



Review article

Contextual interlinkages and authority levels for strengthening coordination of national food safety control systems in Africa

Martin Epafra Kimanya

School of Life Sciences and Bioengineering, Nelson Mandela African Institution of Science and Technology, P. O. Box 447, Arusha, Tanzania

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ABSTRACT

Africa is the greatest contributor to the burden of foodborne diseases in the world. The problem is associated with the weak food safety control systems in many countries of Africa. Africa's national food control systems are based on fragmented legislation which provide for multiple jurisdictions resulting in weaknesses in coordination, inspection and enforcement of food safety measures mandated to different sectors such as agriculture, trade, and health. It was hypothesized that the weak food safety legislation is a result of inability to contextualize and appreciate the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) guidelines for strengthening national food control systems. Raising awareness and knowledge on interlinkages and authority levels among the sectoral food safety actors can foster appreciation of the FAO and WHO recommendations and inform food safety policy reforms in the continent. This article highlights the interlinkages in food safety activities of the actors along the food chain. It also contextualizes the roles of each agency or ministry and proposes institutional arrangements to be considered in strengthening national food safety control systems in Africa.

1. Introduction

Each country must put in place a system to ensure that foods produced, manufactured, distributed, or sold in its territory are safe for human consumption. Unsafe food causes diseases (such as diarrhea and cancers) and may be lethal. Africa is the greatest contributor to the burden of unsafe foods in the world. About one-third (137,000 out of 420,000) of the global deaths (and 91 out of the 600 million global cases) of foodborne disease occur in Africa, each year [1]. Of the contaminants implicated for the exceptionally high burden of foodborne diseases and deaths in Africa region are non-typhoidal salmonella caused by consumption of poultry (including eggs) and aflatoxins from cereals or nuts. Poultry meat is likely to be contaminated with salmonella during slaughter especially where good slaughter practices are not observed, and cross-contamination is a possibility at both retail and household level [2]. Aflatoxin is a fungal metabolite, primarily produced by *Aspergillus*, mainly *A. flavus* and *A. parasiticus*, in foods. This toxin may be found in food commodities, including cereal grains like sorghum, maize and pearl millet [3–5], roots and tubers [3], and nuts like groundnuts [6].

Due to the potential to cause foodborne diseases, unsafe foods can decrease worker productivity and cause early death, thus lowering incomes. A World Bank (WB) report of 2018 shows that, annually, unsafe foods cost low - and middle -income countries mainly in Sub-Saharan Africa and Southeast Asia, about \$110 billion in lost productivity and medical expenses alone [7].

Apart from causing foodborne diseases, unsafe food (when traded or exported) cannot access the market. Most countries enforce regulations prohibiting importation of contaminated foods as one of the ways to prevent foodborne diseases. The EU countries (in

E-mail address: martin.kimanya@nm-aist.ac.tz.

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particular) enforce very stringent regulations and can order border rejection or immediate removal from the market for any non-conforming food. In 2021, the EU issued 120 notifications of food from Sub Saharan Africa that had either been rejected at points of entry or removed from circulation in its market [8]. The main causes of the notifications were presence of pesticide residues, pathogenic microorganisms, and mycotoxins. Residues of pesticides at levels of public health concern is a common problem in Africa. For instance, Omwenga et al. [9] reported that as high as 33 % of samples of vegetables collected from Nairobi markets contained pesticide residues at levels exceeding the EU limits.

The problem of unsafe foods and the related health and economic impacts can be attributed to Governments failure to safeguard safety of food due to inadequacies in food control systems. The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) through their publication on guidelines for strengthening national food control systems [10], advise countries on appropriate infrastructures, responsibilities, and coordination of the different national agencies with food related functions. Similar advice is given by the Codex Alimentarius Commission (a joint FAO and WHO body) publication on principles and guidelines for national food control systems [11]. Despite these international recommendations, Africa's national food control systems are still weak. The weakness is attributed to existence of different laws which provide for similar authorities to national agencies responsible for food safety control, standards setting and plant or animal health protection [12–14]. This situation makes coordination and enforcement of food safety measures problematic, thus endangering the health of food consumers. It was hypothesized that the weak food safety policies are a result of limited knowledge and appreciation of the interlinkages and complementarities in the food safety roles performed by the different actors in the food chain. Believably, raising awareness and knowledge on interlinkages and authority levels among the sectoral food safety actors can foster appreciation of the FAO - WHO recommended best practices and inform food safety policy reforms in the continent. Based on the international best practices, the food safety roles, sectoral interlinkages, and authority levels of the different actors along food chain were contextualised and used to make recommendations for strengthening national food safety systems in Africa. Schematic diagrams were used to depict the contextualised interlinkages between food safety measures and other sector measures with food safety implications. In the diagrams, green was used to represent food safety measures and red, other sector measures. The intersection between “green” and “red” measures represents food safety measures mainstreamed in another sector measures. This intersection is depicted in yellow, in accordance with the general knowledge that in the spectrum of light, yellow is recognised as a mix of green with red.

2. The interlinkage between food safety measures of sectoral government agencies and of national food safety agency

Promoting implementation of appropriate food safety measures and therefore protecting the public from harmful agents is one of the Government's responsibilities. These duties are achieved through adoption, promotion, enforcement and auditing of policies, laws, standards, and codes of practice.

2.1. Adopting food safety and related policies and laws

Each country is advised to adopt and implement a food safety legislation which prescribes the roles and responsibilities of each sector/actor along the food chain [10,11]. The legislation should be comprehensive, rational, and clear. The government is also advised to adopt food safety measures in relevant sectoral policies. These policies should elaborate accountabilities for issues such as the adoption and application of food safety aspects in Good Agricultural Practices (GAPs), Good Manufacturing Practices (GMPs) and Good Food Hygiene Practices (GFHPs) [15,16].

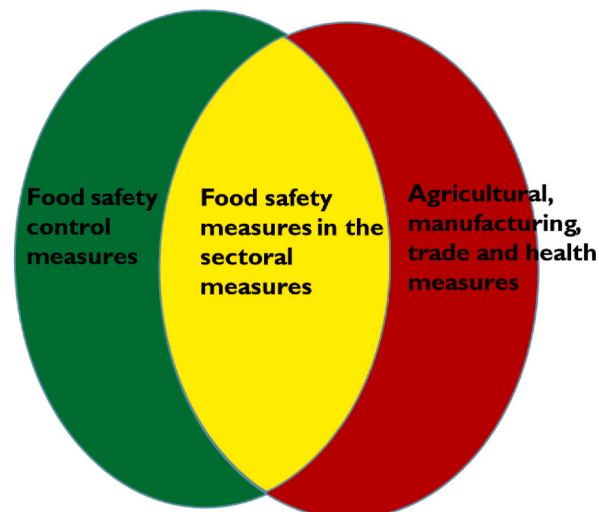


Fig. 1. The intersection between measures for food safety control and measures for agriculture, trade, or health sector promotion.

Formulation and implementation of food safety legislation in a country or region is governed by the World Trade Organisations' agreement on the application of Sanitary and Phytosanitary (SPS) measures. The agreement requires that WTO members base their national or regional food safety measures (policies and laws inclusive) on international standards, guidelines and other recommendations adopted by Codex.

However, most sectoral policies, strategies and laws in Africa do not contain measures that can adequately prevent or control food contamination [16,17]. The situation was also observed by the 73rd session of the World Health Assembly (WHA) which advised that the food safety systems of many countries need to integrate food safety into national and regional policies on health, agriculture, trade, environment, and development [18]. Mainstreaming of food safety control measures into agricultural, trade and health policies, strategies or guidelines will not only improve safety of food but also contribute considerably to addressing the problem of food insecurity in a country. The interrelationship between measures for food safety control and those for agriculture, livestock, fishery, trade, industry, and health sectors promotion is presented in Fig. 1.

The intersection represents food safety measures mainstreamed into sectoral measures (policies, strategies, laws, regulations and/or guidelines). These food safety measures are promoted and enforced by departments, or agencies such as plant and animal health protection agencies, as part of the sectoral measures.

2.2. The interlinkage between food standards and national food safety control measures

It is the role of national governments to set food standards so that all Food Business Operators (FBOs) receive a similar level of control and food consumers receive equal level of protection. A food standard is a government document for food that outlines accurately for businesses and the food industry what ingredients a food product must contain and the requirements for the distribution, labelling, manufacturing, packaging, processing, and production of all types of food. Food safety specifications such as for maximum residues of veterinary drugs or pesticides in food standards are essential components of food safety. Food safety is the assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use. It is imperative for governments to ensure that food safety aspects in food standards are appropriate: based on public health risk assessment [19]. The interlinkage between a food standard and food safety control is shown in Fig. 2.

As previously stated, a food standard contains both safety and quality measures. Examples of food safety measures in a food standard include maximum residual limits (MRLs) for pesticides. The food safety measures in a standard are implemented by dealers in the sectors and enforced by food safety agencies as part of the standard.

3. Interlinkage between measures of food business operations and food safety control

A Food Business Operator (FBO) is the entity responsible to operate a food business at any step in the food chain [13,19]. The primary goal of a FBO is maximizing production or sale. It is also the FBO's duty to build safety into the food, right from the farm, and protect or enhance the safety status during subsequent stages of the food chain [13,20]. All these efforts are achieved with the FBO's own inputs, knowledge, and skills as supported by the government in terms of extension, education, promotion, and regulatory services. In food production, the FBO (farmer) implements GAPs, and, in food processing, they apply GMPs. GAPs and GMPs as performed by FBOs can affect the safety and quality of food. In food distribution, catering and sale, FBOs implement good handling practices (commonly referred to as food hygiene). Thus, in addition to GAPs and GMPs, food hygiene practices (GFHPs) are necessary

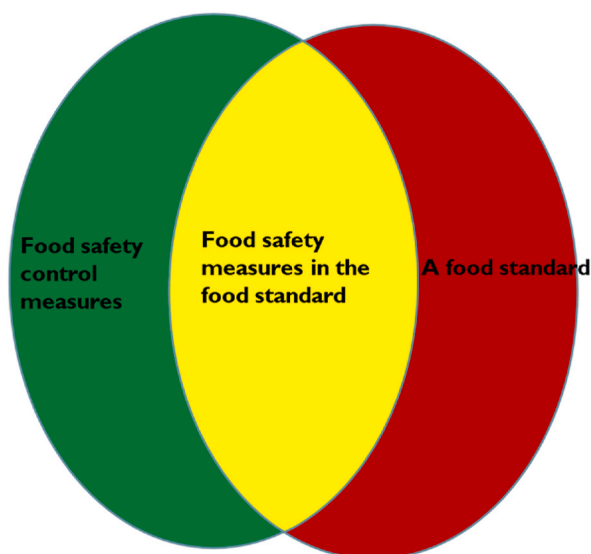


Fig. 2. The intersection between food safety control measures and food standards.

to ensure safety during transportation, storage, sale and preparation of food.

However, in many countries, FBOs do not appreciate the importance of investing in the knowledge and skills necessary for implementation of GAPs, GMPs or GFHPs. For example, a study conducted by the EU-EAC Market Access Upgrade Programme (EU-EAC MARKUP) in the East African Community (EAC) showed that very few food industries had employed food safety experts or established food testing laboratories or adopted quality management systems to provide assurance that the products they produce are safe [21]. Most of the time the FBOs operate – involuntarily - in accordance with Government provided guidelines, standards, or regulations. The best approach is for the FBOs to voluntarily participate in development and implementation of the guidelines, standards, and regulations. If FBOs are knowledgeable and participates in development of standards, they will understand the importance of standard's requirements and implement them, sustainably. Another approach to enhancing FBOs compliance with standards is adoption of voluntary self-regulatory schemes. Examples of voluntary self-regulatory schemes include Canada GAP, GLOBALG.A. P and China HACCP [7]. Canada GAP is an on-farm food safety program owned by the fruit and vegetable growers of Canada (FVGC). GLOBALG.A.P. is a private sector body that sets voluntary standards for agricultural product certification around the world, and the China HACCP is the national certification scheme implemented by the Certification and Accreditation Administration of China.

Apart from enhancing compliance with standards, participation in voluntary self-regulatory schemes can reduce the transaction costs associated with supply chains for agricultural and food products. As a principle, private self-regulatory systems employ third party certification schemes, and once FBOs have been certified to a dominant private self-regulatory scheme, they are able to gain access to the supply chain of all buyers that accept this scheme [22].

The private sector self-regulation does not replace the work of Government regulatory authorities. The self-regulation system recognizes that the government shall continue to play their role of setting regulations, standards, and guidelines relevant to the sector and enforce compliance with the requirements. Fig. 3 shows the partnership that should be sought and established between the government and the private sector associations like GLOBALGAP.

The intersection represents measures issued by local or national food safety agency for implementation by individual FBOs or their association. These measures are implemented by the FBOs as part of their good agricultural, manufacturing or hygiene practices. The local or national food safety agency enforce the food safety measures through premarket approvals and day to day inspection of food or food product.

4. The interlinkage between consumers' food safety measures and local or national food safety control measures

Consumers have a right to expect that the foods they purchase and consume is safe. However, they must verify foods for safety before purchase or preparation. At the point of purchase, the consumer can carry out organoleptic evaluation of food to ascertain specific food safety related aspects. If the consumer observes unusual attributes such as information on the label that the food has expired, he/she is likely to refuse buying because this attribute suggests presence of unacceptable microbiological or chemical status. Generally, microbiological, and chemical aspects of food are not easily assessed by the consumers. For these hazards, the consumer relies solely on the producer and the government. Preparation of food (at home or any other place such as a canteen) is also a critical control point for food safety. If an hazard is overlooked at this point, the consumer is likely to be harmed. Certain operations such as sorting, cleaning, and cooking as performed at home or any catering place are useful in reducing likelihood of occurrence for certain hazards, especially of microbiological nature.

Given the complexity of food safety, consumers need access to timely, clear, and reliable information about the disease risks

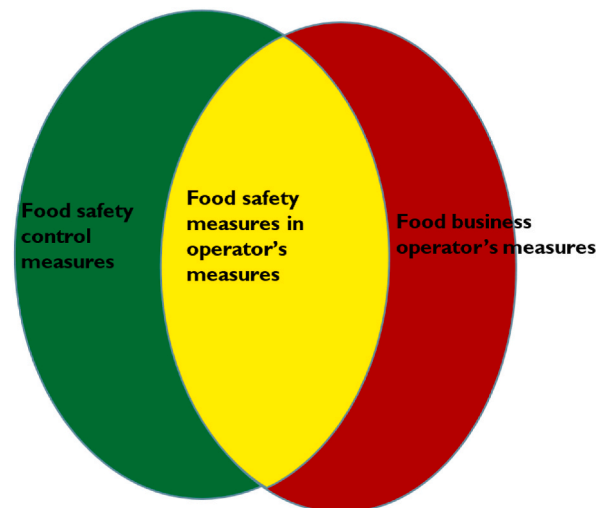


Fig. 3. The intersection between food safety measures of food business operators and food safety control systems.

associated with their food choices to ensure effective consumer action. Thus, food safety regulatory agencies must raise consumer awareness and knowledge about food safety. High consumers awareness and knowledge enhances the assurance that unsafe food cannot be consumed. This implies that cooperation between the consumers and the local government regulatory agencies is paramount in ensuring safety of food. The complementarities of food safety control and consumer' self-protection actions are depicted in Fig. 4.

It is important to remember that food control is an approach applicable to commercial foods only and many people in Africa live in rural areas producing foods mainly for their own consumption without checks by food safety agencies. In this context, there is low awareness and understanding of food safety matters [17]. For these communities, education on the importance of food safety smart good agricultural practices (such proper use of pesticides, and selection of safe animal feeds), good handling practices (such as proper storage and drying for cereals) as well as attributes such colour and texture to check prior to food use, are important [23].

5. Stakeholders' authority levels

As previously stated, food safety responsibility is shared among consumers, FBOs and public institutions (operating under ministries responsible for agriculture, trade, industry, health, research and academia). It is a multi-layered responsibility with interlinked activities of all these actors along the food chain: from farm (farmer) through market (traders) to table (consumers).

Whereas the responsibility for food safety follows the order - from FBOs, through sector regulatory agencies, national food safety regulatory agency and local food safety inspection agency, to the consumer; it was contextualised that the authority to prevent access/consumption of unsafe food follows a reverse order. The consumer has the highest authority because, as previously explained, the selection of food to buy or consume rests with the consumer. The consumer makes choices from that circulating in the market, as authorized by the local food inspection authorities. The local authorities rely on the national food regulatory agencies for premarket approvals. These local inspectors have powers to remove from the market any non-conforming food regardless of whether it was approved by national food safety agencies or not. Thus, the authority level for the local food safety agencies is higher than that of the national food safety agencies. The lowest level of authority rests with the FBOs. These can only place food in the market for processing, distribution, or sale, after approval by either a sectoral agency or national food control agency. These national level agencies include plant and animal health protection bodies (commonly serving under ministries responsible for agriculture, livestock, or fisheries). The order of authority levels for preventing sale and consumption of unsafe food is as shown in Fig. 5.

It should be noted that FBOs, private self-regulators, sectoral regulators and food safety regulators are consumers as well. Fig. 6 shows that although consumers, FBO and regulators are categorized at the lowest level of the pyramid, they are embedded in the consumers' sphere. This serves to remind the FBOs and regulators to be mindful of the fact that their actions affect them as well, positively, or negatively.

6. Government institutional arrangements

The main challenge to many countries is setting up a food safety control system that suits the interests of all the sectors or ministries with food safety related functions. According to the Codex Alimentarius Commission [11] the objective of a national food control system is to protect the health of consumers and ensure fair practices in the food trade. This Codex Alimentarius text underlines the pivotal role of competent authorities and provides principles and a framework for the design and operations of national food control systems. Also, FAO-WHO [10] recommends three options of institutional arrangements that may be appropriate at a national level.

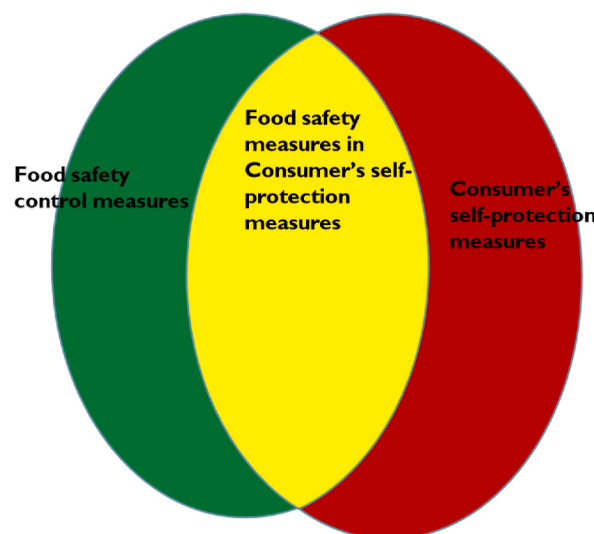


Fig. 4. The intersection between Consumer's self-protection measures and food safety control measures.

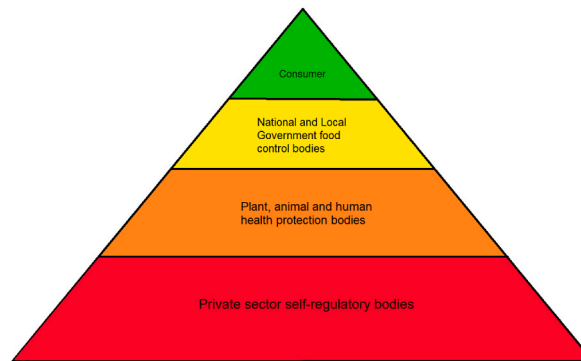


Fig. 5. Stakeholders' food safety authority levels in increasing order from food business operators to consumers.

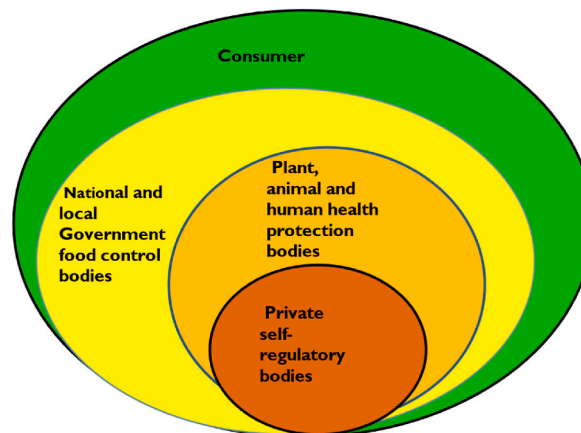


Fig. 6. The intrarelationship with, and nature of dealers in the food chain as, food consumers.

These are a multiple agency system where the food control responsibilities are shared between Government ministries; a single agency system where the responsibility for protecting public health and food safety are consolidated to a single agency with clearly defined terms of operation; and an integrated system where a mechanism is established for collaboration and coordination between agencies across the farm-to-table continuum. The integrated system appears to be the most appropriate arrangement for effective oversight and delivery of food safety services in a country with already established multiple agencies [13]. The FAO -WHO [10,11] recommendations and the organization structures of the food safety control systems of Ireland and Canada as cited by FAO-WHO [10] as well as the food safety control systems for Morocco [24], Gambia [25] and The Philippines [26] were contextualised to determine features and roles for which recommendations could be made to inform strengthening of food safety control in Africa. The considered key features are the need for an autonomous food safety control agency and its key functions; the need for a multisectoral food safety coordination mechanism; the arrangement for premarket authorisation and day to day inspection of food, ministry to lead/coordinate food safety control services; ministry or agency to lead formulation of food safety policy, laws, regulations and standards, and agency to lead food safety risk assessment.

6.1. *Autonomy in food safety control and multisectoral coordination board*

As previously explained, it is a challenge for ministries to reach consensus on the ministry to lead food safety services. FAO-WHO recommends establishment of an autonomous national food safety agency: independent of any sectoral interest or ministry [10,11]. Establishing an autonomous body minimizes the risk of one ministry, for example agriculture, health, or trade to influence its operations. The Gambia Food Safety and Quality Authority is a good example from Africa, of autonomous food safety agencies [25]. Some countries of Africa with autonomous food safety agencies established them as food and drug bodies [27]. The challenge of regulating food through a department or division of a food and drugs body is the tendency to prioritize on processed foods and evaluating them as medicines. Other countries of Africa established their food safety agencies as departments or divisions of autonomous national standard bodies. This arrangement has the tendency of treating food like other commodities that do not require very stringent control measures, has a bias on processed foods and creates challenges in implementing the farm – table approach required for food. In autonomous institutions regulating both food and drugs, coordination with other food safety agencies is a challenge. In those

institutions, coordination is done through a board responsible for both food and drugs. Such a board is unlikely to be able to rationally include key representatives (experts) from both drugs and food sectors. For instance, in the Ghana Food and Drugs Authority [27], the board includes about 2 (out of 8) experts from food safety related sectors (veterinary services, and food research institute).

FAO – WHO [10] cited the food safety control systems of Ireland and Canada as examples of systems with well constituted coordination boards. Also, Gambia, Morocco and Philippines have established multisectoral food safety coordinating Boards. In all these countries, food safety coordinating boards are composed of representatives of key institutions, including those responsible for agriculture, livestock, fishery, trade, industry, and health. Kenya is another country in Africa with an inter-ministerial board that aims at increasing awareness of food safety and quality and coordinating all food safety activities in the country [17].

Key functions (as adopted from FAO -WHO, 10, 11) of the autonomous food control coordinating board may include the following:

- To coordinate, monitor and audit sectoral and local food inspection agency activities, including inspection, analysis, enforcement, and education.
- To identify legislative needs; monitor the efficiency and effectiveness of food surveillance activities.
- To advance and foster food safety risk assessment.

6.2. Ministry to lead food safety policy formulation and host the autonomous food safety control agency

One of the challenges facing coordination of food safety control services in developing countries is deciding the ministry to lead food safety policy formulation and host the autonomous (coordinating) agency. FAO-WHO [10,11] recommends adoption and implementation of a comprehensive national food safety policy which prescribes the roles and responsibilities of each sector/actor along the food chain. In many countries of Africa, there are no comprehensive food safety policies. The Gambia [25] and Morocco [24], however, have adopted food safety specific laws. In these countries, there are also sectoral legislations governing agriculture, trade, and public health but for food safety aspects, they reference food safety legislation. Presumably, in The Gambia, food safety policy formulation is the mandate of the Vice President Office and in Morocco, the ministry responsible for agriculture. Mandating food safety policy or law formulation to the Vice President is a commendable decision and in line with the FAO-WHO [10] recommendation that food safety coordination should be independent of sectoral influences. Given that it is always not easy to secure placement for a food safety agency under a higher authority like the Vice President, it is my opinion that formulation of food safety policy, laws or regulations and hosting of the food safety agency should be entrusted with the ministry responsible for health. In principle, food safety is a health matter. The World Trade Organisation (WTO) SPS agreement shows clearly that food safety measures are for human health protection. According to the SPS agreement, exported food can justifiably be blocked if it is not safe: poses a risk of endangering public health in the importing country. Many countries including Ireland and Canada [10], Ghana [27] and The Philippines [26] have placed their food safety control (coordination) systems under leadership of ministries responsible for health.

6.3. Agencies responsible for food inspection services

The FAO-WHO guidelines on strengthening food safety control systems advises that the day-to-day food inspection services in a country should be performed by agencies other than the autonomous food safety agency. Ideally, day-to-day inspection of foods of plant and animal origins is carried out in accordance with regulations or guidelines issued by the ministry responsible for agriculture and livestock, respectively. These practices are provided for by the food safety laws of The Philippines [26] and Morocco [24]. In Philippines, the law provides that the ministry of agriculture is responsible for safety of foods at the primary productions and post-harvest stages of the food supply chains, including foods imported in these stages; the ministry of health is responsible for safety of processed and pre-packaged foods; and the local Government authorities, for safety of foods in businesses such as slaughterhouses,

Table 1
Scope of food inspection roles and agencies.

Food	Agency	Responsibility	Reference country (law)
Unprocessed foods of plant origin	National Plant Health Protection Agencies	<ul style="list-style-type: none"> • Premarket authorization • Import control (including port inspection) • Providing regulations and guidelines for inspection 	<ul style="list-style-type: none"> • The Gambia (Food Safety and quality Act, 2011) • Morocco (Food Safety Law, 2010) • Philippines (Food Safety Law, 2013)
Unprocessed foods of animal origin	Animal health and fishery agencies	<ul style="list-style-type: none"> • Premarket authorization • Import control (including port inspection) • Providing regulations and guidelines for inspection 	<ul style="list-style-type: none"> • The Gambia (Food Safety and quality Act, 2011) • Morocco (Food Safety Law, 2010) • Philippines (Food Safety Law, 2013) • South Africa (The Meat Safety Act of 2000)
Processed and prepackaged foods	National food safety agencies	<ul style="list-style-type: none"> • Premarket authorization • Import control (including port inspection) • Providing regulations and guidelines for inspection 	<ul style="list-style-type: none"> • The Gambia (Food Safety and quality Act, 2011) • Morocco (Food Safety Law, 2010) • Philippines (Food Safety Law, 2013)
All foods	Local, district or provincial authorities	Day to day inspection	Philippines (Food Safety Law, 2013)

dressing plants and wet markets. Similar arrangement is provided under the food safety law of Morocco. The Gambia [25] has memoranda of understanding with the Gambia plant health and animal health authorities for inspection of plant and animal source foods, respectively. The above stated arrangements may be acceptable to most nations, but slight modifications are proposed as in Table 1.

6.4. Agency to lead formulation of food standards

FAO – WHO [10] recommends that setting of food standards and codes of practice should be one of the functions of national food safety agencies. This is a common practice in countries like Ireland, Canada [10] and The Philippines [26]. In many countries of Africa, however, food standards setting is a mandate of the national standard bodies. In the spirit of separating the function of food standards setting from the function of food standards enforcement (as performed by food safety agencies), it is desirable to keep the former within National Standards Bodies.

6.5. Agency to lead food safety risk assessment

Food safety risk assessment is necessary to generate knowledge of the burden of foodborne diseases and cause of food contamination to facilitate prioritization of mitigation actions [20]. Codex Alimentarius Commission (CAC) defines food safety risk assessment as a scientifically based process consisting of four steps: hazard identification, hazard characterization; exposure assessment; and risk characterization [19]. With risk assessment information, policymakers and regulatory bodies can make informed decisions about food safety standards and develop appropriate control measures to protect public health [12]. The data for use in food risk assessment can be obtained through research or organized audit of the farmers, processors, traders, distributors, and caterers to ensure compliance with standards. Good regulatory practices require that food safety risk assessment is performed and managed separate from the food safety management [10,11]. The food safety management may, however, establish a committee to coordinate with the risk assessment body and advise the food safety board on the food safety risk assessment outcomes. Many countries of Africa do not have their own risk assessment bodies because it is expensive, both financially and skill-wise. These countries rely on international risk assessment bodies such as JECFA - the Joint FAO/WHO Expert Committee on Food Additives [19].

7. Conclusion

An attempt was made to contextualize and define the interlinkages between measures for food safety control and those for food production, trade promotion, private sector self-regulation or consumer self-protection. With the defined interlinks it was possible to demonstrate the complementarities between food safety control measures and those of each of the other sectors. Levels of authority to protect the public against unsafe food, among the various actors in the food chain, were also contextualised and defined. It was demonstrated that authority increases in the order from FOBs, sectoral agencies, national food safety agencies, local food safety authority to consumers. With the identified interlinkages and consumer protection levels, it was possible to recommend modes of cooperation and coordination among government food safety agencies. The recommendations are as follows:

- Formulation of food safety policy, laws, and regulations – Ministry responsible for health
- Setting of food standards - National standard bodies under ministries responsible for trade and industry
- Premarket approval of unprocessed foods - Ministries responsible for agriculture (including livestock and fishery)
- Premarket approval of processed and pre-packaged foods - National food safety control agency
- Day-to-day inspection of all kinds of food circulating in the market - Ministry responsible for local governments through district or provincial health departments.

It is also recommended that each country should consider establishing an autonomous national food safety agency to be hosted by the ministry responsible for health and mandated to coordinate functions of all the other agencies and audit their performance, through a multisectoral coordination board. A detailed analysis of the risk assessment and communication components of the food safety system is recommended to improve the guidance on national food safety control infrastructure.

Data availability

No data was used for the research described in the article.

CRedit authorship contribution statement

Martin Epafra Kimanya: Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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