesticide residues and heavy metals). The microbial hazards identified are in consonance with the listing of the foodborne hazards produced by the FERG (2015) report on foodborne burden of disease that showed that 349 million cases of illness resulting in 187,000 deaths and 14.5 million disability adjusted life years (DALYs). Only two experts named parasites (*Cryptosporidium* spp and *Enteroamoeba histolytica*) as important food safety concerns. The FAO/WHO (2014) report on prioritization of food parasites ranked the two parasites fifth and sixth respectively. Torgersson et al. (2015) showed that parasitic diseases caused 48.4 million cases, 59,724 deaths and 8.78 million DALYs. A total of 48% of the cases were food borne. The safety issues were perceived to cause a low magnitude of food loss [0–10%] each. Only pesticide residues were thought to be responsible for 30% food loss.

Food Loss

Food loss is the proportion of food lost in quantity and or quality (reflected in nutritional value), economic value or food safety between harvesting and retail that is not eaten. On average, the loss in the horticulture sub-sector was estimated at between 20% and 30%. This is in line with the FAO estimate that about 33% of all the food is lost which amounts to about 1.3 billion tonnes per year (FAO, 2011).

The main causes of food loss were enumerated as spillage, microbial contamination, poor handling practices, poor infrastructure, over production, grading, failure to comply with MRLs, lack of cold chain, pest and diseases and temperature which causes browning leading to food loss. The main impact of food loss is loss of income to the producer. This exacerbates the number of people who go hungry. FAO estimates that 842 million people go hungry (FAO, 2013); the amount of food lost annually could easily feed this population.

Good/hygienic agricultural (production and storage) practices, improving infrastructure, creating awareness of the causes of food loss by the actors in the value chain are good measures which could help reduce the amount of horticultural crops lost. If the country had a policy addressing food loss reduction, it would help direct resources in the sector to curb the food loss. Equally such a policy could come up with incentives both at national and county government level which would spur actors to engage in practices that could result in reduction of food loss.

Observations

The horticulture sector is a key foreign exchange earner for the country. Just as in any other sector, there are challenges and opportunities for improvement in service delivery and capacity building of the various actors. Emanating from this study, the following are observations when addressed would go a long way in reducing the food safety concerns of the sector.

- i) The horticulture value chain is important as a foreign exchange earner for Kenya. The export market sector that accounts for 5% of the produce is well regulated but such regulation and compliance is not evident in the domestic market which makes 95% of the volume of the produce.
- ii) Many government agencies (regulators) have legal mandates in the sector without an overarching agency to coordinate the food safety issues.
- iii) The sector is served by several food control laboratories (public and private), located in large urban centres. This makes their services difficult to access by smallholder farmers who produce the bulk of the produce serving the domestic market. This may constitute a probable foodborne illness risk.
- iv) Microbial contamination due to poor hygienic handling (poor adoption of good agricultural practices) are the food safety concerns of the domestic market while pesticide residues in excess of MRL is a major concern for the export market.
- v) Awareness of parasitic hazards which are recognized as foodborne pathogens transmitted through fruits and vegetables in the international and domestic trade seems to be lacking, yet they are food safety concerns of equal importance to microbial hazards and pesticide residues.
- vi) The relationship between growers and processors is weak. This link needs strengthening so farmers can receive feedback on quality demands of the markets which will help them improve quality and reduce the incidence of market and trade rejections.
- vii) Additional investments by government in partnership with the private sector is needed to sustain the fast growth witnessed in recent past and address factors responsible for food loss and the attendant loss of livelihoods for many smallholder farmers.

References

FAO [2002]. Trade and Food Security: Conceptualizing the Linkages Expert Consultation, Rome

FAO. [2011]. Global food losses and food waste – Extent, causes and prevention. Rome

FAO, [2013] . Food wastage footprint. Impacts on natural resources. Summary Report. Rome.

GoK (2003) Economic Recovery Strategy for Wealth and Employment Creation, Ministry of Planning and Development, Kenya

<http://siteresources.worldbank.org/KENYAEXTN/Resources/ERS.pdf>

GoK (2004). Strategy for revitalizing agriculture. Kenya Ministries of Agriculture, Livestock and fisheries development. <http://www.worldcat.org/title/strategy-for-revitalizing-agriculture-2004-2014/oclc/123362592>

GoK,(2007). Kenya Vision 2030.

GoK (2010). Agricultural Sector Development Strategy,

http://www.kecosce.org/downloads/AGRICULTURE_SECTOR_DEVELOPMENT_STRATEGY_2009_2025.pdf NFNSP (2011).

GoK (2011). National Food Nutrition Security Policy, ASCU,.

<https://extranet.who.int/nutrition/gina/sites/default/files/KEN%202011%20National%20Food%20and%20Nutrition%20Security%20Policy%5B1%5D.pdf>

GoK. (2012). National Horticulture Policy. ASCU, www.ascu.go.ke

GoK (2012). National Horticulture policy. Agriculture Sector Coordination Unit.].

<http://extwprlegs1.fao.org/docs/pdf/ken147935.pdf>

Kangai,E, Gwademba,G and Atela, M (2017). Creating employment in horticulture sector in Kenya: productivity, contracting and marketing policies. Policy brief No. 2 (www.pasgr.org/www.Cabe-africa.org.)

Kenya Law Review at <http://kenyalaw.org/kl/index.php/>

Kenya Vision (2030) <https://vision2030.go.ke/about-vision-2030/>

Torgerson, P.R., Devleesschauwer, B., Praet, N., Speybroeck, N., Willingham AL, Kasuga F, et al.(2015) .World Health Organization Estimates of the Global and Regional Disease Burden of 11 Foodborne Parasitic Diseases, 2010: A Data Synthesis. PLoS Med 12(12): e1001920. doi:10.1371/journal.pmed.1001920.

WHO (World Health Organization). 2000. World Health 53rd Assembly. WHO, Geneva, Switzerland.

WHO (World Health Organization). 2012. Guidelines for Developing and Implementing a National Food Safety Policy and Strategic Plan. Regional Office for Africa, Brazzaville