



Addressing food safety challenges in the African informal sector through innovative strategies & Use Cases

D1.2: Gap Analysis Report

GAP Analysis on the food safety policy, legal and institutional environment and identification of enablers and barriers for effective implementation of policies

Responsible Author: Ebenezer M Kwofie, Ogan Mba, and Joyce Selby

| | |
|---|---|
| Grant Agreement No. | 101136916 |
| Project Acronym | FS4Africa |
| Project Title | Food Safety for Africa |
| Type of action | HORIZON RIA – Research & Innovation Actions |
| Horizon Europe Call Topic | Fair, healthy and environmentally-friendly food systems from primary production to consumption (HORIZON-CL6-2023-FARM2FORK-01-20) |
| Start – ending date | 1 January 2024 – 31 December 2027 |
| Project Website | foodsafety4africa.eu |
| Work Package | WP1: Enabling policy environment and strategic agenda setting |
| WP Lead Beneficiary | Food Systems Transformation Solutions (Pty) Ltd (FSTS) |
| Relevant Task(s) | T1.1 Assessment of the policy, legal, technical guidelines, and institutional environment for food safety management in Africa |
| Deliverable type Dissemination level | R – Document, report; PU: Public; |
| Due Date of Deliverable | 31 December 2024 |
| Actual Submission Date | 28 December 2024 |
| Responsible Author | Ebenezer M. Kwofie (McGill) Ogan Mba (McGill) Joyce Selby (McGill) |
| Contributors | Fadel Ndiame (FSTS) Rose Omari (CSIR-GH) Lise Korsten (UP) |
| Reviewer(s) | Laurette Dube (McGill) Valerie Orsat (McGill) |

Disclaimer

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

Copyright message

This document contains unpublished original work unless clearly stated otherwise. Previously published material and the work of others has been acknowledged by appropriate citation or quotation, or both. Reproduction is authorised provided the source is acknowledged.

| FS4Africa Consortium | | | |
|----------------------|---|--------------|---------|
| Participant Nr. | Participant organisation name | Short name | Country |
| 1 | INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE | IITA | NG |
| 2 | STICHTING WAGENINGEN RESEARCH | WR | NL |
| 3 | ITC - INOVACIJSKO TEHNOLOSKI GROZD MURSKA SOBOTA | ITC | SI |
| 4 | COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH | CSIR-GH | GH |
| 5 | REFRAME FOOD ASTIKI MI KERDOSKOPIKI ETAIREIA | RFF | GR |
| 6 | UBUNTOO BV | Ubuntoo B.V. | NL |
| 7 | FOOD SYSTEMS TRANSFORMATION SOLUTIONS (PTY) LTD | FSTS | ZA |
| 8 | UNIVERSITY OF PRETORIA | UP | ZA |
| 9 | WAGENINGEN UNIVERSITY | WU | NL |
| 10 | KNOWLEDGE ECONOMY FOUNDATION FOR SOCIETY DEVELOPMENT | KEF | EG |
| 11 | AFRICAN UNION DEVELOPMENT AGENCY - NEW PARTNERSHIP FOR AFRICA'S DEVELOPMENT | NEPAD | ZA |
| 12 | EGERTON UNIVERSITY | EGE | KE |
| 13 | AGLOBE DEVELOPMENT CENTER | ADC | NG |
| 14 | UNIVERSITAET DER BUNDESWEHR MUENCHEN | UniBw M | DE |
| 15 | BAYER AKTIENGESELLSCHAFT | BAYER | DE |
| 16 | ROYAL INSTITUTION FOR THE ADVANCEMENT OF LEARNING MCGILL UNIVERSITY | McGill | CA |

Executive Summary

A comparative analysis of food safety governance policies in the informal food sector of Ghana, Kenya, Nigeria, South Africa, and Egypt is presented, using the European Union as a benchmark. The informal food sector plays a crucial role in African food systems, representing about 35% of the GDP in low- and middle-income countries and providing sustenance for an estimated 70% of urban and peri-urban populations.

The analysis reveals significant gaps in food safety governance across these African nations compared to the EU's unified approach. While each country has established food safety authorities and regulatory frameworks, implementation and enforcement remain challenging, particularly in the informal sector. Key challenges include fragmented regulatory oversight, inadequate infrastructure, limited surveillance systems, and insufficient coordination among multiple agencies responsible for food safety.

Critical gaps identified include weak hygiene standards enforcement, poor storage facilities, limited access to clean water and sanitation, inadequate cold chain infrastructure, and challenges in implementing traceability systems. These deficiencies contribute to approximately 91 million Africans falling ill annually from foodborne diseases, with 137,000 fatalities.

The report recommends a multi-faceted approach to strengthen food safety governance in Africa's informal food sector. Key recommendations include developing flexible policies adapted to informal sector realities, promoting community-led initiatives, enhancing public awareness through education programs, and building trust through voluntary certification programs. Additionally, the report advocates for government subsidies to support infrastructure improvements, simplified reporting mechanisms for violations, and stronger involvement of local authorities in market infrastructure development.

Implementation of these recommendations requires sustained commitment from governments, including dedicated domestic funding for food safety initiatives rather than relying solely on international donor support. Success will depend on balancing the need for robust food safety standards with the economic realities of informal sector operators, while ensuring consumer protection and public health remain paramount priorities.

Looking ahead, the establishment of an African Food Policies Digital Platform is proposed to serve as a comprehensive resource for stakeholders, facilitating access to food safety laws, policy updates, and socioeconomic impact assessments. This platform would support the harmonization of food safety standards across the continent while promoting best practices in the informal food sector.

Table of Contents

| | | |
|-------|--|----|
| 1 | Introduction..... | 8 |
| 1.1 | Purpose of the Report..... | 8 |
| 1.2 | Background and Scope..... | 8 |
| 1.3 | Relationship to Other Deliverables..... | 10 |
| 2 | Overview of the food safety policy, legal, technical, and institutional frameworks..... | 11 |
| 3 | Comparative Analysis of Pertinent Food Safety Laws and Policies In The EU, Nigeria, Ghana, South Africa, Kenya, and Egypt..... | 13 |
| 4 | Gap Analysis in food safety policies..... | 18 |
| 4.1 | Regulatory Gaps..... | 18 |
| 4.2 | Hygiene and Food Handling..... | 19 |
| 4.2.1 | Contaminants Handling..... | 19 |
| 4.3 | Infrastructure Gaps..... | 20 |
| 4.3.1 | Food Storage..... | 21 |
| 4.4 | Awareness and Compliance Gaps..... | 21 |
| 4.5 | Traceability and Transparency..... | 23 |
| 5 | Policy Recommendations..... | 25 |
| 5.1 | Key strategies include:..... | 25 |
| 5.1.1 | Flexible policies:..... | 25 |
| 5.1.2 | Community-led initiatives:..... | 25 |
| 5.1.3 | Public awareness and education:..... | 25 |
| 5.1.4 | Trust-building initiatives:..... | 25 |
| 5.1.5 | Government Subsidies and Incentives:..... | 26 |
| 5.1.6 | Simplified Reporting Mechanisms:..... | 26 |
| 5.1.7 | Responsible and Strong Local Governments:..... | 26 |
| 5.1.8 | Creation of African Food Policies Digital Platform:..... | 26 |
| 6 | Conclusion..... | 27 |
| 7 | References..... | 28 |
| 8 | Annex I: The URL of the food safety policy and regulation agencies..... | 32 |

List of Figures*

| | |
|---|----|
| Figure 1: Conceptual Model for the food safety policy gaps in the informal food business ecosystem..... | 10 |
|---|----|

List of Tables

| | |
|---|----|
| Table 1: Regulatory and Inspection Roles..... | 15 |
| Table 2: Standards Setting Bodies..... | 16 |
| Table 3: Government Ministries and Departments..... | 16 |

| | |
|--|----|
| Table 4: Program | 17 |
| Table 6: Regulatory Policies Governing the Informal Food Sector..... | 18 |
| Table 7: Food Hygiene and Handling Regulations in the Informal Food Sector | 20 |
| Table 8: Regulations on Infrastructure in the Informal Food Sector | 21 |
| Table 9: Policies Governing Knowledge and Compliance in the Informal Food Sector | 22 |
| Table 10: Policies on Traceability and Transparency in the Informal Food Sector..... | 24 |

Glossary of terms and abbreviations used

| List of Abbreviations and Acronyms | |
|------------------------------------|---|
| ABNE | African Biosafety Network of Expertise |
| ACA | Anti-Counterfeit Authority |
| ADC | Aglobe Development Center |
| AFA | Agriculture & Food Authority |
| AMR | Antimicrobial Resistance |
| ARC | Agricultural Research Council |
| ARSO | African Regional Standards Organization |
| AU | African Union |
| AUDA-NEPAD | African Union Development Agency - New Partnership for Africa's Development |
| CAPQ | Central Administration of Plant Quarantine |
| CGCSA | Consumer Goods Council of South Africa |
| CLFF | Central Laboratory for Food and Feed |
| CPHL | Central Public Health Laboratories |
| DVS | Directorate of Veterinary Services |
| EAC | East African Community |
| ECHA | European Chemicals Agency |
| ECOWAS | Economic Community of West African States |
| EFSA | European Food Safety Authority |
| EGE | Egerton University |
| EMA | European Medicines Agency |
| EOS | Egyptian Organization for Standardization and Quality |
| EPA | Environmental Protection Agency |
| EU | European Union |
| FAO | Food and Agriculture Organization |
| FCCPC | Federal Competition & Consumer Protection Council |
| FDA | Food and Drugs Authority |
| FENIP | National Federation of Processing and Upgrading Industries for Fishery Products |
| FMAFS | Federal Ministry of Agriculture & Food Security |
| FMENV | Federal Ministry of Environment |
| FMITI | Federal Ministry of Industry, Trade and Investment |
| FMOH | Federal Ministry of Health |
| FPIS | Federal Product Inspection Services |
| FRI | Food Research Institute |

| | |
|-----------|---|
| FS4Africa | Food Safety for Africa |
| FSI | Food Safety Initiative |
| FSTS | Food Systems Transformation Solutions |
| GAP | Good Agricultural Practices |
| GDP | Gross Domestic Product |
| GEPA | Ghana Export Promotion Authority |
| GHP | Good Hygiene Practices |
| GMP | Good Manufacturing Practices |
| GOVS | General Organization for Veterinary Services |
| GSA | Ghana Standards Authority |
| GTA | Ghana Tourism Authority |
| HACCP | Hazard Analysis Critical Control Point |
| IITA | International Institute of Tropical Agriculture |
| IoT | Internet of Things |
| IPAN | Institute of Public Analysts of Nigeria |
| IPPC | International Plant Protection Convention |
| ISO | International Organization for Standardization |
| ITC | Innovation Technology Cluster |
| JRC | Joint Research Center |
| KALRO | Kenya Agricultural and Livestock Research Organisation |
| KDB | Kenya Dairy Board |
| KEBS | Kenya Bureau of Standards |
| KEF | Knowledge Economy Foundation |
| KEPHIS | Kenya Plant Health Inspectorate Service |
| LGA | Local Government Area |
| MMDA | Metropolitan, Municipal and District Assembly |
| MoFAD | Ministry of Fisheries & Aquaculture Development |
| NAFDAC | National Agency for Food and Drug Administration and Control |
| NAQS | National Agricultural Quarantine Service |
| NBMA | National Biosafety Management Agency |
| NESREA | National Environmental Standards and Regulations Enforcement Agency |
| NFSA | National Food Safety Authority |
| NGO | Non-Governmental Organization |
| NIFSCC | National Intersectoral Food Safety Coordinating Committee |
| NPHL | National Public Health Laboratory |
| NRCS | National Regulator for Compulsory Specifications |
| OIE | World Organisation for Animal Health |
| PACA | Partnership for Aflatoxin Control in Africa |
| PCPB | Pest Control Products Board |
| PPRSD | Plant Protection and Regulatory Services Directorate |
| PSI | Pre-shipment Inspection |
| QCAP | Central Laboratory for the Analysis of Pesticide Residues |
| RASFF | Rapid Alert System for Food and Feed |
| RCFF | Regional Food and Feed Centre |
| SADC | Southern African Development Community |
| SABS | South African Bureau of Standards |

| | |
|------|--|
| SAVC | South African Veterinary Council |
| SMS | Short Message Service |
| SON | Standards Organization of Nigeria |
| SPS | Sanitary and Phytosanitary |
| STDF | Standards and Trade Development Facility |
| UP | University of Pretoria |
| VCN | Veterinary Council of Nigeria |
| VSD | Veterinary Services Directorate |
| WHO | World Health Organization |
| WHOA | World Health Organization Africa |
| WTO | World Trade Organization |
| WU | Wageningen University |

1 Introduction

1.1 Purpose of the Report

This report conducts a comprehensive gap analysis of food safety governance policies in the African informal food business value chain, focusing specifically on the African Union and five key member states: Ghana, Nigeria, South Africa, Kenya, and Egypt. Using the European Union's food safety framework as a benchmark, the analysis aims to identify critical gaps in existing policies, understand their socioeconomic impacts, and propose strategic recommendations for strengthening food safety governance across the informal food sector. The ultimate goal is to enhance public health outcomes while supporting the economic vitality of this crucial sector that serves as a primary food source for urban populations across Africa.

1.2 Background and Scope

The informal sector has been described as the “most deprived sectors of the population” [1]. Today, the informal food business (IFB) sector refers to all food-related activities conducted outside the formal, regulated market. The IFB ecosystem is comprised of large numbers of small producers, processors, vendors, and food service operators. It is still a vital component of the food systems, especially in lower-to-middle-income countries. The International Monetary Fund (IMF) suggests that, on average, the sector represents 35% of GDP in low- and middle-income countries [2]. This shows how much the sector has grown from mere deprivation to significant contributions to developing economies.

While the formal food sector dominates in developed economies, the informal food sector, though relatively small, plays a vital role. The sector is primarily driven by street vending, small-scale artisanal production, food service operations, and neighborhood markets. A shift to home-grown foods has also seen the rise of the informal food sector in developed economies [3,4].

The European Union (EU) remains a global leader in the regulation of the food sector to ensure quality and safety. The EU maintains strict policies and regulations through the European Food Safety Authority (EFSA) that apply to both the formal and informal sectors. The EU has sets of standards and procedures in all matters relating to food and food safety for businesses that target small and informal operators within the European Union, as well as imports into the territories. These policies and regulations ensure that food placed on the market is safe for all Europeans [5].

The EU's approach to informal food markets involves efforts to integrate them into the formal sector rather than suppressing them. However, informal operations are still prevalent in rural communities and regions with high unemployment rates or marginalized groups such as migrant communities [3]. Countries like Italy, Spain, and France see informal food markets, like open-air farmers' markets, as part of their cultural heritage [6]. As such, efforts are made to ensure these vendors comply with basic food safety and hygiene practices. Also, through the Rapid Alert System for Food and Feed (RASFF), the food safety authorities across the Union exchange timely information on health risks derived from food or feed and take prompt actions to avert risk [7].

The informal food sector in Africa is much larger and more pervasive. It comprises street vendors, kiosks, and traditional markets. These provide food for approximately 70% of African urban and peri-urban households [8]. Generally, individual African States have championed food safety regulations in their respective countries. However, in 2021, the African Union formulated the Food Safety Strategy of Africa (FSSA), a framework to implement activities that

promote various specific policies and guidelines to improve food safety, especially in the informal food sector. The framework was projected to be in force from 2022 till 2036 in pursuit of the AU's Agenda 2063 [9].

It is estimated that 239 million people living in sub-Saharan Africa, representing about 22.8 percent of the population, are undernourished [10]. The informal food sector plays an essential role on the continent by ensuring food supply and access to much of the population by providing employment opportunities for women and other marginalized groups and making food products available at affordable prices to urban dwellers who buy more food than they produce [11]. Despite the expanding contributions of the informal food sector, food safety remains a paramount issue on the continent. While it is estimated that intra-African food demand will increase by 178% by 2050 [12], about 91 million Africans fall ill each year due to foodborne diseases, and about 137,000 of them die of the same causes [13]. Thus, food safety is essential in meeting the health and nutritional needs of the growing African population.

Analysis of Country Policy Gap (Appendix I) will highlight the existing food safety laws, policies, regulations, interventions and yet to be addressed gaps that significantly concerns the informal food sector through understanding the economic conditions, demographics, education, cultural practices, food availability, and export activities. These factors shape the structure, dynamics, and reliance on informal food markets, influencing everything from production methods to consumer behavior.

The present GAP analysis of food safety policies in the African informal sector, is based on the EU European Food Safety Authority, EFSA, as a reference framework to measure FS implementation in the African Union at large, with a specific focus on 5 main countries: Nigeria, Ghana, South Africa, Kenya and Egypt.

A conceptual model guiding the food safety governance mapping to identify the policy gaps is shown in Figure 1. The model looks at the entire informal food business value chain. At the top of the model are the actors and policy interventions, which are the identified activities implemented by the international, regional, national, and non-state actors. This report highlights the food safety policies that govern the informal food business ecosystem. It gives a general overview of the informal food sector. It examines food safety policies, standards, and regulations of the European Union and the African Union, vis-a-vis their adoption or adaptation in Nigeria, Ghana, South Africa, Kenya, and Egypt. Additionally, the identified gaps in the food safety policies specific to informal food businesses in the African countries under consideration and the socio-economic impacts of these gaps are highlighted. Also, recommendations that will contribute to strengthening the food safety policies are advanced.

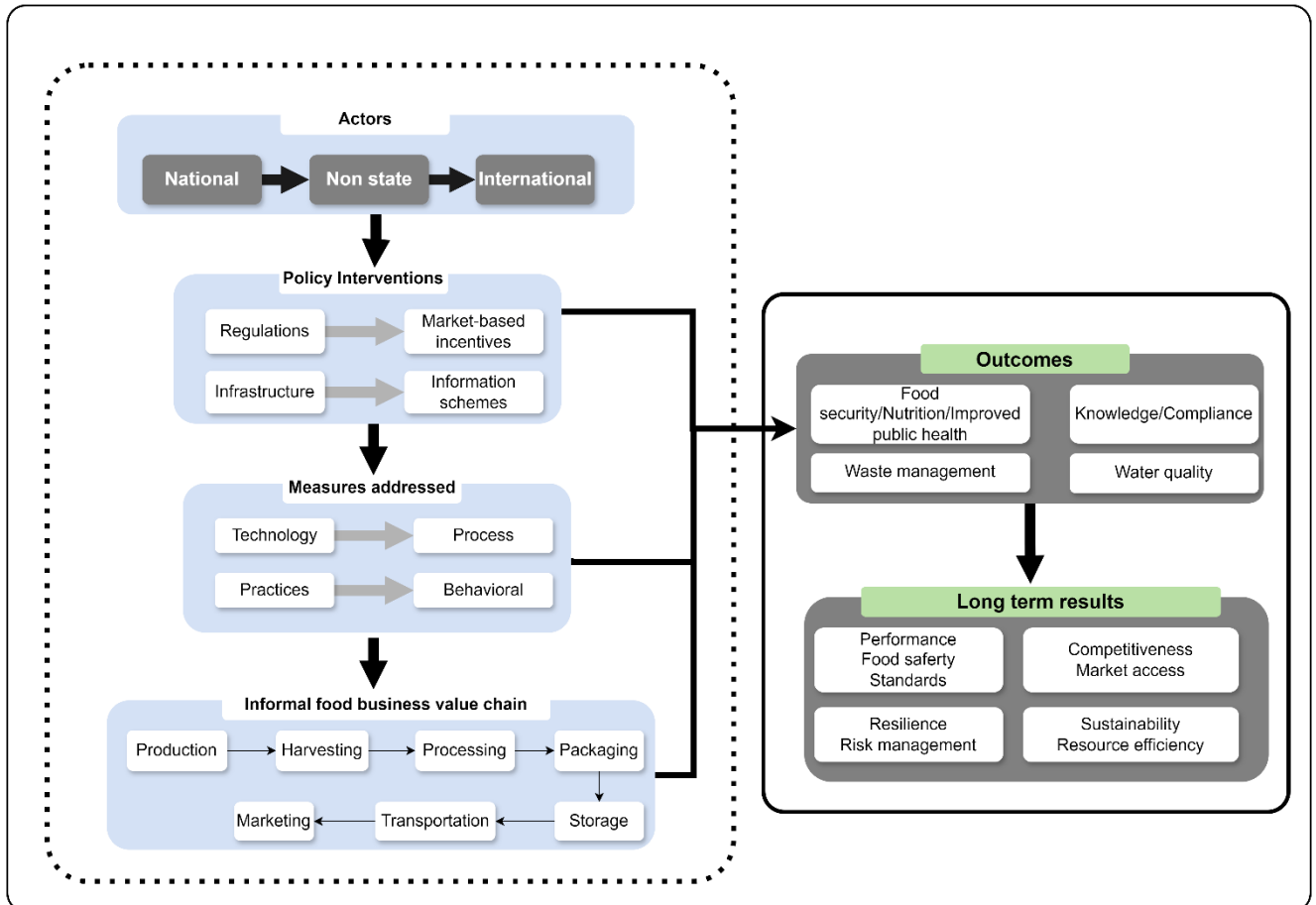


Figure 1: Conceptual Model for the food safety policy gaps in the informal food business ecosystem

1.3 Relationship to Other Deliverables

This report is directly relevant to Deliverable 1.1, the Assessment Report on the policy, legal, technical, and institutional frameworks governing food safety management, including the private sector. Deliverable 1.1 provides a foundational understanding of current policies and the legal framework. Based on this understanding, a comparative analysis of food safety governance policies was conducted, using the European Food Safety Authority (EFSA) as a benchmark for assessing the implementation of food safety measures within the African Union, specifically focusing on Nigeria, Ghana, South Africa, Kenya, and Egypt. Based on the gap analysis, preliminary recommendations have been formulated. The initial recommendation will serve as the foundation for deliverable 1.3, encompassing the development and dissemination of evidence-based recommendations and guidelines.

2 Overview of the food safety policy, legal, technical, and institutional frameworks

A detailed assessment of food safety management systems in Ghana, Nigeria, South Africa, and Egypt has been completed and submitted as Deliverable 1.1. This report offers an analysis of the policy, legal, technical, and institutional structures regulating food safety, with specific focus on the informal sector. A synopsis of the policy, legal, technical, and institutional frameworks underpinning the food safety gap analysis is presented to provide context.

Food safety remains a critical public health concern across Africa, with an estimated 91 million people falling ill and 137,000 deaths annually from foodborne diseases. The informal food sector, which accounts for over 80% of employment and 50% of GDP in many African countries, presents unique challenges for food safety governance. While this sector provides affordable food and vital employment opportunities, it typically operates outside formal regulatory frameworks, making it particularly difficult to enforce food safety standards.

Several key challenges across the focus countries are identified. A primary concern is the fragmented and sometimes outdated food safety legislation, coupled with overlapping responsibilities between multiple agencies. This is compounded by limited coordination between national and local authorities and inadequate enforcement mechanisms, especially in informal markets. Implementation challenges are equally significant, including limited financial and human resources for monitoring and enforcement, insufficient laboratory and testing infrastructure, weak food safety surveillance systems, and poor coordination between stakeholders.

The informal sector faces specific challenges that make food safety compliance particularly difficult. These include limited access to proper infrastructure and facilities, low awareness of food safety practices among vendors, economic constraints affecting compliance with standards, and difficulty in implementing traceability systems. These challenges are often exacerbated by the sector's informal nature and limited access to resources and training.

In spite of the aforementioned challenges, a number of successful initiatives and best practices from various countries are transferable to the informal sectors within the selected countries. For instance, India has made significant progress through implementing digital traceability systems and training programs for street vendors. Kenya has adopted innovative technologies like blockchain for supply chain monitoring. Morocco has introduced improved monitoring systems and QR codes to better inform consumers about food safety and quality.

In deliverable 1.1, we make several key recommendations for improving food safety governance. Emphasizes on the need to harmonize national regulations with international standards while strengthening coordination between agencies. Specific guidelines for informal sector regulation should be developed, and risk-based approaches to food safety management should be implemented. The report also stresses the importance of expanding training programs for informal vendors, strengthening laboratory and testing capabilities, improving surveillance systems, and enhancing inspector training and resources.

Technology and innovation play a crucial role in the recommended solutions. The report advocates for implementing digital traceability systems, adopting mobile testing and monitoring solutions, using early warning systems for food safety incidents, and leveraging blockchain and other emerging technologies. These technological solutions should be accompanied by strengthened public-private partnerships, increased community involvement, enhanced consumer awareness, and support for the formation of vendor associations.

The report emphasizes that improving food safety requires a balanced approach that considers both public health protection and the economic importance of the informal sector. Success depends on adapting international best practices to local contexts while ensuring that interventions are practical and affordable for informal vendors. Implementation should be progressive, allowing informal vendors to gradually improve their practices. This should be supported by capacity building at all levels of the food safety system, sustainable funding mechanisms, strong coordination between government agencies, private sector, and development partners, and regular monitoring and evaluation of interventions.

The report concludes that while significant challenges exist in ensuring food safety in Africa's informal sector, there are promising approaches and technologies that can help improve the situation. Success requires sustained commitment from governments, development partners, and stakeholders at all levels of the food system. By implementing the recommended strategies while considering local contexts and constraints, significant progress can be made in enhancing food safety across Africa's informal food sector.

3 Comparative Analysis of Pertinent Food Safety Laws and Policies In The EU, Nigeria, Ghana, South Africa, Kenya, and Egypt

Food safety laws and policies play critical roles in regulating practices and promoting public health within the food ecosystem. While laws are binding regulations enforced by government authorities to ensure compliance, food safety policies serve as non-binding guidelines aimed at promoting awareness and best practices. Together, these frameworks establish accountability, mitigate risks, and safeguard public health. The European Union (EU), Nigeria, Ghana, South Africa, Kenya, and Egypt represent diverse approaches to food safety governance, each shaped by unique circumstances. A comparative analysis of their regulations, inspection bodies, standards-setting institutions, governing ministries, and programs, as detailed in Tables 1 through 4, offers insights into their similarities and differences.

The European Union stands out with its harmonized and comprehensive food safety framework. Anchored by the Food Law Regulation (EC) No 178/2002, the EU ensures uniformity across member states through a centralized system led by the European Food Safety Authority (EFSA). This regulation establishes a unified approach, setting the foundation for laws and requirements across the Union. Table 1 highlights the EFSA's role and the inspection agencies involved. In contrast, while the African Union has introduced the Food Safety Strategy for Africa (FSSA), binding regulations do not exist at the continental level. Consequently, African nations develop and enforce food safety laws tailored to their specific needs and contexts.

Nigeria's food safety framework is shaped by legislation such as the Food and Drug Act 35 of 1974 and the National Agency for Food and Drug Administration and Control (NAFDAC) Act 15 of 1993. The National Policy on Food Safety and Its Implementation Strategy (NPFSIS), launched in 2014, consolidates food safety governance and enhances public health protection. NAFDAC serves as the primary enforcement body, while the Federal Ministry of Health, the Federal Ministry of Agriculture and Food Security (FMAFS), and the Federal Ministry of Environment (FMEnv) provide oversight, as detailed in Table 3. Table 2 outlines the role of the Standards Organization of Nigeria (SON) in setting and enforcing standards.

Ghana's approach to food safety is defined by the Public Health Act 2012 (Act 815), which integrates earlier legislation and mandates the Food and Drugs Authority (FDA) to oversee safety standards across the food chain. The Ghana Standards Authority (GSA), established under the Standards Decree of 1973 (NRCD 173), develops and enforces national standards, as shown in Table 2. Sector-specific legislation, such as the Animals Act and the Fisheries Act, address areas like veterinary services, meat inspection, and aquaculture, as described in Table 1. Municipal and district authorities also play a critical role in enforcing food hygiene in the informal sector, as highlighted in Table 3.

South Africa's regulatory landscape is decentralized, with numerous entities involved in food safety enforcement. The Foodstuffs, Cosmetics, and Disinfectants Act (Act 54 of 1972) and the National Health Act of 2003 form the legislative backbone, complemented by sector-specific regulations. The National Regulator for Compulsory Specifications (NRCS) and the South African Bureau of Standards (SABS) oversee enforcement and standard-setting, respectively, as outlined in Tables 1 and 2. Despite adopting international standards, South Africa's progress toward a consolidated food safety policy remains ongoing.

Kenya's legal framework is relatively fragmented, governed by various acts such as the Public Health Act (Cap 242 of 1921) and the Food Drugs and Chemical Substances Act (Cap 254 of 1965). Inspection and enforcement responsibilities are distributed among agencies like the Kenya Plant Health Inspectorate Service (KEPHIS) and the Directorate of Veterinary Services (DVS), as shown in Table 1. The Kenya Bureau of Standards (KEBS) serves as the sole standard-setting authority (Table 2), while the Ministry of Health plays a central role in enforcement (Table 3). Kenya's Standards and Market Access Program (SMAP), launched in 2018, aims to modernize food safety systems and enhance trade opportunities (Table 4).

Egypt's food safety governance is distinct, with clear delineation between pre-harvest and post-harvest responsibilities. The National Food Safety Authority (NFSA), established under Law No. 1 of 2017, oversees post-harvest food safety and enforces binding technical standards, as outlined in Table 1. These include limits on contaminants, HACCP (Hazard Analysis and Critical Control Points) implementation, and traceability measures. Pre-harvest activities fall under the jurisdiction of the Ministry of Agriculture, while the Ministry of Health conducts laboratory analyses and supports the NFSA's operations, as shown in Table 3. The Egyptian Organization for Standards focuses on quality specifications (Table 2), distinguishing them from food safety regulations enforced by the NFSA.

Inspection and regulatory bodies vary significantly across these regions. In the EU, EFSA ensures a centralized and harmonized inspection process, as shown in Table 1. In Nigeria, NAFDAC and the Standards Organization of Nigeria (SON) lead enforcement efforts. Ghana's FDA collaborates with local authorities to maintain hygiene standards, while South Africa relies on entities like NRCS and SABS for enforcement and standard-setting. Kenya's fragmented system involves multiple agencies, whereas Egypt's NFSA holds exclusive authority for post-harvest inspections, supported by other ministries.

Standards-setting bodies also differ across the regions. The EU benefits from a harmonized system, while Nigeria's SON and Ghana's GSA develop and enforce national standards, as detailed in Table 2. South Africa's SABS and Kenya's KEBS focus on product specifications, labeling, and categorization. Egypt's Egyptian Organization for Standards, though influential in quality specifications, plays a limited role in food safety enforcement.

Government ministries and departments further illustrate differences in food safety governance. In the EU, food safety oversight is streamlined across member states under EFSA's guidance. Nigeria's approach involves three key ministries, while Ghana's responsibilities are distributed across multiple entities, including the Ministry of Food and Agriculture (MOFA) and the Ministry of Fisheries and Aquaculture Development (MoFAD). South Africa's decentralized model involves the Department of Health and other sector-specific agencies. Kenya's Ministry of Health collaborates with bodies like KEPHIS and DVS, whereas Egypt's NFSA coordinates with the Ministries of Agriculture and Health, with distinct pre- and post-harvest roles (Table 3).

Programs and initiatives reflect each country's priorities and capacity. The EU's programs are harmonized and focus on risk management and public health. Nigeria's NPFSIS aims to enhance food commerce and safety. Ghana's FDA guidelines and Meat Inspection Regulation (2020) exemplify its proactive stance. South Africa continues to develop a consolidated policy while implementing sector-specific measures. Kenya's SMAP modernizes food safety systems, and Egypt's NFSA adopts internationally recognized programs like HACCP and Codex Alimentarius (Table 4).

Table 1: Regulatory and Inspection Roles

| | International | European Union | African Union | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|---|---|--|--|---|---|--|---|
| 1. | World Health Organization (WHO) | European Food Safety Authority (EFSA) | Africa Food Safety Agency (proposed) | National Agency for Food and Drug Administration and Control (NAFDAC) | Food and Drugs Authority (FDA) | National Department of Health- Food Control Directorate | Kenya Plant Health Inspectorate Service (KEPHIS) | National Food Safety Authority (NFSA) |
| 2. | Food and Agriculture Organization (FAO) | Directorate-General for Health and Food Safety (DG-SANTE) | Africa Biosafety Network of Expertise (ABNE) | Standards Organization of Nigeria (SON) | Veterinary Services Directorate (VSD) | National Regulator for Compulsory Specifications (NRCS) | Directorate of Veterinary Services (DVS) | General Organization for Veterinary Services (GOVS) |
| 3. | World Trade Organization (WTO) – Sanitary & Phytosanitary (SPS) Agreement | European Chemicals Agency (ECHA) | | Veterinary Council of Nigeria (VCN) | Environmental Protection Agency (EPA) Ghana | South African Veterinary Council (SAVC) | Pest Control Products Board (PCPB) | Central Laboratory for Food and Feed (CLFF) |
| 4. | | European Medicines Agency (EMA) | | Federal Competition & Consumer Protection Council (FCCPC) | Public Health Act (PHA) | Perishable products Export Control Board (PPECB) | Kenya Dairy Board (KDB) | Central Administration of Plant Quarantine (CAPQ) |
| 5. | | | | National Biosafety Management Agency (NBMA) | | | Agriculture & Food Authority (AFA) | |
| 6. | | | | National Agricultural Quarantine Service (NAQS) | | | Anti-Counterfeit Authority (ACA) | |
| 7. | | | | Environmental Health Officers Registration Council of Nigeria (EHORECON) | | | | |

Table 2: Standards Setting Bodies

| | International | European Union | African Union | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|---|--|--|---|---------------------------------|--|----------------------------------|---|
| 1. | Codex Alimentarius Commission (CAC) | Standing Committee on Plants, Animals, Food and Feed (SCoPAFF) | African Regional Standards Organization (ARSO) | National Agency for Food and Drug Administration and Control (NAFDAC) | Food and Drugs Authority (FDA) | South African Bureau of Standards (SABS) | Kenya Bureau of Standards (KEBS) | Egyptian Organization for Standardization and Quality (EOS) |
| 2. | International Organization for Standardization (ISO) – ISO22000 | | | Standards Organization of Nigeria (SON) | Ghana Standards Authority (GSA) | | | |
| 3. | | | | Institute of Public Analysts of Nigeria (IPAN) | | | | |

Table 3: Government Ministries and Departments

| | International | European Union | African Union | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|---------------|---|--|---|---|---|---|---------------------------------|
| 1. | | Directorate-General for Health and Food Safety (DG-SANTE) | African Union Commission (AUC)- Dept. of Rural Economy & Agriculture | Federal Ministry of Health | Ministry of Health, Environmental Protection Agency (EPA), Plant Protection and Regulatory Services Directorate (PPRSD), Fisheries Commission | Department of Forestry, Fisheries & the environment | Ministry of Health – Public Health Department | Ministry of Health & Population |
| 2. | | | | Federal Ministry of Agriculture & Food Security (FMAFS) | Ministry of Food and Agriculture (MOFA) | | | |

| | | | | | | | | |
|----|--|--|--|---|---|--|--|--|
| 3. | | | | Federal Ministry of Environment (FMENV) | Ministry of Fisheries & Aquaculture Development (MOFAD) | | | |
|----|--|--|--|---|---|--|--|--|

Table 4: Program

| | International | European Union | African Union | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|--|--|--|---------|---|---|--|-------|
| 1. | International Food Protection Training Institute (IFPTI) | Rapid Alert System for Food & Feed (RASFF) | African Union Development Agency (AUDA-NEPAD) | | Ghana Export Promotion Authority (GEPA) | Food Advisory Consumer Services (FACS) | Standards and Market Access Program (SMAP) | |
| 2. | | Joint Research Center (JRC) | Partnership for Aflatoxin Control in Africa (PACA) | | Food Research Institute (FRI) | Agricultural Research Council (ARC) | Kenya Agricultural and Livestock Research Organization (KALRO) | |
| 3. | | | | | | Consumer Goods Council of South Africa (CGCSA) – Food Safety Initiative (FSI) | National Public Health Laboratory (NPHL) | |

4 Gap Analysis in food safety policies

In the EU, Nigeria, Ghana, South Africa, Kenya, and Egypt food safety policies and regulations exist albeit not to the same degree. A comparison of major selected policies and regulations is presented Table 6-. Though food safety policies exist targeted at the informal food sector value chain, challenges remain in their implementation, enforcement, and harmonization to encourage local and international trade. The ability of the informal food sector to self-regulate in their compliance is also very important in enhancing national and international well-being and public health. Some of the identified gaps are highlighted in the sections below.

4.1 Regulatory Gaps

Across the EU, Nigeria, Ghana, South Africa, Kenya, and Egypt, food safety oversight involves multiple agencies, but coordination mechanisms are often lacking in the informal sector. This lack of coordination allows informal sector operators to evade oversight. Table 6 presents a description of regulations governing the informal food sector. The EU is the only region with explicit regulations governing informal food businesses operating from home, ensuring that food businesses meet food safety standards. None of the African countries in the review have made strides toward regulation of home-based food businesses. Similarly, The EU has taken measures through regulations to formalize the informal food businesses. However, the approach of the African countries has not prioritized formalizing the informal sector. The above-mentioned lack of coordination mechanisms, coupled with existing regulations and standards that are rarely adapted to the unique conditions of the informal sector, leads to inconsistencies even in basic food safety practices in African countries. A lack of regular reviews and updates to existing regulations further complicates effective enforcement. Additionally, clearly defined policies/regulations on health, risk, and safety surveillance in the informal sector are lacking, and the agency responsible for the surveillance oversight is mixed up and, at times, confusing. From a public health perspective, the surveillance gaps must be addressed, and local government and municipal authorities that are close to the informal sector players must be trained and equipped to carry out regular and proactive risks and safety surveillance.

Table 5: Regulatory Policies Governing the Informal Food Sector

| S# | Food Safety Policy | Description | The EU | The AU | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|---|--|--------|--------|---------|-------|--------------|-------|-------|
| 1. | Regulation of Home-based Food Businesses | Many informal food businesses operate from home. The existence of specific regulations or guidelines for home-based food businesses, ensuring they meet food safety standards while providing flexibility for small-scale operations | Yes | No | No | No | No | No | NA |
| 2. | Integration of Informal Food Sector into the Formal Economy | Efforts to formalize informal food businesses through incentives for registration and compliance, reduction of bureaucratic barriers, and providing support for the transition. | Yes | No | No | No | No | No | NA |

4.2 Hygiene and Food Handling

Enforcing hygiene standards in the informal food sector is a significant challenge in African countries. Table 7 highlights the existence of food hygiene and handling regulations. Though the African Union has no set policies on food hygiene and handling, Nigeria, Ghana, South Africa, Kenya, and Egypt have some form of regulations on hygiene and proper handling of food that apply to all businesses. Similarly, in theory, all countries have set standards for the maximum levels of contaminants like aflatoxin and pesticide residues permitted in food. Nonetheless, compliance remains a challenge. In Nigeria, studies reveal that many food handlers in informal markets lack basic knowledge about pathogens and appropriate hygienic practices [34]. This knowledge gap results in unsafe food handling practices, which increase the risk of foodborne diseases. Likewise, in Kenya, informal markets are under-regulated, with low compliance rates, resulting in weak adherence to hygiene requirements [35].

Evidence suggests that Africa accounts for about 30% of the total non-conformity of EU food standards, with non-compliance to maximum contaminant levels being a significant rejection factor [41]. This underscores the need to bolster food hygiene and handling policies and ensure compliance in Africa. In the food hygiene, handling, and storage requirements category, food safety policies are well-enforced in the EU's informal sector, with a "farm to fork" strategy that covers the entire food chain [32]. The EU places the primary responsibility for food safety on producers, supported by adequate government controls. In Nigeria, Ghana, South Africa, Kenya and Egypt general food laws provide guidelines for all food businesses. While these policies have the flexibility to accommodate informal food operators, they are not strictly enforced in the sector.

4.2.1 Contaminants Handling

Contaminants are communicated through the respective alert systems when exceeded. Guidelines are also set for food safety certification in all countries. However, the nature of the informal sector relaxes the need for informal businesses to obtain food safety certifications, especially in African countries, as there are low barriers to entry. Furthermore, the EU, Nigeria, Ghana, and South Africa have community engagement and education programs to raise awareness about food safety practices. These are done through channels such as television and radio advertisements, print and social media, and in-market interactions. Nonetheless, these actions can be bolstered to expand the reach into the informal markets.

Additionally, the countries have policies that ensure consumers receive accurate and clear requirements to an extent. No specific acts govern street food markets. Nevertheless, food safety agencies at times provide information about the safety of some food products sold at local markets and requirements that applies to labeling and packaging. Though this indirectly encourages informal businesses to adhere to safety standards, only the EU enforces these in respective countries address requirements for street vendors and have the mandate to improve access to necessary resources and infrastructure in the sector.

In Ghana, the national food safety policy was adopted in 2021 and one of its main objectives is to enhance coordination among institutions. Thus, the policy seeks to address the problem of overlaps and low collaboration among institutions. Accordingly, a National Intersectoral Food Safety Coordinating Committee (NIFSCC) has been established of which technical committees have been formed to oversee the implementation of the strategic plan of the policy and to develop harmonized guidelines and other operational documents. Already, the Food Safety Technical Working Group has developed harmonized import and export procedures for

implementation. Currently, the Food Safety Technical Working Group of the NIFSCC is assessing competent authorities' institutional mandates to streamline them and eliminate duplication of efforts and ensure clear distinctions in mandates. Another important policy is the national policy for aflatoxin control in feed and feed with the vision to improve harmonisation and coordination of activities among all stakeholders for effective management and control of aflatoxins in food and feed. In Ghana, all the regulatory institutions are expected to oversee the formal and informal sectors, however, due to various challenges, more attention is given to the formal sector at the expense of the informal sector. Notwithstanding, the MMDAs operate with the Part 5 of the Public Health Act, the Local Governance Act 2016 (Act 936) and various Local Government By-laws that mandate them to ensure compliance with food safety and hygiene requirements in the informal sector. Thus, the MMDAs has a significant influence in the regulation of the informal food sector in Ghana and they work collaboratively with other regulatory institutions. Furthermore, specifically for the informal sector, Ghana recently developed the Food Safety Guidelines for MMDAs, which is expected to be mainstreamed in their operations and by-laws.

Table 6: Food Hygiene and Handling Regulations in the Informal Food Sector

| S# | Food Safety Policy | Description | The EU | The AU | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|--|---|--------|--------|---------|-------|--------------|-------|-------|
| 1. | Hygiene, Food Handling & Storage Requirements | Hygiene, proper handling, and storage guidelines that apply to all food businesses regardless of size. Includes flexibility for small businesses and relevant traditional methods | Yes | No | Yes | Yes | Yes | Yes | Yes |
| 2. | Aflatoxin, Other Mycotoxins, & Contaminants Levels | Regulation that sets permissible limits for contaminants in foodstuffs, including aflatoxins, ochratoxin A, patulin, fusarium toxins in nuts, dried fruits, cereals, pulses, and related products | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3. | Street Food & Farmer' Market Regulations | Regulations governing street food vendors, mobile hawkers, & farmer's market. Mandatory local authority inspections. Includes requirements to provide accurate information about the ingredients used in preparing their foods & drinks, including possible allergens | Yes | No | No | Yes | Yes | No | NA |
| 4. | Pest Control/ Pesticide Use/ Pesticide Residues | Regulation that sets maximum residue levels (MRLs) of pesticides in or on foods; establishes rules for the approval of active substances in pesticides & sets conditions for their use in food premises | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

4.3 Infrastructure Gaps

Unlike Europe, informal food businesses in African countries suffer from severe infrastructure deficiencies, including potable water, refrigeration/cold chain storage, and appropriate waste

disposal facilities. These gaps contribute to high levels of contamination, spoilage, pest infestation, and bacterial and mold growth, which significantly increase health risks. For example, municipalities in Kenya struggle to provide the necessary infrastructure for safe food handling in informal markets. About 60% of informal vendors in Nairobi lack access to basic sanitation facilities and clean water [38]. Similarly, in Nigeria, the absence of drainage systems and waste management facilities creates environments prone to contamination and foodborne diseases [39].

Additionally, limited testing and monitoring tools and facilities are grossly limited. Inadequate infrastructure for food testing and monitoring in informal markets allows contamination to go undetected until outbreaks occur, posing serious risks to public health.

Table 8 shows the existence of regulations regarding infrastructure for food safety. It can be seen that aside from the EU, South Africa is the only African country in review that has codified policies on providing access to informal food businesses through tailored resources and infrastructure. Nigeria, Ghana, and Kenya do not provide support initiatives to improve access to resources and infrastructure such as market stalls, clean water, sanitation, and waste disposal facilities. Moreover, Egypt, like the EU, has policies that offer microfinancing and loans to businesses in the informal food sector. It is imperative that countries provide resources in the form of loans and microfinance, as well as infrastructure dedicated to the informal food business to strengthen their capacities of ensuring hygienic and safe food conditions in the sector.

4.3.1 Food Storage

The absence of proper food storage facilities threatens food safety in the informal sector. In Ghana and Kenya, Informal vendors handle large quantities of fresh food but often store perishable items at ambient temperatures due to a lack of refrigeration [37]. Open-air markets, prevalent in the informal sector, lack protection against environmental contaminants. The absence of cold storage facilities is particularly problematic for perishable foods like meat, fish, dairy products, and fresh produce.

Table 7: Regulations on Infrastructure in the Informal Food Sector

| S# | Food Safety Policy | Description | The EU | The AU | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|---|--|--------|--------|---------|-------|--------------|-------|-------|
| 1. | Access to Informal Business Tailored Resources & Infrastructure | Availability of support initiatives that improve access to resources and infrastructure such as market stalls, clean water, sanitation proper storage and waste disposal facilities that are critical to maintaining food safety | Yes | No | No | No | Yes | No | NA |
| 2. | Microfinance & Loans | The existence of microfinance and loans dedicated to or targeting informal food businesses. Access allows them to invest in necessary improvements to meet food safety standards. | Yes | No | No | No | No | No | Yes |

4.4 Awareness and Compliance Gaps

Awareness of proper food safety standards remains challenging in the informal food sector in Africa. FAO studies have shown that many African informal food business operators have

limited education and knowledge of best food practices relevant to their trade. Table 9 discusses the extent to which food safety policies govern the knowledge and compliance of stakeholders in the informal food ecosystem. While the AU does not have policies on community engagement and public education, Nigeria, Ghana, South Africa, Kenya, and Egypt have policies focused on raising awareness about food safety practices in the informal food sector. Similarly, except for Kenya, the countries require informal food businesses to train and acquire food safety certifications. However, gaps in knowledge and compliance remain and are attributed to the limited training opportunities and minimal engagement with food control officials. Support programs are also lacking. Hence, informal operators are unable to navigate the verification process. The unavailability of training opportunities, resources, or simplified or local language training materials worsens this.

The EU, Ghana, and South Africa actively utilize social media and digital platforms to disseminate food safety information and best practices. However, the AU, Nigeria, Kenya, and Egypt have not fully embraced this approach, missing an opportunity to reach informal food operators who may not have access to formal training resources. Collaboration with research and academic institutions has proven to aid in creating awareness and encouraging compliance. However, apart from South Africa and Egypt, other African countries fall short in policies that promote collaboration with universities and research institutions to develop and disseminate best practices for food safety in the informal sector. This hinders the development of tailored guidelines and training materials specially designed for the needs and context of the informal food sector.

Table 8: Policies Governing Knowledge and Compliance in the Informal Food Sector

| S# | Food Safety Policy | Description | The EU | The AU | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|---|--|--------|--------|---------|-------|--------------|-------|-------|
| 1. | Community Engagement & Public Education | Policy recommendation focused on community engagement and education to raise awareness about food safety practices within the informal sector. Includes workshops, public health campaigns, safe food handling practices, & collaboration with local authorities | Yes | No | Yes | Yes | Yes | Yes | Yes |
| 2. | Food Safety Certifications | Policy encouraging informal food businesses to train and acquire food safety certifications which enhances credibility & market access. Existence of support programs to help informal operators navigate the certification process & the associated costs. | Yes | No | Yes | Yes | Yes | No | Yes |
| 3. | Social media & Digital Platforms | Use of social media and other digital platforms to disseminate food safety information and best practices with the aim of reaching informal food operators that might not have access to the formal training resources | Yes | No | No | Yes | Yes | No | NA |
| 4. | Collaboration with Academia & | Existence of policies that encourages collaboration with | Yes | No | No | No | Yes | No | Yes |

| | | | | | | | | | | |
|----|----------------------------|---|-----|----|----|-----|----|----|-----|--|
| | Research Institutions | universities and research institutions to develop and disseminate best practices for food safety in the informal sector, leading to the creation of tailored guidelines and training materials | | | | | | | | |
| 5. | Cross-Sector Collaboration | Regulations requiring collaboration across different sectors, such as health, trade and commerce, leading to more effective food safety interventions; Incorporation of traditional indigenous knowledge into food safety guidelines and practices. | Yes | No | No | Yes | No | No | Yes | |

4.5 Traceability and Transparency

Food safety efforts in the informal food sector of Africa are confronted with traceability and transparency issues. Table 10 shows policies on traceability and transparency in the informal food sector. The most striking gap is evident in traceability practices and policies. While the EU encourages informal food businesses to adopt traceability practices to ensure food safety and accountability within the food supply chain, the AU and most African countries lag behind. Only Egypt, among the African countries listed, has implemented policies encouraging traceability in the informal sector. This poses significant risks to food safety as tracking the origin and movement of food products in case of contamination and other safety issues is difficult.

Moreover, policies on recalling unsafe foods and alerting the public need to be improved. Ghana, South Africa, and Egypt have protocols for food recalls and public alert systems, while Nigeria and Kenya are lacking in these measures. This often leads to prolonged exposure to unsafe food items, increasing the risk of foodborne illnesses. Nigeria, Ghana, South Africa, Kenya, and Egypt have all made strides with regulations and programs that encourage the use of mobile apps for traceability.

Similarly, all African countries have systems in place to detect and respond to food safety issues. While they are primarily used in the formal sector, they are difficult to implement in the informal sector due to the predominance of small operators. In Nigeria, less than 10% of informal food vendors could reliably trace the source of their products beyond immediate suppliers [38]. The fragmented nature of the informal sector complicates efforts to achieve transparency and traceability, posing risks to public health and safety. Regarding traceability and transparency, the EU's Rapid Alert System for Food and Feed (RASFF) is the primary means of communicating information on recalls, public health warnings, and harmful products to consumers [7]. Similarly, Nigeria, through the NAFDAC Recalls and Alerts System [33], and Ghana, through the FDA Alert System, promote traceability and transparency practices and Egypt through NFSA. However, gaps remain as the informal food sector is not incorporated into the alert system of these countries. No clear information was found relating to practices in South Africa and Kenya.

All countries under review were found to have regulations that set permissible limits for contaminants like aflatoxins in foodstuffs. For instance, in Egypt there are published 7 MRL for different food categories including food additives, veterinary drug residues in food, etc.

Table 9: Policies on Traceability and Transparency in the Informal Food Sector

| S# | Food Safety Policy | Description | The EU | The AU | Nigeria | Ghana | South Africa | Kenya | Egypt |
|----|-----------------------------------|---|--------|--------|---------|-------|--------------|-------|-------|
| 1. | Traceability & Transparency | Informal businesses encouraged to adopt basic traceability practices to ensure safety and accountability within the food supply chain | Yes | No | No | No | No | No | Yes |
| 2. | Food Recalls & Alerts | Protocols for recalling unsafe foods and food products from the market & existence of systems to inform the public | Yes | No | No | Yes | Yes | No | Yes |
| 3. | Innovation & Technology Adoption | The existence of regulations and programs that promote innovation and adoption of new technologies that can help informal food businesses improve safety, such as, use of mobile apps for traceability, digital thermometers for temperature control, & other affordable tech solutions | Yes | No | Yes | Yes | Yes | Yes | Yes |
| 4. | Monitoring & Surveillance Systems | The existence of monitoring and surveillance systems to help detect and respond to food safety issues in the informal food sector. Systems include local community reporting, whistle blower protection, regular inspections of food establishments, collecting and analyzing data related to street food consumption | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

5 Policy Recommendations

The socio-economic impacts of food safety gaps in Africa's informal food sector are significant, affecting both public health and economic stability. Informal food vendors often contribute disproportionately to contamination risks and other hazards. As a major driver of employment in Africa, the informal food sector's vulnerabilities, such as outbreaks of foodborne diseases, undermine consumer confidence, reduce sales, and can lead to regulatory restrictions that jeopardize vendors' livelihoods. Addressing these gaps requires targeted strategies that prioritize regulation harmonization, infrastructure improvement, education and training programs, and financial support that would be beneficial to the informal food business enterprises. Strengthening traceability systems and fostering compliance through community engagement can enhance food safety in the informal sector while promoting public health and economic growth. Despite the challenges of implementing traceability in the informal sector, African nations should prioritize its integration within the food supply chain. Encouraging informal businesses to adopt basic traceability practices can enhance accountability and food safety. Initiatives could include requiring retailers to retain invoices and receipts for a specified period and promoting the use of barcoding for products among small-scale producers, farmers, and microprocessors. Public awareness campaigns should educate consumers on the importance of sourcing food from trusted vendors who comply with safety standards, fostering trust and supporting local food systems.

5.1 Key strategies include:

5.1.1 Flexible policies:

Developing adaptable food safety regulations that reflect the realities of informal businesses while safeguarding public health. This should include developing simplified and easy-to-understand compliance guidelines and checklists for food safety compliance.

5.1.2 Community-led initiatives:

Promoting community-driven food safety practices and collaboration among stakeholders. Including incorporating local customs and best practices into training materials to ensure the policy formulation and information therein is relevant and easily adoptable by the community. Also, training selected individuals from each community who can train others, ensuring that food safety knowledge is disseminated widely and sustainably. Local food safety networks should be created, where informal food business operators and vendors can share the best practices, resources, and support.

5.1.3 Public awareness and education:

Implementing workshops, campaigns, and training programs focused on safe food handling and fostering peer collaboration. Regular community food safety events should be organized to facilitate peer-to-peer learning opportunities. Training materials should be available in local languages and formats accessible to individuals with limited education. Remote learning modules should be developed so that vendors can access via smartphones, ensuring continuous education even in remote areas. Pilot programs in Ghana and Kenya demonstrate that even basic training can significantly reduce food safety risks among street vendors.

5.1.4 Trust-building initiatives:

Ensuring that informal vendors understand that food safety enhances opportunities for better pricing and market access, free from the fear of increased financial burdens. Voluntary

certification programs need to be put in place. The scheme should encourage informal food businesses to participate to demonstrate their commitment to food safety. Voluntary participants should be rewarded or recognized through rating systems (e.g., star ratings) based on food safety compliance or receive visible certification stickers that can be displayed at their vending locations, building consumer trust. The law should also mandate periodic refresher training for certified businesses to maintain their certification and stay updated on best practices.

5.1.5 Government Subsidies and Incentives:

Informal businesses that implement and maintain high food safety standards should be offered subsidies or incentives. The incentives can include but are not limited to financial support to help invest in necessary infrastructure improvements or new technology; subsidizing the cost of protective clothing such as aprons, gloves, and masks to promote hygienic practices; distributing portable handwashing stations to street vendors who lack access to permanent facilities; distribution of hygiene kits containing items such as soap, hand sanitizer, gloves, hairnets, and disinfectants; offering solutions such as insulated containers for the safe transport of food items to prevent spoilage during transit; offering subsidized professional pest control services to manage and prevent infestations; regulations that encourage alternative non-chemical based storage solutions such as hermetic storage should be explored; etc.

5.1.6 Simplified Reporting Mechanisms:

User-friendly reporting systems for food safety violations must be established. Vendors and consumers should be able to easily and possibly anonymously report issues easily and promptly.

5.1.7 Responsible and Strong Local Governments:

Enabling laws should mandate Local Government Authorities to invest in upgrading open market infrastructures. The key areas of focus should be:

- Sanitation facilities: Providing accessible clean water for hygiene and sanitation.
- Cold chain and storage facilities: Establishing communal refrigeration and storage facilities with affordable access for vendors.
- Waste management: Ensuring regular waste collection, providing sealed disposal bins of various sizes, and locating waste dumps far from food handling areas.
- Collaboration: Local and Municipal governments should collaborate with universities, research institutions and local and active food safety NGOs to develop scientifically validated, locally relevant food safety solutions, training materials, training and certification for the informal food business enterprises.

5.1.8 Creation of African Food Policies Digital Platform:

A user-friendly digital platform on all matters related to food safety policies in Africa should be created. This should be a one-stop platform for informal vendors, aggregators, policy makers and other stakeholders to explore existing food safety laws per country and region, updates on the policies and the socioeconomic impacts of the policies such as health and trade (local, regional, and international) tradeoffs and implications of non-compliance.

6 Conclusion

Improving food safety in the informal food sector of Africa particularly Nigeria, Ghana, South Africa, Kenya, and Egypt begin with the existence of relevant food safety policies, laws and regulations. These laws must cover the entire food system value chain from production to the retailer and even the consumer. No section should be allowed to compromise the safety and public health of the populace. It is also important to build trust among the operators and vendors. It is critical to assure them that enhancement strategies will not result in additional taxes or financial burdens. Any associated costs for implementing food safety improvements should directly correlate to better market prices for their products, ensuring that vendors perceive these initiatives as investments in their success rather than as penalties.

This food safety policy gap analysis has highlighted the significant challenges in food safety governance across the informal food sectors of Nigeria, Ghana, South Africa, Kenya, and Egypt. These challenges include fragmented policy approach through diverse government agencies, limited regulatory and surveillance oversight, inadequate infrastructure, and financial barriers, all of which pose serious risks to public health and economic resilience. While fully integrating informal food businesses into formal frameworks may not be feasible, targeted policy and regulated interventions can mitigate these risks. Lastly, African governments must rise to the occasion of meeting the food security and food safety needs of the continent. Over-reliance on international donor funding for food safety research is unsustainable; African governments must allocate domestic budgets for long-term monitoring and evaluation of food safety initiatives.

7 References

- [1] Portes, A. (1983). The informal sector: Definition, controversy, and relation to national development. *Review* (Fernand Braudel Center), 7(1), 151-174. <http://www.jstor.org/stable/40240956>
- [2] International Monetary Fund. (2021). Five things to know about the informal economy. IMF. Retrieved November 28, 2024, from <https://www.imf.org/en/News/Articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy>
- [3] Martínez, M. A., Brons, A., & Wertheim-Heck, S. C. O. (2024). How do the people that feed Europe feed themselves? Exploring the (in)formal food practices of Almería's migrant and seasonal food workers. *Agriculture and Human Values*, 41, 731-748. <https://doi.org/10.1007/s10460-023-10513-8>
- [4] Termeer, E., van B., S., D., Y., & de S.P., B. (2024). Unpacking the informal midstream: How the informal economy could contribute to enhanced food system outcomes. *Current Opinion in Environmental Sustainability*, 68, Article 101433. <https://doi.org/10.1016/j.cosust.2024.101433>
- [5] European Commission. (2024). General food law. Food Safety. Retrieved November 28, 2024, from https://food.ec.europa.eu/horizontal-topics/general-food-law_en
- [6] Butera, S. (2018). In Italy the world's largest network of farmers' market. Euractiv. Retrieved November 28, 2024, from <https://www.euractiv.com/section/agriculture-food/news/in-italy-the-worlds-largest-network-of-farmers-market>
- [7] European Commission. (2024). Rapid alert system for food and feed (RASFF). Food Safety. Retrieved November 28, 2024, from https://food.ec.europa.eu/food-safety/rasff_en
- [8] Fraser, E., Malambo, M., & Johanna, W. (2014). The role of the informal economy in addressing urban food security in sub-saharan africa. CIGI Junior Fellows Policy Brief, 14.
- [9] African Union Department of Rural Economy and Agriculture. (2021). Food safety strategy for Africa: 2022-2036. Retrieved November 28, 2024, from <http://repository.au-ibar.org/handle/123456789/1405>
- [10] Food and Agriculture Organization of the United Nations. (2020). COVID-19 and malnutrition: Situation analysis and options in Africa. Policy Support and Governance Gateway. Retrieved November 28, 2024, from <https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1307999/>
- [11] Skinner, C., & Haysom, G. (2017). The informal sector's role in food security: A missing link in policy debates (Discussion Paper No. 6). Hungry Cities Partnership.
- [12] Food and Agriculture Organization of the United Nations. (2020). Intra-Africa trade in food and agriculture: Issues, challenges and prospects in the context of the African Continental Free Trade Area (AfCFTA). Retrieved November 28, 2024, from <https://openknowledge.fao.org/server/api/core/bitstreams/56c8b951-5624-4f37-9c8c-c04c8685a4a3/content>
- [13] World Health Organization. (2024). Foodborne diseases estimates. Retrieved November 28, 2024, from <https://www.who.int/data/gho/data/themes/who-estimates-of-the-global-burden-of-foodborne-diseases>

- [14] International Labour Organization. (2024). Informal economy. Retrieved November 28, 2024, from <https://www.ilo.org/projects-and-partnerships/projects/partnership-improving-prospects-forcibly-displaced-persons-and-host/themes/informaleconomy>
- [15] Skinner, C. (2016). The nature, contribution and policy environment for informal food retailers: A review of evidence. African Centre for Cities.
- [16] Mitullah, W. V. (2004). A review of street trade in Africa.
- [17] Grace, D., Morenike, D., & Silvia, A. (2019). Improving food safety in the informal sector: Nine years later. *Infection Ecology & Epidemiology*, 9(1). <https://doi.org/10.1080/20008686.2019.1579613>
- [18] Knox, A. J., Hans, B., Nthabiseng, M., & Jiska D. G. (2019). Aspirations to grow when micro-and informal enterprises in the street food sector speak for themselves. *Journal of Global Entrepreneurship Research*, 9, 1-24.
- [19] Food and Agriculture Organization of the United Nations. (2003). The informal food sector. FAO Knowledge Repository. Retrieved November 28, 2024, from <https://openknowledge.fao.org/server/api/core/bitstreams/78f51386-a4c1-408c-913a-686f8f3b2149/content>
- [20] Weng, X. (2015). The rural informal economy understanding drivers and livelihood impacts in agriculture, timber and mining. International Institute for Environment and Development. Retrieved November 28, 2024, from <http://pubs.iied.org/16590IIED>
- [21] Kiggundu, M. N., & Siva P. P. (2018). Structure and management of formal and informal business activities in entrepreneurial family and small firms in Africa. *Africa Journal of Management*, 4(3), 347-388.
- [22] Tellstrom, R., Gustafsson, I.-B., & Mossberg, L. (2005). Local food cultures in the Swedish rural economy. *Sociologia Ruralis*, 45, 346-359. <https://doi.org/10.1111/j.1467-9523.2005.00309.x>
- [23] Kok, R., & Balkaran, R. (2014). Street food vending and hygiene practices and implications for consumers. *Journal of Economics & Behavioural Studies*, 6(3), 188-193.
- [24] Kanu, P. J., & Hamid, T. (2024). Food hygiene and safety practices amongst food vendors in the Western Area, Sierra Leone. *Food and Nutrition Sciences*, 15(6), 421-431.
- [25] Emmanuel, A., Mangai, J. M., Kayong, E. A., Afoi, B. B., Goshit, J. D., Naman, K., & Innocent, O. (2015). Assessment of practice of food safety and hygiene among food vendors within Jos North Local Government Area of Plateau State, Nigeria. *International Journal of Medical and Health Research*, 1, 83-86.
- [26] Abdi, A. M., Amano, A., Abraham, A., Getahun, M., Ababor, S., & Kumie, A. (2020). Food hygiene practices and associated factors among food handlers working in food establishments in the Bole Sub City, Addis Ababa, Ethiopia. *Risk Management and Healthcare Policy*, 13, 1861-1868. <https://doi.org/10.2147/rmhp.s266342>
- [27] Robinson, E., & Yoshida, N. (2016). Improving the nutritional quality of food markets through the informal sector: Lessons from case studies in other sectors. Institute of Development Studies. Retrieved November 28, 2024, from <https://hdl.handle.net/20.500.12413/8959>

- [28] WHO's first ever global estimates of foodborne diseases find children under 5 account for almost one third of deaths. (2016). *Saudi Medical Journal*, 37(1), 109-110.
- [29] Hoffmann, S., & Anekwe, T. D. (2013). Making sense of recent cost-of-foodborne-illness estimates (Economic Information Bulletin No. 118). United States Department of Agriculture, Economic Research Service.
- [30] World Bank Group. (2018). Food-borne illnesses cost US\$ 110 billion per year in low- and middle-income countries. Retrieved November 28, 2024, from <https://www.worldbank.org/en/news/press-release/2018/10/23/food-borne-illnesses-cost-us-110-billion-per-year-in-low-and-middle-income-countries>
- [31] European Commission. (2002). Regulation (EC) No 178/2002.
- [32] European Union. (2020). Farm to fork strategy. Food Safety. Retrieved November 28, 2024, from https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en
- [33] National Agency for Food and Drug Administration and Control. (2024). Recalls and alerts. Retrieved November 28, 2024, from <https://nafdac.gov.ng/category/recalls-and-alerts/>
- [34] Onyeaka, H., Ekwebelem, O. C., Eze, U. A., Onwuka, Q. I., Aleke, J., Nwaiwu, O., & Chionuma, J. O. (2021). Improving food safety culture in Nigeria: A review of practical issues. *Foods*, 10(8), Article 1878. <https://doi.org/10.3390/foods10081878>
- [35] Kuboka, M., Delia, G., Karin, A., Johanna, L., Gunnar, C., & Mutua, F. (2024). Food safety in informal public markets in Kenya: Perceptions of stakeholders in the food chain. *Frontiers in Sustainable Food Systems*, 8, Article 1411318. <https://doi.org/10.3389/fsufs.2024.1411318>
- [36] Henson, S., & Jaffee, S. (2024). Food safety policy neglects informal markets in developing countries - 3 ways this can change. *The Conversation*. Retrieved November 28, 2024, from <https://theconversation.com/food-safety-policy-neglects-informal-markets-in-developing-countries-3-ways-this-can-change-209049>
- [37] Radoli, I. (2024). Empowering street food vendors for a safer future: Is food safety achievable or is it an oxymoron? *APHRC*. Retrieved November 28, 2024, from <https://aphrc.org/blogarticle/empowering-street-food-vendors-for-a-safer-future-is-food-safety-achievable-or-is-it-an-oxymoron/>
- [38] Mazi, I. M., Onyeaka, H., Akegbe, H., Njoagwuani, E. I., Ochulor, C. E., Oladunjoye, I. O., & Odeyemi, O. A. (2023). Street vended foods in Nigeria: An analysis of the current state of affairs and the way forward. *Cogent Food & Agriculture*, 9(2). <https://doi.org/10.1080/23311932.2023.2266194>
- [39] Boatemaa, S., Kushitor, M., Badu, M., Kushitor, M., & Currie, P. (2022). Working with little: Access to market infrastructure and its effect on food handling and food safety among vegetable traders in an African city. *Frontiers in Sustainable Food Systems*. <https://doi.org/10.3389/fsufs.2022.724190>
- [40] Food and Agriculture Organization of the United Nations, International Fund for Agricultural Development, & World Food Programme. (2013). The state of food insecurity in the world 2013: The multiple dimensions of food security.
- [41] Kareem, F. O., Inmaculada, M., & Bernhard, B. (2022). What drives Africa's inability to comply with EU standards? Insights from Africa's institution and trade facilitation measures.

The European Journal of Development Research, 35(4), 938-973.
<https://doi.org/10.1057/s41287-022-00547-9>

8 Annex I: The URL of the food safety policy and regulation agencies

| Outreach | Agency | Weblink |
|---------------|------------------|---|
| International | Codex | https://www.fao.org/fao-who-codexalimentarius/committees/cac/about/en/ |
| | WHO | https://www.who.int/ |
| | FAO | https://www.fao.org/home/en |
| | WTO-SPS | |
| | ISO22000 | https://www.iso.org/iso-22000-food-safety-management.html |
| The EU | IFPTI | https://www.ifpti.org/ |
| | EFSA | https://www.efsa.europa.eu/en |
| | DG-SANTE | https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/health-and-food-safety_en |
| | RASFF | https://food.ec.europa.eu/food-safety/rasff_en |
| | FSAI/BVL/AN SES | https://www.fsai.ie/ ; https://www.bvl.bund.de/EN/Home/homenode.html ; https://www.anses.fr/en |
| | ECDC | https://www.ecdc.europa.eu/en |
| | ECHA | https://echa.europa.eu/ |
| | JRC | https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/joint-research-centre_en |
| | SCoPAFF | https://food.ec.europa.eu/horizontal-topics/committees/paff-committees_en |
| | EMA | https://www.ema.europa.eu/en/homepage |
| Canada | CFIA | https://inspection.canada.ca/en |
| | Health Canada | https://www.canada.ca/en/services/health/food-safety.html |
| | PHAC | https://www.canada.ca/en/public-health.html |
| | CPCFSE | https://www.fightbac.org/ |
| | CGC | https://www.grainscanada.gc.ca/en/ |
| | AAFC | https://agriculture.canada.ca/en |
| | P&T MoA&H | |
| The AU | AUC- DREA | https://au.int/en/rea/departement |
| | AU-IBAR | https://www.au-ibar.org/ |
| | EAC/ECOWA S/SADC | https://www.eac.int/ ; https://www.ecowas.int/ ; https://www.sadc.int/ |
| | AUDA-NEPAD | https://www.nepad.org/ |
| | AU-IAPSC | https://auiapsc.org/ |
| | ABNE | https://www.nepad.org/programme/african-biosafety-network-of-expertise-abne |
| | PACA | https://www.aflatoxinpartnership.org/ |
| | ARSO | https://standardsmap.org/en/factsheet/905/overview |
| | NAFDAC | https://nafdac.gov.ng/ |
| | SON | https://son.gov.ng/ |
| Nigeria | FMH | https://www.health.gov.ng/ |
| | VCN | https://www.vcn.gov.ng/ |
| | FCCPC | https://fccpc.gov.ng/ |
| | NBMA | https://nbma.gov.ng/ |
| | NAQS | https://naqs.gov.ng/ |
| | FMAFS | https://agriculture.gov.ng/ |
| | FMENV | https://environment.gov.ng/ |
| | EHORECON | https://ehcon.gov.ng/ |
| | IPAN | https://www.ipan.gov.ng/ |
| | FDA | https://fdaghana.gov.gh/ |
| Ghana | GSA | https://www.gsa.gov.gh/ |
| | MoH | https://www.moh.gov.gh/ |
| | VSD | https://riwaghana.org/node/7 |
| | GEPA | https://www.gepaghana.org/ |
| | MOFA | https://www.ghana.gov.gh/ministries/c5a8adf720/ |
| | EPA Ghana | https://www.epa.gov.gh/epa/ |
| | FRI | https://fri.csir.org.gh/ |
| | MOFAD | https://www.mofep.gov.gh/ |

| | | |
|--------------|-----------|---|
| South Africa | NDHFC | https://www.health.gov.za/food-control/ |
| | NRCS | https://www.nrccs.org.za/ |
| | SABS | https://www.sabs.co.za/ |
| | SAVC | https://savic.org.za/ |
| | PPECB | https://ppecb.com/ |
| | FACS | https://foodfacts.org.za/ |
| | ARC | https://www.arc.agric.za/Pages/Home.aspx?qad_source=1&qclid=Cj0KCQjwpP63BhDYARIsAOQkATZo2C30qaJgbh4fFRxFKMbbd8wPIIqPJeeW_kzjqWVbE69yXmL2EelaAi2eEALw_wcB |
| | CGCSA-FSI | https://www.cgcsa.co.za/ |
| | DFFE | https://www.dffe.gov.za/ |
| Kenya | KEBS | https://www.kebs.org/ |
| | MoH-PHD | https://www.health.go.ke/ |
| | KEPHIS | https://www.kephis.go.ke/ |
| | DVS | https://kilimo.go.ke/ |
| | NPHL | https://www.health.go.ke/ |
| | PCPB | https://www.pcpb.go.ke/ |
| | KDB | https://www.kdb.go.ke/ |
| | KALRO | https://www.kalro.org/ |
| | AFA | https://www.afa.go.ke/ |
| | ACA | https://www.aca.go.ke/ |
| Egypt | NFSA | https://www.nfsa.gov.eg/en-gb |
| | EOS | https://www.eos.org.eg/en |
| | MoH&P | https://www.mohp.gov.eg/ |
| | CLFF | https://gfair.network/organizations/central-laboratory-food-feed-giza |
| | CAPQ | https://site.capq.gov.eg/Home/HomePage/Index |