SITUATION ANALYSIS OF FOOD SAFETY CONTROL SYSTEM IN UGANDA

REPORT

By

Country team

Prof. Clovice Kankya, Dr. Titus Mukungu, Dr. Jolly Justine Hoona, Mr. Authur Mukanga
Ms. Sylivia Nantongo and Dr. Josephine Nanyanzi

The country team was supported by the following Research Assistants:

Okello Justine, Moses Kalungi, Nakaye Jacinta, Immaculate Kembabazi, Mawenu Daphine, and Ayebale Rose.

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Authors: Clovice Kankya[1], Titus Mukungu[2], Jolly Justine Hoona[2], Arthur Mukanga[3], Sylvia Nantongo[2], Josephine Nanyanzi[4], George Nasinyama[5], Rose Ayebale[1] and Justine Okello[1]

Author affiliations: [1]Makerere University, [2]Ministry of Agriculture, Animal Industry and Fisheries, Uganda, [3]Uganda National Bureau of Standards, [4]National Drug Authority, [5]Consultant

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Abbreviations and acronyms

FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administration
ILRI	International Livestock Research Institute
ISO	International Standards Organization
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MoH	Ministry of Health
MSMEs	micro, small and medium enterprises
MTTI	Ministry of Tourism, Trade and Industry
UIRI	Uganda Industrial Research Institute
UNBS	Uganda National Bureau of Standards
USD	United States dollars

Executive summary

Food safety is imperative for the health and wellbeing of communities. Unsafe food can impact trade and compromises the achievement of the Sustainable Development Goals. The global burden of foodborne diseases is comparable to that of major illnesses, malaria, and tuberculosis (Havelaar et al. 2015). The burden is highest in Asia and sub-Saharan Africa. Foodborne diseases in low- and middle-income countries cost about 110 billion United States dollars (USD) a year, with sub-Saharan Africa accounting for USD 16.7 billion (Jaffee et al. 2019). Food can be contaminated anywhere along the value chain from production to consumption. Improving food safety is a process that requires the participation of all relevant stakeholders. Several initiatives have been undertaken to support food safety, including harmonization of regional standards and continuous development of guidelines by international bodies. Food safety is a public good, and governments are responsible for ensuring that available foods are safe for human consumption. They can do so by enacting appropriate food laws and putting in place measures to support their implementation (including inspections, laboratory testing, and training). A strong food safety system is an important contributor to public health, but informal food businesses are a challenge to its implementation, especially in developing countries.

Against this background, a study was undertaken to review food safety systems in East Africa and identify gaps to address to ensure the safety of foods consumed in the region. The study had other components, including food safety investments, evidence on foodborne disease occurrence and stakeholder understanding of food safety, but these will be presented separately. In this report, we present findings from the food safety system review work in Uganda, including a description of challenges posed by foodborne diseases, food value chains in the country, and the regulatory framework of food safety laws, regulations, and policies.

Although the country has made progress towards ensuring a safer food safety environment and reducing the burden of foodborne disease, a lot remains to be done. Much of the burden is from inadequate handling of food during production, processing, storage, transportation and retailing. A strong food control system is required to ensure current gaps are addressed; however, its successful implementation is dependent on collaboration from all value chain actors, both formal and informal.

1. Introduction

1.1. Background

The availability and accessibility of safe food in Uganda and Africa at large is still a problem (Government of Uganda 2003). Food safety cannot be guaranteed if food is not properly handled. Foodborne diseases can be defined as any illness caused by ingesting contaminated foods and can manifest through acute gastrointestinal infections (WHO 2018).

Foodborne illness is a major public health problem globally to varying degrees in developed and undeveloped countries. Recent estimates indicate that foodborne diseases account for 33 million years of healthy lives lost (disability-adjusted life years), with 600 million cases and 420,000 deaths. Approximately 30% of deaths from foodborne diseases occur among children under five years of age (Tirado et al. 2010; WHO 2015).

The majority of known foodborne diseases are due to exposure to pathogenic organisms including bacteria, viruses, parasites, protozoa, and fungi, which are transmitted through food (Humphrey 2017; Thielecke and Nugent 2018). Diarrhoea, a frequent manifestation of foodborne diseases, is prevalent in Uganda (Omona et al. 2020). However, food can also be contaminated with physical hazards, such as glass particles or chemical agents, but there is little information regarding their level of contamination and effects on consumers (FDA 2016). In Uganda, chemical agents of public health concern have been detected in food and food products in the market are heavy metals such as arsenic, cadmium, and mercury; pesticides; insecticides; and residues of disinfectants and veterinary drugs (Gullino et al. 2008; UNBS 2019). These chemicals are known carcinogens and can cause severe organ damage (Bamuwamye et al. 2017). However, there is insufficient data to enable quantification of the health burden associated with these hazards in Uganda.

In terms of food value chains of importance to Uganda, over 60% of the known foodborne diseases in the country result from consumption of fresh and perishable foods including fish, milk, fruits, meat, and vegetables which are sold through formal and informal market channels (Roesel 2014).

The purpose of this study was to provide a current understanding of the national food control system in Uganda. The study also sought to generate evidence to inform food safety decisions in the region and particularly the food safety situation in the Ugandan context. The study was approved by the Institutional Research Ethics Committee of the International Livestock Research Institute (ILRI) (approval number ILRI-IREC2019-24/1).

1.2. Approach and data collection

Relevant data were collected through a desk review of literature. The country team compiled a draft report that was first shared with the country (internal) reviewer who gave comments, suggestions, and inputs that were incorporated to produce the final report that was shared with ILRI.

2.Food safety stakeholders

2.1. Food control management

In Uganda, there is no single agency, institution, or authority responsible for food safety issues. The mandate for food safety falls under several ministries: Ministry of Local Government, Ministry of Health (MoH), Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Tourism, and Trade and Industry (MTTI). Other stakeholders

include the private sector, farmer associations, consumer associations, and the Parliament of Uganda.

MOH, through the Department of Public Health, also ensures the safety of foods by conducting routine surveillance. In MAAIF, there are three departments that deal specifically with the safety of food: the fisheries department, which oversees the safety of fish and fish products in the country (primarily exports); the livestock health and entomology department, which deals with the health of animals; and the crop protection department, which deals with the safety of the crop (plant) source and the hygiene levels in abattoirs and other slaughter premises.

The Uganda National Bureau of Standards (UNBS) falls under MTTI and is responsible for developing and enforcing standards for all food commodities (both domestic and imported) except for those handled by authorized institutions, such as dairy products by the Dairy Development Authority, coffee by the Uganda Coffee Development Authority, and fish and meat by the fisheries department and the livestock health and entomology department, respectively, in MAAIF.

The Ministry of Local Government, Parliament of Uganda, private sector associations such as the Uganda Manufacturers' Association, farmers' associations (beef, poultry, dairy, and fish farmers), produce associations, and the Uganda Consumer Education Trust are some of the institutions and groups that collectively work towards ensuring food safety in the country.

Although there is no organization in Uganda to singlehandedly address issues associated with food safety, the different institutions and organizations concerned with food safety work collectively to ensure food safety outcomes are achieved (Figure 1).

Figure 1: Stakeholders (ministries) directly involved in food safety control in Uganda.

2.1.1. Food safety regulations framework

In Uganda, the main law that governs food safety is the Food and Drug Act 1964, which has not been amended to account for new technology, food safety issues, and challenges. In the absence of a substantive and updated food law, Uganda relies heavily on other laws such as the Uganda National Bureau of Standards Act 1983, under which UNBS has the mandate to formulate and enforce national standard specifications for commodities and codes of practice; promote standardization in commerce, industry, health, safety, and social welfare; and provide testing and calibration services to facilitate both regulatory and promotional roles. UNBS regulations on inspection and certification of imports (in combination with food standards) are used to ensure the quality and safety of foods manufactured locally as well as those imported into the country.

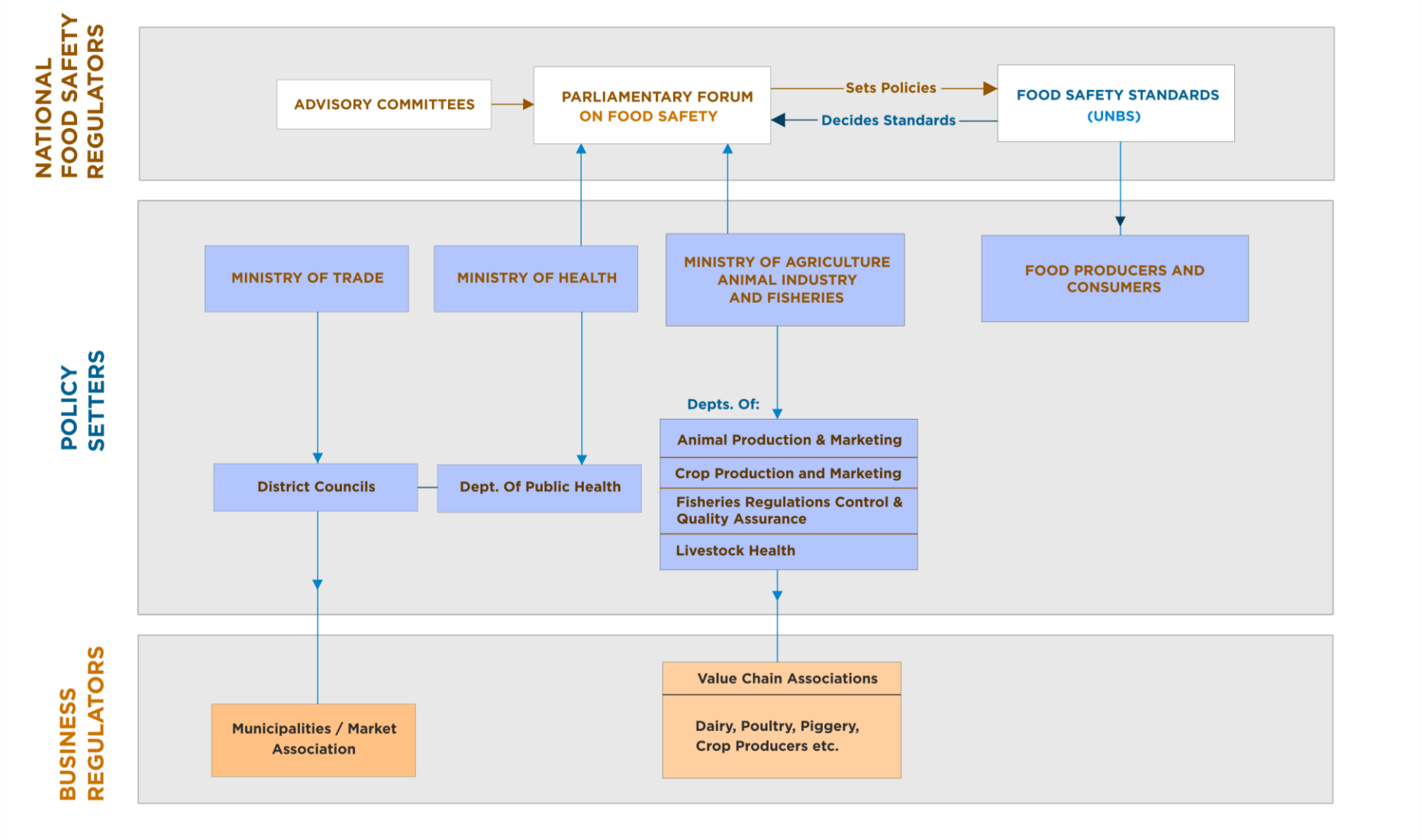
Uganda currently has a fragmented food safety system (Onen 2019). This fragmentation is reflected in disaggregated food safety regulations and laws. Food safety regulations fall within different institutions and departments that carry out mandates independently with minimal or no linkages and with some evidence of overlap (Table 1). Currently, the National Drug Authority has a food desk that coordinates food safety in the country, but it is weak. The efforts of the National Drug Authority food desks are inefficient and disaggregated such that Uganda cannot claim to have a functional food safety control system that adequately protects consumers' health from food-related hazards.

Table 1: The current food safety regulatory framework in Uganda

Laws or regulations	Ministry	Implementing agency	Food safety work addressed by the document
Public Health Act (Meat) Rules 1935	MoH MAAIF	• MoH, Department of Public Health • MoH, Department of Environment and Sanitation • MAAIF Directorate of Animal Resources • UNBS • Kampala Capital City Authority (which has a high level of meat slaughtering) • Food and Agriculture Organization of the United Nations (FAO) • Uganda police force	Examination of animals and carcasses Marking of meat Conveyance of meat Applications for butcheries licences Requirements for butcheries to give information on infectious diseases Prohibition of persons suffering from infectious diseases from employment in slaughterhouses or butcheries These rules apply to cities, municipalities, and all towns in the country.
Dairy Industry Act 2000	MAAIF	• Dairy Development Authority • UNBS	Regulating the market and processing of dairy products. The objective is to provide proper coordination and efficient

			implementation of all government policies which are designed to achieve and maintain self-sufficiency in the production of milk in Uganda by promoting production and competition in the dairy industry and monitoring the market for milk and dairy products.
National Agricultural Policies 2000	MAAIF	• UNBS • FAO	Ensures a broad range of safety in both plant and animal-source foods.
National Standards and Quality Policy Implementation Plan	Ministry of Trade, Industry and Cooperation	• UNBS	Facilitate/support the private sector dealing in food production to conform to national standards and adopt relevant management systems in their operations to competitively produce and trade in quality goods and services to ensure food safety.
Food and Nutrition Security Policy 2003	MoH	• MoH, Department of Public Health • UNBS	Eradicate malnutrition and poverty. Review, formulate, and enforce food standards and codes of practice to ensure that food meant for human and animal consumption is safe and nutritious. Strengthen UNBS to carry out its role of coordinating and formulating food standards and codes of practices. Set up a national certification system to guarantee the quality of food. Create public awareness of food standards and food quality through information dissemination. Establish an effective quality control system throughout the food chain. Continuously monitor and document food safety, food quality, and related activities. Promote regional and international cooperation in areas of food safety and food quality. Strengthen national capacity to set standards, monitor, regulate, and control food supplements.

Figure 2: An illustrative schematic diagram of the Ugandan food safety regulatory framework.



Source: Uganda food safety study team

Figure 2 shows a schematic illustration of the food safety regulatory framework in Uganda. Husbandry and fisheries together with the committee on tourism, trade, and industry serve as a forum on food safety in the Parliament of Uganda. This forum sets policies for food safety that are acted upon by the relevant government agency, which also decides on the standards of particular food items or products; these are further discussed in the forum before other polices are developed.

The parliamentary committee that is responsible for setting policies on food safety is advised by technocrats from sub-committees of MoH and MAAIF that initiate policies regarding food safety.

The MoH Departments of Public Health and of Environmental Health together with MTTI then direct the local government district councils, which in turn guide the municipalities and market associations to ensure that food safety is guaranteed. The Departments of Animal Production and Marketing, Crop Production and Marketing, Fisheries Regulations Control and Quality Assurance, and Livestock Health in MAAIF work closely with value chains and associations of dairy, poultry, piggery, crop producers, and others to ensure that food safety policies and standards are implemented. The food producer and consumer associations that contribute to policy development also directly ensure food safety.

2.2. Regulation and control: inspection

The Government of Uganda has invested in laboratory-based food system surveillance through the establishment of national food quality testing and research laboratories. The private sector supplements the government's efforts by also setting up laboratories to carry out food safety and quality analyses. The different laboratories (agencies) that are involved in food safety inspection and surveillance in Uganda are discussed below.

2.2.1 Uganda National Bureau of Standards

UNBS, a parastatal body under MTTI, was established by an Act of Parliament in 1989 and started operations in the same year. The role of UNBS is to formulate and promote the use of standards. It performs the following functions:

- Development of standards
- Assistance to industrialists, manufacturers, and producers to improve the quality of their products and services
- Enforcement of standards in protection of public health and safety
- Market surveillance to rid the market of dangerous, counterfeit, and substandard products
- Provision of information services on all matters related to standards
- Verification of the accuracy of weighing and measuring instruments
- Quality assurance
- Testing
- Metrology

Recently, UNBS established a new food safety laboratory to prioritize food safety and consumer health and facilitate rapid testing of food for both the local market and export. This well-equipped laboratory conducts food analysis for possible contaminants (microbial, chemical, and physical) including quality and nutritive value of food.

The UNBS microbial food safety laboratory is accredited to international standards (ISO 17025) by the South African National Accreditation System and routinely undertakes analysis for microorganisms, chemicals, and chemical residues of public health significance. The scope of accredited tests is on the rise. The laboratory tests a range of both fresh and processed foods, including fruit juices, milk, fish and fishery products, water, meat products, cereals, canned foods, and dried foods.

2.2.2 Uganda Industrial Research Institute

The Uganda Industrial Research Institute (UIRI) food laboratory has professionally trained food scientists and nutritionists and highly efficient laboratory facilities, which collectively ensure the quality assurance of in-house and community processed products.

UIRI's laboratories include microbiology, food, and chemistry laboratories, all of which strive to comply with national and international food safety standards. The laboratories continuously engage in remodelling their scope of activity, not only to meet food safety standards but also to meet the needs of exporters and other players in food value chains (researchers, food manufacturers, etc.).

The food laboratory is also mandated to conduct research and therefore is also engaged in food product research and development. The laboratory ensures that the food products pass through a cycle that enables commercialization. State-of-the-art technologies are employed to deliver modern solutions to the challenges of an increasingly dynamic food industry, including ultrasonic raw milk analysis, freeze drying technology, fluidized bed drying technology, atmospheric packaging, and rapid plate freezing technology. The UIRI food laboratory provides services such as customized food quality assessment, technical and advisory services, food product design and formulation, product testing, among others.

2.2.3 Food analysis laboratory, Makerere University

Several research laboratories are located at Makerere University. The Department of Food Science in the College of Agriculture and Environmental Studies hosts the food analysis laboratory. Much of its analysis is for research purposes. The laboratory ensures food safety through routine microbial and chemical analysis of submitted food samples.

The microbiology and biotechnology laboratory in Makerere University's College of Veterinary Medicine, Animal Resources, and Biosecurity assists stakeholders in the food industry in product development and provision of microbiological analytical services. The laboratory ensures microbial quality of products and processes and product compliance with national and international quality requirements and standards as well as providing analytical services to industries for product safety surveillance.

The chemistry analytical laboratory hosted in the Department of Chemistry, College of Natural Resources, is one of the country's best equipped laboratories. Its mass spectrometry capacity provides testing facilities to food scientists, researchers, pharmacists, manufacturers, and other key stakeholders.

2.2.4 Chemiphar laboratory

The Chemiphar laboratory is a private laboratory that promotes food and beverage quality through provision of credible food safety tests. The laboratory works alongside national regulatory agencies to ensure the quality, health, and safety of food products for both the

domestic and export markets. Chemiphar provides the food industry and regulatory inspection services with quality analyses of raw, intermediate, and finished products to comply with national legislation and international food standards. In addition, the laboratory also collaborates with regulatory and competent authorities to ensure efficient mechanisms of control and certification of food products before shipment to meet the quality needs and conditions of the European Union market as well as other foreign markets.

Some of the frequently performed analyses to ensure food products comply with food safety and public health standards include:

- Determination of the hygiene status of food products as well as pathogen levels
- Microbiological analysis of foodstuffs, drinking water, and beverages
- Chemical analysis of foodstuffs, feeds, drinking water, and beverages
- Determination of impurities, contaminants, and toxins, for example, heavy metals, pesticide residues, polyaromatic hydrocarbons, natural toxins such as cyanides in cassava, and fungal toxins such as aflatoxin, fumonisins, and ochratoxins

2.3. Regulation and control: private sector

Private sector organizations such as Uganda Consumer Education Trust, Uganda Farmers Federation, and Uganda fish processors and exporters associations among others are in most cases engaged in policy, legal, and regulatory framework review, reform, development, advocacy, promotion of ethical practices, and consumer awareness.

2.4. Regulation and control: civil society

Civil society organizations such as FAO and the World Food Program are engaged in capacity building in food value addition and agro-enterprise development as well as conducting research along different value chains on value addition, food safety, and other post-harvest handling practices.

3. Detection and management of foodborne diseases

3.1. On-farm production and harvesting

The main challenges include improper use of pesticides which results in contamination of produce (especially fresh fruits, and vegetables) and poor handling of produce (fish, meat, and milk) due to lack of knowledge on food safety. Other challenges include unhygienic handling of meat, fish, and milk, lack of cooling facilities, prolonged exposure of food to environmental contamination, unclean cutting surfaces for fish and meat, and poor personal hygiene of food handlers.

Bad agronomic practices such as repeated planting of cereals and legumes on the same piece of land, combined with delayed harvesting (especially of maize), expose the crop to fungal infestation leading to food spoilage which greatly compromises food safety. Due to the challenge of inadequate drying facilities, crops are not dried to the right moisture content for storage. The practice of drying of cereals and legumes on bare ground also exposes the crop to mycotoxin contamination.

Abuse of plant protection chemicals such as use of chemicals to dry maize in farms, use of non-food grade or contaminated tools and use of poor quality inputs on the farm have been linked to food spoilage and reduction of food quality. Furthermore, failure to follow good agricultural practices, standards, or bylaws mainly in informal/formal micro, small, and medium enterprises (MSMEs) has been shown to contribute to unsafe foods.

3.2. On-farm storage

Once food has been produced, it is not always consumed immediately and thus requires storage. However, food storage is also associated with contamination from different sources such as dirty storage containers, inappropriate cold storage facilities for milk, fresh fruits, and vegetables, and inappropriate storage facilities for cereals and legumes which expose the produce to microbial infestations that directly reduce the quality of food.

Other sources of contamination include abuse of crop preservatives and other public health chemicals, dirty storage surfaces or containers, and unhygienic storage facilities. The use of non-food grade materials, tools, and infrastructure combined with not following good practices, standards, or bylaws mainly in informal/formal MSMEs all lead to deterioration in food quality.

3.3. Transportation to market

When transported poorly, food can be unsafe for consumption. This can arise from inadequate transport facilities that are not able to protect the produce from spoilage agents. Also, abuse of public health chemicals, use of contaminated containers or vehicles, poor personnel hygiene, use of wrong transportation vehicles, and generally not following good handling and transporting practices, standards, and bylaws mainly in informal/formal MSMEs all limit the quality of food.

3.4. At the marketplace

Contamination can arise from unhygienic handling of produce (especially meat, fish, and milk), abuse of public health chemicals, unclean containers or surfaces, inappropriate storage facilities, use of non-food grade packaging materials, tools, and infrastructure, and generally not following good hygiene, handling and storage practices, standards, and bylaws. This is mainly in informal/formal MSMEs.

3.5. During processing

Use of inappropriate technologies can expose produce to contamination; this is mainly associated with poor cleaning of peanut grinding machines and cereal milling machines, leading to accumulation of fungi and contamination of incoming produce. Other sources of food contamination during processing include poor hygiene and sanitation in the processing facilities, abuse of public health chemicals, unclean containers, unhygienic food handling, use of non-food grade processing tools and infrastructure, and generally not following good handling, storage, and processing practices, standards and bylaws. This is mainly in informal/formal MSMEs.

3.6. During food preparation for consumption

Cross contamination is associated with unclean handling and processing surfaces and equipment when preparing foods. In eating houses and facilities, abuse of public health chemicals, use of contaminated containers or utensils, poor personnel and facility hygiene, and use of non-food grade processing tools and infrastructure have all been shown to greatly reduce the quality and safety of food, as well as failure to follow the codes, practices, standards and bylaws contained in the operational licence. This is mainly in informal/formal MSMEs.

During food preparation at home, abuse of public health chemicals, use of contaminated containers or surfaces, poor kitchen hygiene, unhygienic food handling, and use of non-food

grade tools and containers all reduce the quality and safety of food. Generally, not following primary health principles and the World Health Organization (WHO) food safety golden rules greatly reduces the quality and safety of food during its preparation.

4. Priorities in Food Safety

Food security and food safety are directly connected. In this regard, international and national organizations and agencies have set food safety priorities to not only ensure safe food but also food security. In Uganda, MAAIF is fully aware of the rising demand for food and food safety.

Due to their high vulnerability to microbial and chemical contaminants (especially mycotoxins for cereals and legumes), milk, fish, meat, cereal (maize), and legume (peanuts) value chains are the priority for food safety. Similarly, grains, fruits, and vegetables as well as meat and meat products are also a priority.

The ultimate impact that the agricultural sector national plan intends to achieve is "a climate-resilient agricultural sector that is contributing to the achievement of the Uganda Vision 2040." The pathway from the main outcome (climate-resilient agricultural development) to the intended impact is not a straightforward process; the intermediate states are the attainment of (1) sustainable agriculture, (2) food safety and nutritional security, (3) livelihood improvement, and (4) economic growth.

5. Conclusion

In general, peer-review studies of the food safety situation in Uganda are limited, but it is presumed that the country is progressively strengthening the food safety environment. Information available online regarding the subject is limited, and most of the accessible information is outdated. In addition to the existing food safety challenges along the value chain from farm to fork, COVID-19 and its associated dynamics presents an additional challenge in the management of food safety in Uganda.

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