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The U.S. Government's Global Hunger & Food Security Initiative

FOOD SAFETY NETWORK PAPA COUNTRY ASSESSMENT AND ACTION PLAN Nigeria's Food Safety System

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List of Acronyms

CVO	Chief Veterinary Officer of Nigeria
DVPCS	Department of Veterinary and Pests Control Services
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization
FAS	USDA Foreign Agricultural Service
FDA	United States Food and Drug Administration
FMARD	Federal Ministry of Agriculture and Rural Development
FMITI	Federal Ministry of Industry, Trade, and Investment
FMOH	Federal Ministry of Health
FSMA	U.S. Food Safety Modernization Act
FSN	Food Safety Network
FSQP	FMOH's Food Safety and Quality Program
GAIN	Global Alliance in Improved Nutrition
GFSS	Global Food Security Strategy
GON	Government of Nigeria
HACCP	Hazard Analysis and Critical Control Points
INFOSAN	International Food Safety Authorities Network (FAO/WHO)
ISO	International Organization for Standardization
MRL	Maximum Residue Limits
NAFDAC	National Agency for Food and Drug Administration and Control
NAQS	FMARD's Nigeria Agricultural Quarantine Service
NESG	Nigerian Economic Summit Group
NIAS	FMARD's Nigerian Institute of Animal Science
PACA	Partnership for Aflatoxin Control in Africa
PAN	Poultry Association of Nigeria
PAPA	FSN Participating Agency Program Agreement
RASFF	Rapid Alert System for Food and Feed
RTE	Ready-to-Eat foods
SPS	Sanitary and phytosanitary
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USG	Government of the United States of America
WAPRC	West African Pesticide Registration Committee

EXECUTIVE SUMMARY

An assessment of the situation of the food safety system in Nigeria was conducted to be used as a baseline for the development of a roadmap for capacity building assistance. The United States Department of Agriculture's Foreign Agricultural Service (FAS), through its Food Safety Network partnership program with the United States Agency for International Development (USAID) and United States Food and Drug Administration (FDA), undertook this assessment in support of the United States Government's (USG) Global Food Security Strategy (GFSS) and Feed the Future Initiative. This assessment includes recommendations that cover both short-term and long-term timelines that will assist Nigeria to strengthen its sanitary and phytosanitary (SPS) system, thereby better enabling the country to engage in regional and international trade and to most effectively direct future investments.

Strengthening food safety systems is critical to unlocking the economic potential of agricultural value chains through enhanced trade and market access, while increasing the availability of safe and nutritious foods for local consumers. Nigeria's GFSS country action plan calls for investments in SPS measures to build the capacity of Nigerian regulatory agencies to effectively address food safety, animal and plant health issues leading to enhanced food security outcomes.

Nigeria is the most populated country in Africa with 211 million people and an annual growth rate of 3.2 percent, Nigeria's demand for food, fiber, and fuel will grow significantly in the years ahead. Rapid population growth and urbanization will exacerbate existing challenges related to food availability, accessibility, and utilization. Nigeria currently experiences high rates of food-borne disease and a weak culture of food safety.¹ However, Nigeria has recently introduced a new food safety and quality bill that would provide comprehensive reform to its food safety system. The bill awaits passage by Parliament and signature by the President into law before it can be implemented.

This report focused on food safety issues with emphasis on policy and regulatory measures and approaches that can be taken by the Government of Nigeria (and the private sector) to establish a science and risk-based system harmonized with international standards. Literature review was combined with stakeholder consultations with government regulatory authorities and some private sector and civil society groups. In brief the major findings and areas for technical assistance include:

- **Risk Management:** Risk management is a process by which farmers, government officials, and other decision makers detect, evaluate, and choose mitigating measures that will reduce the risk of food contamination and/or adulteration throughout the food chain. The process consists of hazard identification and characterization and risk evaluation and mitigation. In Nigeria, we observed varying levels of risk management implementation across different agencies. However, Nigeria lacks a coordinated and over-arching risk management framework that is integrated and implemented throughout government and private sector operations. Priority actions include risk assessment training (particularly for high-risk food such as ready to eat foods, animal feed, and spices), national level crisis management, and communication strategies.
- **Traceability:** Traceability plays many important roles in food safety as a preventive measure to ensure rapid actions can be taken when a recall is needed, and the recall can be limited to a target batch of products. Currently, Nigeria does not have effective operating traceability systems in place, despite wide recognition among officials about the value of these systems to their operations.² A common theme in our discussions with government agencies was the lack of a regulatory framework or authority to implement a food recall. Compounding this issue is a

¹ H. Onyeaka *et al.*, "Improving Food Safety Culture in Nigeria: A Review of Practical Issues," *Foods* 2021, Vol. 10, Page 1878, vol. 10, no. 8, p. 1878, Aug. 2021.

² H. K. Bako, M. A. Dandago, and S. S. Nassarawa, "Food Traceability System: Current State and Future Needs of the Nigerian Poultry and Poultry Product Supply Chain," *Chem. Biomol. Eng.*, vol. 4, no. 3, p. 40, 2019.

weak foodborne illness registry, challenges in inspection, a porous border with neighboring countries, and lack of resources required to build and sustain traceability systems. Priority actions include increased training on Hazard Analysis and Critical Control Points (HAACP) and Good Handling Practices (GHP); training for inspections, farm auditing, and certification of products; and institutionalization of a national recall system within the new food safety and quality bill's implementing regulations.

- **Mycotoxins:** Contamination of food and feed with mycotoxin, such as aflatoxin, is a serious problem in Nigeria. Aflatoxins are a family of poisonous, mutagenic, and carcinogenic mycotoxins that contaminate a wide range of foods and agricultural goods, with a particular preference for grains and nuts. In Nigeria, studies have found that about one-third (31%) of maize and 51% of groundnut kernels intended for human consumption are contaminated with aflatoxins. Over 70% of post-harvest losses in agricultural crops are due to aflatoxin contamination. Given these products are staples of the Nigerian diet, it is critical to find a lasting solution to reduce aflatoxin contamination. The Partnership for Aflatoxin Control in Africa (PACA) has developed a country specific action plan for Nigeria, which includes measures that can be taken to reduce the presence of aflatoxins such as improved post-harvest handling and increased adoption of bio-control products (e.g., Aflasafe).
- **Pesticides and Maximum Residue Limits:** Pesticides are essential for controlling crop-damaging pests. With a changing climate, new pests and diseases are emerging, persistently threatening Nigeria's agricultural sector. This requires new pest control tools and strategies for farmers to maintain production, while at the same time protecting consumer health, the environment, and enhancing trade. During discussions with multiple government agencies in Nigeria, the issue of pesticide regulatory compliance, alternatives to pesticides, pesticide education among farmers and pesticide safety were discussed as critical needs. For example, cowpea exports to the EU have been rejected since 2015 due to elevated levels of dichlorvos. Priority actions include regular monitoring of chemical pesticide residues in treated agricultural crops, particularly high-risk foods, as well as safer and more effective use of pesticides, and registration and application of biopesticides.

INTRODUCTION

Feed the Future values and supports initiatives that promote food safety, food security, and agricultural development in Africa. The Food Safety Network PAPA is an interagency partnership of the U.S. Department of Agriculture's Foreign Agricultural Service (USDA-FAS), the U.S. Agency for International Development's (USAID) Bureau for Resilience and Food Security, and the U.S. Food and Drug Administration's (FDA) Center for Food Safety and Applied Nutrition to support global food safety capacity building with an emphasis on Feed the Future partner countries, including Nigeria.

Strengthening food safety systems is critical to unlocking the economic potential of agricultural value chains through enhanced trade and market access, while increasing the availability of safe and nutritious foods for local consumers. Nigeria's Global Food Security Strategy Country Action Plan (August 2018) calls for investments in sanitary and phytosanitary (SPS) measures to build the capacity of Nigerian regulatory agencies to effectively address food safety and animal and plant health issues.³

Between June 24-29, USDA Foreign Agricultural Service and technical partners from the University of Missouri, Oregon State University, and Food and Agriculture Export Alliance, traveled to Abuja, Nigeria, to meet with stakeholders across the government of Nigeria, civil society, and private sector to discuss the status of the national food safety system. Stakeholders consulted included members of:

- Federal Ministry of Health's Food Safety and Quality Program (FMOH/FSQP)
- Federal Ministry of Agriculture & Rural Development (FMARD) including the following agencies:
 - Department of Veterinary and Pests Control Services (DVPCS)
 - Nigeria Agricultural Quarantine Service (NAQS)
 - Nigerian Institute of Animal Science (NIAS)
- Poultry Association of Nigeria (PAN)
- Nigerian Economic Summit Group (NESG)
- USAID West Africa Trade and Investment Hub (the Trade Hub)
- Feed the Future Team

Literature review combined with stakeholder consultations in country yielded important insights on the status of Nigeria's food safety system, including technical assistance needs, opportunities for improvements as well as constraints. A synthesis of the consultation findings is provided and followed by an action plan, including technical assistance activities in the short, medium, and long-term that might be undertaken by Feed the Future programs to support the Government of Nigeria in its food safety modernization efforts.

³ Feed the Future. 2018. "Global Food Security Strategy (GFSS) Nigeria Country Plan." Available at: <https://www.usaid.gov/documents/1867/global-food-security-strategy-gfss-nigeria-country-plan>

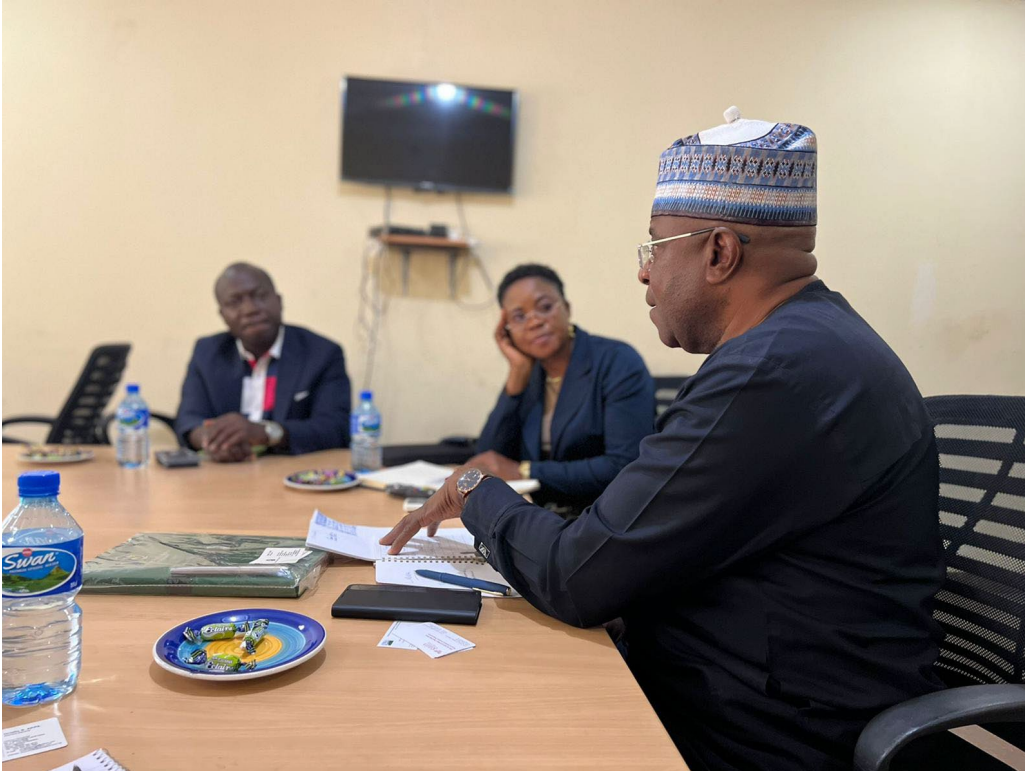


Figure 1: USDA Expert Team meets with the Poultry Association of Nigeria



Figure 2: USDA Expert Team meets with the Nigerian Agricultural Quarantine Service

BACKGROUND

The most populated country in Africa with 211 million people in 2022 and an annual growth rate of 3.2 percent, Nigeria's demand for food, fiber, and fuel will grow significantly in the years to come.⁴ This growth will exacerbate existing challenges related to food availability, accessibility, and utilization. For example, stunting is an indicator of chronic malnutrition and Nigeria has the second highest burden of stunted children in the world.⁵ Agriculture has a prominent role in the economy; some 35% of Nigerians are employed in agriculture (a group that overlaps with the 70% of Nigerians who engage in agriculture for subsistence) and about 76% of land in Nigeria is used for agriculture.⁶ Despite its central role in the economy, agriculture contributes 24 percent of the national GDP and Nigeria remains a food deficit nation.⁷ Agricultural productivity is limited by many challenges including low technology, low levels of irrigation farming, changes in weather due to climate change, land degradation, high production costs, inadequate distribution of inputs, and a weak land tenure system.⁸

Oil and natural gas are Nigeria's main exports, accounting for about 89% of total exports by value in 2021. Its leading agricultural exports are cocoa and cocoa preparation, oil seed, oleaginous fruit, grain and seed, and fruits, but these commodities represent less than 4% of exports by value.⁹ Nigeria is the largest producer of cassava in the world, growing 20% of global harvests, and its other major crops are maize, guinea corn, yam, beans, millet, and rice. Rice production has risen in recent years (from less than 3 million metric tons in 2010 to an estimated 5 million tons in 2022) thanks to a decade of investments in improved seedlings, fertilizers, irrigation systems, land tenure, and mechanization, yet continues to lag domestic consumption estimated at 7 million tons.¹⁰ Nigerians consume about 3.2 million metric tons of fish annually and its fisheries and aquaculture are among the fastest growing subsectors in the country. With a coastline of 853 km and over 14 million hectares of inland waters, total fish production per year reaches 1.1 million metric tons (313,231 metric tons from aquaculture and 759,828 metric tons from fisheries). Fishing is a vital livelihood for the poor as well as an important protein source.¹¹

Nigeria has enormous challenges connected with food safety culture.¹² To produce and provide safe, secure, and nutritious food, the system's producers, consumers, and food businesses must abide by a set of shared values known as food safety culture. In Nigeria, food safety culture is a complex subject due to Nigeria's heterogeneous and diverse nature, as demonstrated by its over 250 ethnic groups. As Nigeria becomes more urbanized and incomes continue to grow, aspects of diets change, and food comes from increasingly great distances. Public engagement in food safety issues has not witnessed a promising trajectory in recent years, but the government is taking steps to improve the safety of the food through its proposed new food safety and quality bill.

Small-scale and artisanal food production and distribution are common in Nigerian markets. Smallholder farmers, street food sellers, and traditional food markets are an important part of the national food supply, even as these activities are often viewed as informal sector activities. These activities amidst a small

⁴ The World Bank. "Nigeria." Accessed July 2022 at: <https://data.worldbank.org/country/NG>

⁵ National Bureau of Statistics. 2018. "National Nutrition and Health Survey (NNHS) 2018." Available at: <https://www.unicef.org/nigeria/media/2181/file/Nigeria-NNHS-2018.pdf>

⁶ See footnote 4, and The Global Economy. "Nigeria Economic Indicators." Accessed July 2022 at: <https://www.theglobaleconomy.com/Nigeria/>

⁷ The World Bank. "Nigeria." Accessed July 2022 at: <https://data.worldbank.org/country/NG>

⁸ FAO. "Nigeria at a Glance." Accessed July 2022: <https://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en/>

⁹ Trading Economics. Nigeria Exports by Category. Accessed July 2022:

<https://tradingeconomics.com/nigeria/exports-by-category>

¹⁰ BBC. February 22, 2022. "Nigeria rice: Is the government exaggerating production figures?"

<https://www.bbc.com/news/60324939>

¹¹ FAO. "Nigeria at a Glance." See footnote 8.

¹² Onyeaka H, Ekwebelem OC, Eze UA, Onwuka QI, Aleke J, Nwaiwu O, Chionuma JO. Improving Food Safety Culture in Nigeria: A Review of Practical Issues. *Foods*. 2021 Aug 13;10(8):1878. doi: 10.3390/foods10081878. PMID: 34441654; PMCID: PMC8394198.

number of large-scale, modern multinational food establishments, make the Nigerian food supply chain a complex food safety issue. While moving through the food supply chain, foods are frequently subjected to unclean and unhygienic circumstances, contributing to postharvest losses and contamination. Foodborne disease cases and outbreaks are on the rise, as are biological dangers in food, chemical contaminants including pesticides, microbial toxins, and veterinary medicine residues (Kearney, 2018). Food safety issues are affecting Nigerian exports. The EU has raised multiple alerts in the Rapid Alert System for Food and Feed (RASFF) portal for contamination with salmonella, pesticide residues, illegal colors, and aflatoxins.¹³ The same groups of contaminants are stated in import alerts issued by the U.S. Food and Drug Administration.¹⁴

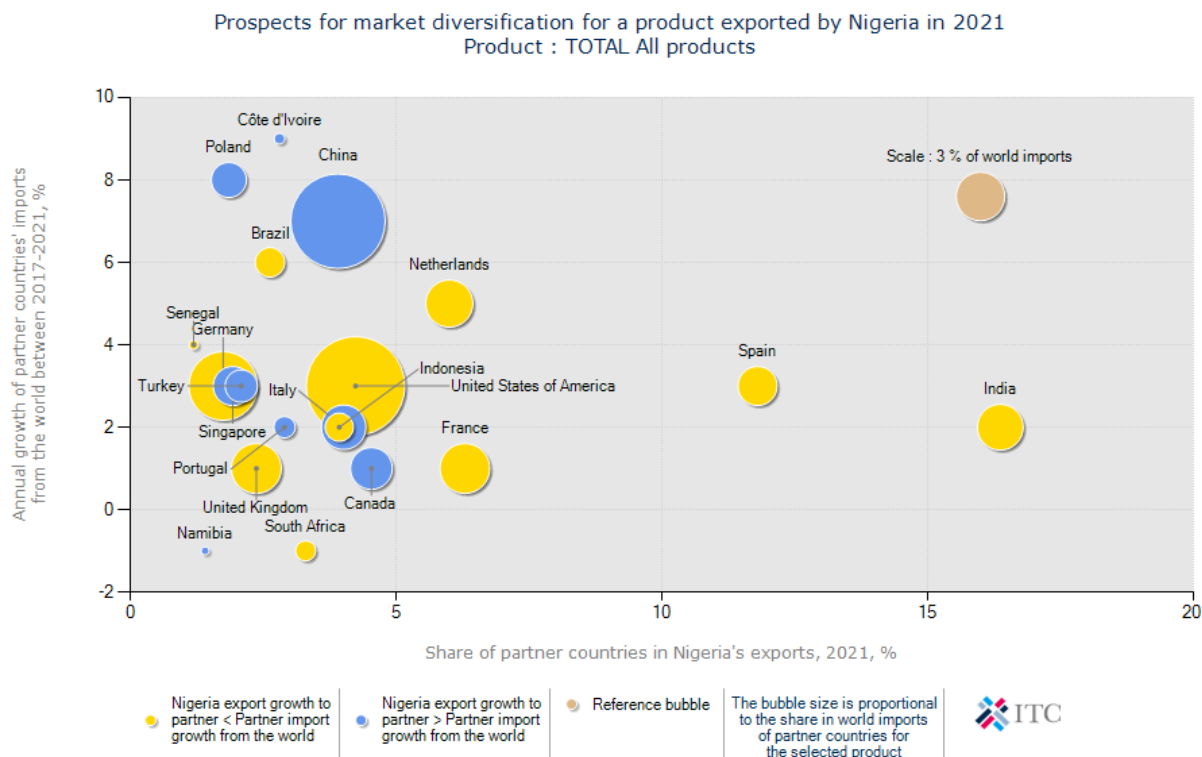


Figure 3: Nigeria export destination prospects in 2021, International Trade Center (ITC) Nigeria Trade Map. www.Trademap.org

An effective food safety system is vital to decrease the incidence of foodborne disease, to reduce post-harvest losses, and to expand access to export markets. In Nigeria, responsibility for food safety regulations is spread across the three tiers of government: federal, states, and local. The federal level includes responsibilities to regulate and monitor food safety standards and practices, which is done by the Federal Ministry of Health (FMOH), the Federal Ministry of Agriculture and Rural Development (FMARD), and the Federal Ministry of Industries, Trade, and Investments (FMITI). A broad network of federal ministries, departments, and agencies oversee food safety policy, as illustrated in Figure 4.

Nigeria's agricultural sector is a major producer of food and industrial products. To ensure the quality of food produced and sold, the national food safety system is important to regulating and enforcing food safety laws and standards in line with international best practices. Through efforts since 2014 under the National Policy on Food Safety, Nigeria has developed a comprehensive governing food safety legislation, the Nigeria's Food Safety and Quality Bill (2016), currently under consideration by the National Assembly. When passed, this new legislation will provide the legislative authority to address longstanding

¹³ RASFF Window. <https://webgate.ec.europa.eu/rasff-window/>

¹⁴ Import Alerts for Nigeria. https://www.accessdata.fda.gov/cms_ia/country_NG.html

issues related to overlapping mandates and roles, monitoring, and enforcement of food safety regulations.¹⁵

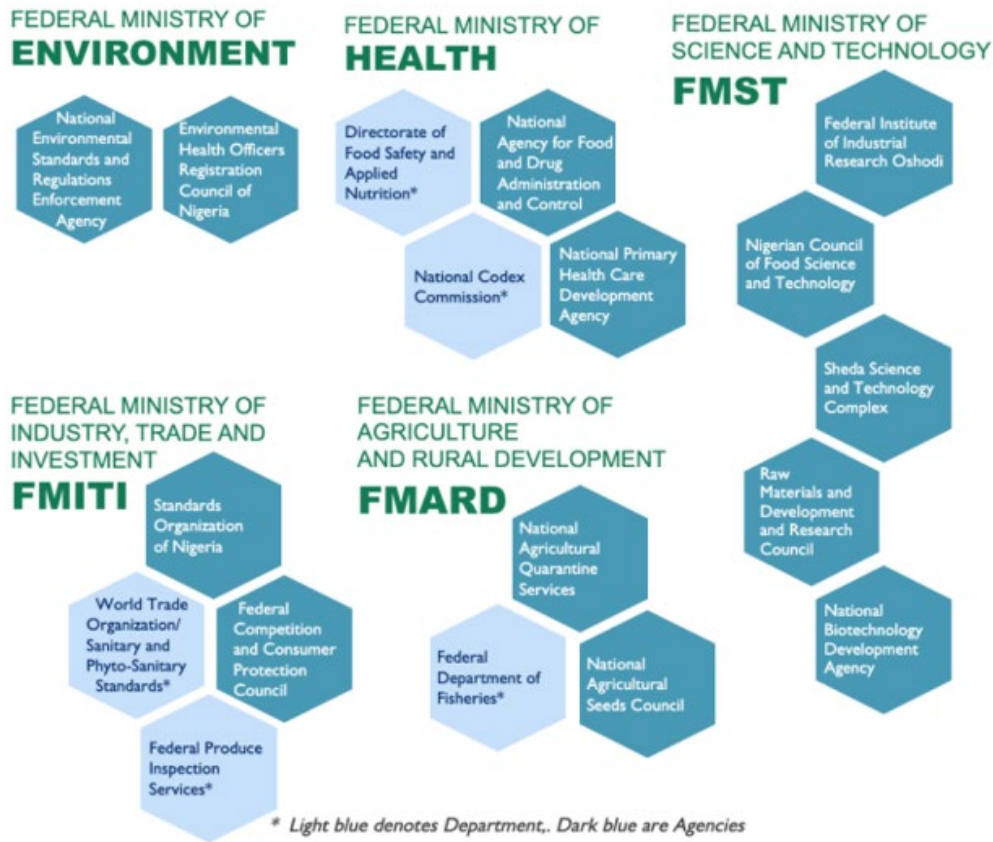


Figure 4: Federal Ministries, Departments, and Agencies Responsible for Food Safety in Nigeria Source: Global Alliance in Improved Nutrition (GAIN) April 2022. "Food Safety Policy in Nigeria." Accessed from: <https://www.gainhealth.org/sites/default/files/publications/documents/Food%20Safety%20in%20Nigeria%20Policy%20Brief.pdf>

¹⁵ Okoruwa, Augustine, and Nwando Onuigbo-Chatta. "Review of food safety policy in Nigeria." *Journal of Law, Policy & Globalization* 110 (2021): 57. <https://www.iiste.org/Journals/index.php/JLPG/article/view/56653/58581>



Figure 5: Smoked fish for sale in markets of Abuja, Nigeria

FINDINGS

Agricultural value chains have common sanitary and phytosanitary (SPS) challenges that are addressed with sanitary, phytosanitary, and food safety measures implemented from production to processing all the way to consumption. Nigeria already has the foundational pieces needed for food safety system regulation, having generally equipped laboratories and regulators who know about risk-based approaches (e.g., Hazard Analysis and Critical Control Points). The new law, if and when passed, will provide the structure to adopt and enforce regulations that align with international standards and global best practices for food safety and quality. The drafting and implementation of new rules will be arduous due to weak data and the challenges posed by inadequate infrastructure and resources to support scientific risk analysis.^{16,17}

A burgeoning population with greater demand for diverse food products, in an increasingly volatile production environment due to conflict and climate change, requires leadership by government and the private sector to improve the food safety and quality infrastructure for Nigeria's food and nutritional security. Nigeria's forthcoming Food Safety and Quality Bill, put forth in mid-2022 for public hearing after a decade-long delay, offers promise to help strengthen and improve coordination on food safety governance. From there, strategic decisions will be needed to address priority challenges, including strengthening the ability of the regulators to take risk-based regulatory actions. This assessment concluded with four priority areas for consideration by Feed the Future programming to offer technical assistance to the government of Nigeria in its food safety system modernization efforts. These include:

- I. Risk Management
- II. Traceability
- III. Mycotoxins
- IV. Pesticides and Maximum Residue Limits

¹⁶ Federal Ministry of Health 2014, "National Policy on Food Safety and Its Implementation Strategy." Accessed July 2022 from: <http://extwprlegs1.fao.org/docs/pdf/nig151436.pdf>

¹⁷ Onyeaka H, Ekwebelem OC, Eze UA, Onwuka QI, Aleke J, Nwaiwu O, Chionuma JO. Improving Food Safety Culture in Nigeria: A Review of Practical Issues. *Foods*. 2021 Aug 13;10(8):1878. doi: 10.3390/foods10081878. PMID: 34441654; PMCID: PMC8394198.

I. Risk Management

Risk management is a process by which farmers, government officials, and other decision makers detect, evaluate, and choose mitigating measures that will reduce the risk of food contamination or adulteration throughout the food chain. The process of risk analysis consists of hazard identification and characterization and risk evaluation, management, and communication. A strong risk-based food safety system will help to reduce food safety concerns before they become problematic to consumer health and trade. Essentially, risk-based food safety is a framework to develop prevention strategies to reduce the likelihood of occurrence of the most important issues. Effective implementation translates in the establishment of regulatory requirements for actions such as employee training, traceability and recall plans, farm and industry-level food safety plans, standard operating procedures (SOPs), risk communication plans, and the application of international standards such as Good Manufacturing and Good Hygiene Practices. The regulations are best developed with input from all stakeholders to ensure their applicability, acceptance, and enforceability (see text box for a case study at the Bodija meat market¹⁸). While these efforts cannot ensure a hazardous event will not occur, they are likely to reduce risk and enhance response time to mitigate adverse effects.



Figure 6. African snails for sale in market in Abuja, Nigeria.

In Nigeria, we observed varying levels of risk-based management across different agencies. FMOH is proactive and delivering HACCP and GMP training to external stakeholders over the coming months and has already conducted a baseline survey targeting high-risk foods. However, Nigeria lacks a coordinated and over-arching risk-based food safety framework that is integrated and implemented throughout the government and private sector operations. For instance, animal feed was identified by the Nigerian Institute of Animal Sciences as requiring food safety and risk management training and technical assistance, noting specifically, the need for FSMA Preventive Controls for Human Food and Animal Feed.

¹⁸ Grace et al. 2019, "Improving food safety in the informal sector: nine years later," *Infection Ecology & Epidemiology*, VOL. 9, 1579613. Accessed 10/2022 from <https://doi.org/10.1080/20008686.2019.1579613>

A Case Study in Risk Management

The traditional, informal markets sell most fresh and high-risk foods in Nigeria. Recognizing the microbial hazards affecting fresh meat, a pilot project was set forth to improve food safety at the Bodija slaughterhouse and market. Training of butchers, supply of technology (disinfectants and aprons) and communication strategies to promote the resulting safer meat to customers were deployed. Measurement of the microbial quality of the meat and perception by the butchers immediately following the intervention showed both improvement of quality and good buy-in from the stakeholders. The pilot project ended, but its long-term impact was measured nine years later. Local authorities had followed up with the construction of new slaughterhouse and attempted to forcefully move the butchers to the new location, which was far from their customer base and had a much greater operational cost. In addition, butchers reported not buying replacement disinfectants after the free supplies were exhausted. Clashes between the butchers unwilling to relocate to the new facility and the local government resulted in deaths and riots.

The Bodija market story is a stark reminder that food safety can only be improved through joint efforts between government and industry to achieve sustainable change. The three components of risk analysis play vital roles; in this case, the risk mitigation measures implemented during the pilot project were effective and should have been affordable for the butchers. However, the use of disinfectants was only encouraged and not institutionalized through an enforceable regulation. Such a regulation would provide the incentive for the butchers, but also create a level playing field as the cost would be borne by all butchers instead of only those having received training on food safety. The construction of a new more hygienic facility should also have been a step in the right direction, but its location was too far from customers, a barrier to adoption that could have been identified through consultation at an early stage.

Overarching Observations:

- There was wide recognition across agencies of the value of a proper risk management system in preventing illness and facilitating trade.
- Across all stakeholder consultations, risk assessment training was identified as a priority need, particularly for high-risk foods such as Ready-To-Eat (RTE) foods, animal feed, and spices.
- Adoption and training on Whole Genome Sequencing was discussed by the CVO as a priority to assist with outbreaks and traceability and management of public health risk.
- Crisis management and risk communication was identified as a need by FMOH.
- NAQS identified several challenges with traditional medicine, known in the United States as dietary supplements (*e.g.*, herbs such as bitter leaf). Risk management approaches to drug residues and antimicrobial resistance were identified as important issues by NAQS, National Institute of Animal Science, and CVO.

II. Traceability

Traceability plays many important roles in food safety as a preventive measure to ensure rapid actions can be taken when a recall is needed, and a tool for limiting the scope of the recall to a target batch of products. This ensures a faster recovery from an adverse event and restoration of public confidence and trust. Agencies also use traceability in response to food fraud, adulteration, disease management, and environmental disasters.

Beyond the ability to recall a product effectively and quickly, traceability allows for the origin of products and ingredients to be traced throughout the supply chain. Having this information is helpful to improve buyers' confidence in the supply chain, increase efficiencies in production, improve revenue generation, and reduce waste. The benefit to consumers is to increase trust and enhance brand loyalty. In today's global market, traceability is either required for regulatory or business compliance, or it provides a competitive advantage to those that adopt end-to-end tracking systems, allowing participation in high value initiatives like organic or private industry standard certification. With traceability, industry can also analyze the supply chain for insights into consumer trends and market needs, as well as trustworthiness to buyers, the real needs of the individual market, and better predict future customer behavior.

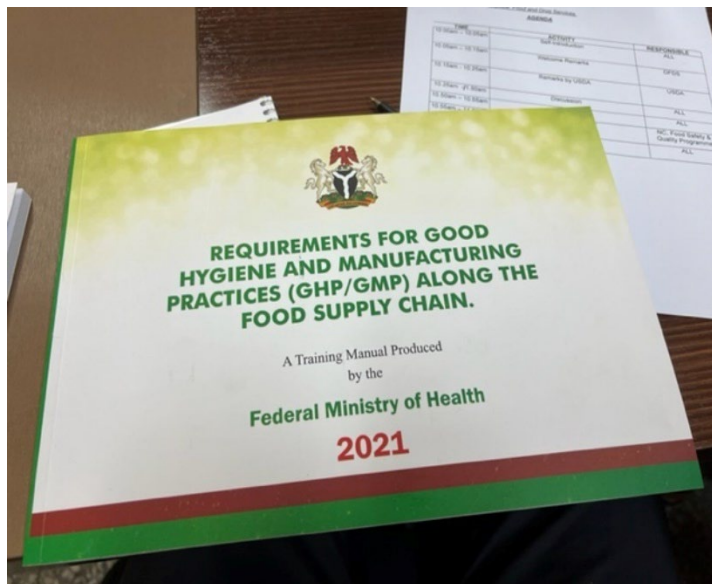


Figure 7: HAACP Manual Provided by Nigerian Ministry of Health

Regulatory Framework

Several agencies in Nigeria have a role in traceability. For food, the Federal Ministry of Health has a mission to promote the health of all Nigerians through the formulation of national policies, development of guidelines and strategies, and initiation of legislation aimed at ensuring that food is safe. Traceability would allow officials to more rapidly and effectively initiate a food recall to protect public health. The Federal Ministry of Agriculture and Rural Development, which includes the National Agricultural Quarantine Services and the National Institute of Animal Sciences, has a direct link to traceability systems as well, including tracking products certified or tested for various compliance or market access attributes, food and feed tracing, origin of identity, vaccination status of livestock, and tracking post-harvest losses.

Currently, Nigeria does not have legal requirements for traceability systems. Voluntary recalls have been used with some success, but a common theme in our discussions with government agencies was the lack of a regulatory framework or authority to implement a food recall (see text box). Compounding this issue is a weak foodborne illness registry, challenges in inspection, and porous borders with neighboring countries. With passage of the pending National Food Safety and Quality Bill, Nigeria would have the authority to require traceability along the food supply chain and more effectively implement recalls, thereby addressing some of the issues outlined above.

Overarching Observations:

- Government officials recognize the importance of traceability and wish for capacity building in traceability to develop rules and regulations that will address the risks of hazards entering at various points in a supply chain, including transportation, processing, and storage. The Poultry Association of Nigeria also identified the need in industry.

- FMARD discussed technical assistance for inspections, farm auditing, and certification that effectively control food safety risks.
- Certified products tested for pesticide residue violations co-mingled with uncertified products was identified as a major issue by NAQS, highlighting the need for effective tracking.
- The National Agency for Food and Drug Administration & Control (NAFDAC) which is a parastatal of the FMOH, has authority to recall, but capacities are constrained by the lack of traceability.
- Supporting the institutionalization of HACCP training was identified by FMOH as a priority for food safety. The MoH is planning to conduct more training on HACCP and Good Hygiene Practices (GHP), and traceability should be a topic shared with participants.
- Nigeria has an opportunity to advance traceability and develop regulatory requirements with the passage of the National Food and Safety Bill

III. Mycotoxins (e.g., Aflatoxin)

Contamination of food and feed with mycotoxins, such as aflatoxin, is a serious problem in Nigeria. Aflatoxins are a family of mutagenic and carcinogenic mycotoxins that grow in soil and contaminate a wide range of foods and agricultural goods, such as cereals, groundnuts, fruits, decaying vegetation, hay, and grains.¹⁹ In humans, aflatoxins have been shown to cause hepatic toxicity, nephron toxicity, and immunological suppression.²⁰ Aflatoxins have been most widely studied as causative agents of liver cancer, but chronic aflatoxicosis is difficult to diagnose and treat.

Aflatoxin levels can increase across the food supply, including in pre-harvest, harvest, drying, storage, transit, processing, and handling, if conditions are favorable for fungus to create toxins. Aflatoxin synthesis in agricultural products is also known to be enabled by plant immunocompromising variables such as drought stress, damage, pest infestation, and poor fertilization.

In Nigeria, an estimated one-third of maize and half of groundnut kernels intended for human consumption are contaminated with aflatoxins. In some cases, over 70 percent of post-harvest losses in agricultural crops are due to aflatoxin contamination^{21,22}. Given these products are staples of the Nigerian diet, it is critical to find a lasting solution to reduce aflatoxin contamination.

Measures can be taken throughout the value chain of vulnerable commodities to reduce the presence of aflatoxin. For instance, farmers can use seeds that produce plants with a better resistance, can apply biocontrol (such as Aflasafe™) to drastically reduce aflatoxins on their crops, and can work with distributors and processors to implement a 'dry chain', referring to maintaining appropriate conditions such as low humidity in all the stages of the value chain to suppress aflatoxin-producing fungus after harvest.²³

Overarching Observations:

¹⁹ Iram, W., Anjum, T., Iqbal, M., Ghaffar, A., Abbas, M., 2016. Structural elucidation and toxicity assessment of degraded products of aflatoxin B1 and B2 by aqueous extracts of *Trachyspermum ammi*. *Front. Microbiol.* 7, 346. <https://doi.org/10.3389/FMICB.2016.00346/BIBTEX>

²⁰ Liu, L., Xie, M., Wei, D., 2022. Biological Detoxification of Mycotoxins: Current Status and Future Advances. *Int. J. Mol. Sci.* 23. <https://doi.org/10.3390/ijms23031064>

²¹ S. C. Onyedum *et al.*, "Occurrence of major mycotoxins and their dietary exposure in North-Central Nigeria staples," *Sci. African*, vol. 7, Mar. 2020.

²² A. O. Esan, S. O. Fapohunda, C. N. Ezekiel, M. Sulyok, and R. Krska, "Distribution of fungi and their toxic metabolites in melon and sesame seeds marketed in two major producing states in Nigeria," *Mycotoxin Res.*, vol. 36, no. 4, pp. 361–369, Nov. 2020.

²³ Massomo, S.M.S., 2020. *Aspergillus flavus* and aflatoxin contamination in the maize value chain and what needs to be done in Tanzania. *Sci. African* 10, e00606. <https://doi.org/10.1016/J.SCIAF.2020.E00606>

- The Partnership of Aflatoxin Control for Africa’s Nigeria country-led action plan for aflatoxin control could effectively drive the implementation of requirements and practices to reduce aflatoxin in Nigeria if it received appropriate support.
- Awareness of aflatoxin is low among actors of the food supply chain and sensitization was identified as a priority by the Federal Ministry of Health, Federal Ministry of Agriculture and Rural Development, Nigerian Institute of Animal Science, and Nigerian Agricultural Quarantine Service.
- A need to promote biocontrol for aflatoxin was identified by FMARD.
- As the aquaculture and poultry industries grow, the development of sampling procedures and standard operating procedures for the identification of aflatoxin in feed and feed ingredients was identified as a priority. This includes training on the use of quick screening tools for detection of aflatoxin in:
 - Fresh fish
 - Fish feed
 - Poultry feed
 - Corn/maize
 - High-risk foods
 - Soy was identified as a potential problem by Trade Hub
- Capacity for public laboratories was identified as a need by several stakeholders including FMARD as needing assistance to enable the government to perform control activities that will support the implementation of risk-based regulations, while potentially also providing fee-for-service to industry at a cost that smallholder enterprises can bare. This type of approach supports the sustainability of the laboratories as well as access to market for smaller enterprises.

IV. Pesticides and Maximum Residue Limits

Pesticides are essential for controlling crop-damaging pests. With a changing climate, new pests and diseases are emerging, persistently threatening Nigeria’s agricultural sector. This requires new pest control tools and strategies for farmers to maintain production, while at the same time protecting consumer health, the environment, and enhancing trade. Application of pesticides may leave chemical residues on treated crops, and the amount of residue depends on the pesticide formulation, application methods, rates, timing, number of applications, and other important treatment instructions described on the product labels. Expected levels of pesticides (and within safety limits for human health) on treated crops are called maximum residue limits (MRLs). When countries adopt different or low residue standards, or are missing standards altogether, MRLs can be a significant barrier to trade and corresponding economic growth.²⁴

Not many African countries regularly monitor chemical pesticide residues in treated agricultural crops after a pesticide is registered for a crop. Yet in recent years, many African countries have developed laboratories with analytical capabilities that enable them to identify and quantify pesticide residues for compliance with national and international MRLs. Some laboratories test foods with the intent to protect public health nationally, while others specialize in testing for compliance to the requirements of export markets. Biopesticides are generally less hazardous than conventional pesticides and typically do not produce chemical residues. They are often utilized in organic programs or as alternatives to conventional pesticides and can be very effective if used appropriately under sound good agricultural practices. A barrier to wide-scale adoption of biopesticides across Africa is that new, low-risk, yet highly effective biopesticides are not widely registered and made commercially available to farmers.

²⁴ United States International Trade Commission. 2020. “Global Economic Impact of Missing and Low Pesticide Maximum Residue Levels, Vol. 1.” <https://www.usitc.gov/publications/332/pub5071.pdf>

Cowpea Case Study

Nigeria is the largest cowpea (*Vigna unguiculata*) producer in the world. In 2015, Nigerian exports of cowpeas were banned by the EU due to levels of dichlorvos, an organophosphate insecticide, above EU residue limits (0.01 mg/kg). The EU is the most valuable market for cowpeas. Several Nigerian agencies discussed with the project team the issues and process required to lift the ban and sustain trade with the EU market. These include farmer education on pesticide use and alternatives to pesticides, good agricultural practice training, proper post-harvest handling, and implementation of risk management and communication for multiple actors across the value chain.

During discussions with multiple government agencies in Nigeria, the issue of pesticide regulatory compliance, alternatives to pesticides, pesticide education among farmers and pesticide safety were discussed as critical needs. Often the agencies identified the need to address these specific issues during open-ended discussions without prompts or cited concern about the cowpea export restrictions (see text box), highlighting the ongoing need around pesticide training and education. In addition, the FMARD discussed challenges in farmer education around safe and judicious use of pesticides, label use comprehension, organic certification standards, and counterfeit or limited efficacy pesticides. Some extension-oriented farmer trainings have been conducted by the FMARD in various regions of Nigeria, however, more comprehensive and up-to-date engagement is warranted. NAQS indicated that they would welcome more information about biopesticides as alternatives to conventional pesticides. The National Institute of Animal Sciences and FMOH discussed the issue of pesticide residues and lack of baseline surveillance in animal feed and human foods, respectively. Finally, the issue of standardizing MRLs and the barrier this presents to trade was mentioned among several participants.

Nigeria is a member of the West African Pesticide Registration Committee (WAPRC), a regional effort to harmonize pesticide registration processes. The WAPRC should facilitate the registration of biopesticides and safe chemical pesticides, but it

leaves a heavy burden of residue studies and risk assessment to each country. As a large country with different agroclimatic zones shared with neighboring countries and with some capacity building in risk analysis for crop protection products, Nigeria could become a leader in this harmonization effort and further promote adoption pathways that would benefit countries with less advanced regulatory infrastructure in this area. Adoption pathways would enable countries to leverage the risk assessment work performed in Nigeria to register products needed by their farmers.

Overarching Observations:

- a. Safe and more effective use of pesticides was identified as a priority by NAQS and FMARD.
- b. Registration, availability, and use of bio-pesticides was identified as a need by the NAQS.
- c. Baseline surveillance of residues was identified as a need by the CVO, the National Animal Health Institute, and the Federal Ministry of Health.
- d. Targeted high-risk food strategic sampling should be conducted based on feedback from FMOH review of pesticides in major value chains in 2015-2016 (ready to eat foods, rice, ginger, spices, sugarcane, and honey were proposed).
- e. Standardization of MRLs across the region and African Union was identified by FMARD and NAQS.
- f. Nigeria is identified as one of four countries that can help lead with greater participation in the regional harmonization through the WAPRC (along with Côte d'Ivoire, Senegal, and Ghana).
- g. A lack of knowledge of alternatives for pest control when residues exceed MRLs was identified as an issue during the meeting with NAQS stakeholders.
- h. MRL exceedance of cowpea (due to insecticide) was identified as an issue by FMARD; requested using cowpea as a case-study for an assessment of the potential for export to U.S.
- i. FMARD has a fledgling organic certification program but has many challenges.
- j. Language barriers was identified as a challenge by NIAS in the interpretation of labeling on the use of pesticides by local farmers who do not understand English.

FOOD SAFETY AND QUALITY BILL, 2019

ARRANGEMENT OF SECTIONS

Section:

PART I - OBJECTIVES, APPLICATION AND SCOPE

1. Objectives of the Act
2. Application and Scope of the Act

PART II - PRINCIPLES OF FOOD SAFETY

3. Scientific basis for Food Safety Measures
4. Risk communication
5. Risk management
6. Risk assessment
7. Precautionary Principle
8. Transparency

PART III - GENERAL REQUIREMENTS FOR FOOD AND FEED SAFETY
AND QUALITY

9. Food Safety Requirements
10. Feed Safety Requirements
11. Power to make Regulations
12. Food Quality Requirements

PART IV - REGISTRATION AND LICENSING OF ESTABLISHMENTS

13. Registration of Establishments
14. Licensing of Establishments
15. Licence Conditions, Suspension and Cancellation
16. Fees for Registration and Licencing

PART V - RESPONSIBILITIES OF FOOD AND FEED BUSINESS OPERATORS

17. Responsibilities with Respect to Unsafe Food and Feed
18. Requirement for Traceability of Food and Feed

PART VI - DECLARATIONS AND LABELLING

19. False and Misleading Descriptions

Figure 8: 1st page of Food Safety and Quality Bill

Identified Opportunities for Improving Nigeria’s Food Safety System

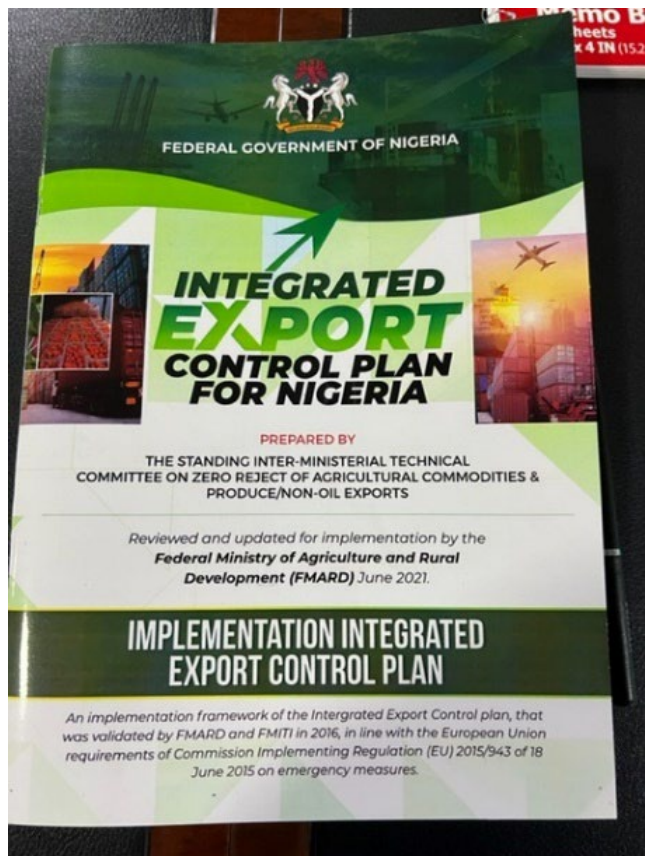


Figure 9: Integrated Export Control Plan for Nigeria

- **Nigeria’s Food Safety and Quality Bill** appears to have renewed momentum with the first of several public hearings held on July 26, 2022. When passed into law, it will represent a significant achievement and basis for collaboration with relevant ministries to support relevant implementation and strengthening of technical capacities by Feed the Future programming in the years ahead.

- **Zero-Reject Initiative** – The FMARD, working with USAID-funded Mercy Corp and the European Union, has developed an *Integrated Export Control Plan for Nigeria* as well as a *Public Sector Action Plan on Zero Reject of Nigerian Agricultural Commodities and Produce/Non-oil Exports*. This program was developed in response to Nigeria’s import rejections for cowpea in 2015 and has an inter-ministerial committee and action framework for improving agricultural export controls including quality and safety. As such, it demonstrates buy-in and should guide USG investments to match the priorities identified in these sectors.

- FMOH, FMARD, and NAFDAC, with resources from a Codex trust fund, are **rolling out both HACCP and national interpretation of Codex** standards aligned with WHO Food Safety Strategy in regions across Nigeria. Significant momentum

exists for national implementation of international science-based standards, with the constraint being uptake by small and medium-sized enterprises.

- **Need for training across value chains:** While FSMA training was discussed among the stakeholders, it is premature to offer full, certified Preventive Controls Qualified Individual (PCQI) or Produce Safety training since exports to the U.S. market are relatively small (about \$95M in 2021). However, these risk prevention programs should be used as examples to facilitate the establishment of new requirements in Nigeria that will fall under the scope of the new law. They will promote engagement of industry stakeholders with government officials to write feasible and effective regulations. The USG and its technical partners have a wealth of experience on this kind of training.

Observed Constraints to Improving Nigeria's Food Safety System

- **Complex Responsibilities:** Food safety regulation falls under numerous federal ministries, departments, and agencies including FMARD, FMITI, and FMOH. Private sector representatives identified this as frustrating and costly. The new food safety bill does not appear to directly change this complexity and duplication of regulatory authorities, but rules developed under the new law could address them.
- **Unequal Access to Foreign Exchange:** the government identifies priorities for where foreign exchange should be used and ensures that the priorities have best access to foreign exchange. For example, priority industries such as the airlines get a better exchange rate than those wanting to import corn. As a result, the importation of high-quality inputs for animal feed such as U.S. corn and soy get suboptimal exchange rates, thereby become more expensive and cost prohibitive for the Nigerian private sector. The Nigerian poultry sector currently suffers the most given its need for high-protein feed.
- **Food Safety Culture:** As identified by the literature review, Nigeria struggles with a weak culture of food safety awareness, and stakeholders reported insufficient engagement with officials which translates into high rates of foodborne illness and little motivation for improvement by producers, processors, and regulators.

ACTION PLAN

For Improving Nigeria's Food Safety System

The following activities comprise a hypothetical Feed the Future action plan to address the priority findings for capacity building in the areas of risk-based food safety management, traceability, mycotoxins, and pesticide registration, including biocontrol, to improve Nigeria's food safety system.

Advocate for Passage of the Food Safety and Quality Bill and Assist with Implementation
Dates: Short- and long-term (0-6, 12+ months)
GFSS Indicators²⁵: 4.5.1-8: Number of institutions undertaking capacity/competency strengthening as a result of USG assistance 4.5.1-9: Number of agricultural enabling environment policies / regulations / administrative procedures being analyzed as a result of USG assistance 4.5.2-7: Number of individuals who have received USG supported short-term agricultural sector productivity or food security and/or SPS training
USAID Program Element: (5.1) Agriculture Enabling Environment; Inclusive Agriculture Sector Growth; Increasing Access to Safe and Nutritious Food
Goals: <ul style="list-style-type: none">• Passage of the Bill into law by the National Assembly by December 31, 2022• Develop science-based regulations to implement the law by December 31, 2023• Improve communications and coordination with key stakeholders in the government of Nigeria, especially FMOH and FMARD food and feed safety regulatory authorities
Background: <p>The Food Safety and Quality Bill was drafted in 2019 but in 2022 is approaching the final stage of passage by the National Assembly. The Ministry of Health (FMOH) is the executive branch ministry that sponsored the Bill, and it has seen support from a renewed effort by the food and agriculture industry to advocate for passage by the end of 2022. Ministries and regulatory authorities are receptive to external guidance once the Bill is passed on a national implementation plan and development of science-based implementing regulations.</p>
Project Description: <p><i>Advocacy for the Passing of the Food Safety and Quality Bill:</i> Work with stakeholders to coordinate a comprehensive review of the Bill to ensure alignment with international science-based standards and good regulatory practice and explain these as needed to elected officials. Provide written comments to relevant Nigerian ministries and competent authorities that will advise the President of Nigeria to approve and sign the Bill. In addition, consider linking this technical assistance with the implementation efforts of the African Union Commission through the African Continental Free Trade Area and its Food Safety Strategy for Africa.</p> <p><i>Assist with Implementation of the Bill:</i> Once the Bill is passed and signed by the President, provide technical assistance and advice to the relevant Nigerian regulatory agencies that will be responsible for preparing new and revised implementing regulations based on science and risk-based approaches.</p>

²⁵ While final GFSS-Feed the Future indicators are not yet available, USDA references its previous indicators.

Train on Risk-Based Regulatory Systems

Dates: Long-term (12+ months)

GFSS Indicators:

4.5.1-8: Number of institutions/organizations undertaking capacity/competency strengthening as a result of USG assistance

4.5.2-7: Number of individuals who have received USG supported short-term agricultural sector productivity or food security and/or SPS training

USAID Program Element: (5.1) Agriculture Enabling Environment; Inclusive Agriculture Sector Growth; Increasing Access to Safe and Nutritious Foods

Goals:

- Improve several Nigerian governmental agencies in understanding Codex guidance and USG framework for risk analysis and science-based decision making, specifically in risk assessment, risk management, and risk communication.
- Build capacity of Nigerian officials to conduct a risk analysis, possibly in the area of pesticide registration to simultaneously improve capacity at regional level (*i.e.* in the WAPRC) in support of safe food and accelerated trade.
- Build capacity of Nigerian officials to effectively communicate risk to diverse stakeholders and manage emerging crises.

Background:

Risk-based decision making is the fundamental basis for harmonization of standards, public health protection, and eliminating unnecessary barriers to trade. Nigerian stakeholders identified their desire to have assistance to better understand best practices in regulatory risk analysis. This includes traditional risk assessment, risk management, and risk communication, as well as elements of the Food Safety Modernization Act as an example of implementation. FMOH indicated they are implementing HACCP training in different states in Nigeria.

Project Description:

Effort should be widespread and sustained to ensure that all relevant agencies are trained, industry and consumer groups understand and contribute to the knowledge about the risk in Nigeria, and that the risk-based approach is well understood and enforced in regulations. Partner with agencies such as NAFDAC to coordinate these workshops.

Assistance should start with training using existing resources on the general guidelines and concepts of risk-based food safety systems. Further efforts can focus technical trainers to develop and continuously refine and implement training modules that are specific to the needs and interests of Nigerian officials and stakeholders. Training workshops will seek to effectively transfer knowledge while developing relationships between Nigerian officials and international and local experts.

Support Traceability in Nigerian Food and Agriculture

Dates: Long Term (12+ months)

GFSS Indicators:

4.5.1-8: Number of institutions/organizations undertaking capacity/competency strengthening as a result of USG assistance

4.5.1-9: Number of agricultural enabling environment policies / regulations / administrative procedures being analyzed as a result of USG assistance

4.5.2-7: Number of individuals who have received USG supported short-term agricultural sector productivity or food security and/or SPS training

USAID Program Element: (5.1) Agriculture Enabling Environment; Inclusive Agriculture Sector Growth; Increasing Access to Safe and Nutritious Food

Goals:

- Improve traceability systems and capacity across relevant stakeholder groups, including the Nigerian government agencies involved in writing the regulatory requirements for food and agriculture.
- Build capacity to respond to outbreaks and effectively conduct a food recall.
- Increase comprehension among value chains stakeholders of the requirement and benefits for them of traceability to facilitate trade and protect their brands.

Background:

Several stakeholders identified improving traceability systems as a critical need to improve public health infrastructure and enable certification programs, such as organic or vaccinated animals. Implementing traceability systems will benefit both domestic production and access to global food markets and trade. In particular, the pending Nigerian Food Safety and Quality Bill contains several sections on how to conduct recalls through improved traceability requirements.

Project Description:

Support technical trainers to build, customize, and deliver training on traceability in the food system. This could be included as a module or component of risk assessment workshops, particularly in the context of risk management. Participants could work on conducting mock recalls based on pre-defined, real-world scenarios, and include risk communication best practices. Effort should be widespread and sustained to ensure that all relevant agencies are trained and that traceability becomes a key component of the food safety regulatory infrastructure.

Pesticide Education and Surveillance

Dates: Medium-Term (6-18 months)

GFSS Indicators:

4.5.1-8: Number of institutions/organizations undertaking capacity/competency strengthening as a result of USG assistance

4.5.2-7: Number of individuals who have received USG supported short-term agricultural sector productivity or food security and/or SPS training

USAID Program Element: (5.1) Agriculture Enabling Environment; Inclusive Agriculture Sector Growth; Increasing Access to Safe and Nutritious Food

Goals:

- Increase the government of Nigeria's interest and capacity to actively participate in the regional alignment processes through the WAPRC to facilitate registration of pesticides and biopesticides.
- Increase access to and knowledge of safe, effective use of pesticides and alternatives to chemical pesticides by farmers and Extension workers to address public health, environmental, and crop loss concerns.
- Reduce exceedance of MRL standards, in particular those arising from missing MRLs, and enable increased trade to international markets.
- Develop and prioritize monitoring of agricultural and food products to establish baseline residue levels for pesticides, as well as targeted high-risk foods requiring regulatory action.

Background:

Several stakeholders identified the need for better pesticide safety education and access to information on integrated pest management (IPM) and use of biopesticides. Nigeria experiences border rejections based on MRL issues, particularly in the EU market. In addition, concerns were raised about adulterated pesticide products and pesticide label comprehension.

Project Description:

Technical experts will engage with relevant offices in the government of Nigeria to identify priority training needs that will facilitate engagement at the regional WAPRC level. Regional alignment of pesticide registration will allow for greater access to pesticides and biopesticides, with less technical and bureaucratic investment due to the shared regional efforts. Addressing needs for risk-based pesticide registration training could include a webinar series and in-person training, along with training in risk communication and other aspects of pesticide regulations.

Furthermore, technical consultations on pesticide safety and application schedules, IPM, and biopesticides for Nigerian stakeholders will provide alternative approaches to addressing pests. The cowpea is a priority crop because it currently faces an import ban in Europe, and this technical assistance will help address challenges to access to international markets. Likewise, support for extension and training of farmers will be provided to ensure implementation of IPM strategies. These activities should be conducted in partnership with relevant USG supported programs such as IR-4 and the Minor Use Foundation.

Mycotoxin Assessment and Control

Dates: Medium Term (6-12 months)

GFSS Indicators:

4.5.1-8: Number of institutions/organizations undertaking capacity/competency strengthening as a result of USG assistance

4.5.2-7: Number of individuals who have received USG supported short-term agricultural sector productivity or food security and/or SPS training

USAID Program Element: (5.1) Agriculture Enabling Environment; Inclusive Agriculture Sector Growth; Increasing Access to Safe and Nutritious Food

Goals:

- Increase awareness of aflatoxin and other mycotoxins through education for farmers, processors, and government officials.
- Assist with a strategy and design for baseline monitoring of aflatoxin across targeted commodities, to ensure a standardization of data collection and quality control.
- Increase knowledge on management and control of aflatoxin at pre-harvest, harvest, and post-harvest storage to reduce aflatoxin and increase access to trade in international markets.
- Development and deploy a laboratory standard operating manual for 1) simple identification of mold growth in crops, feed, and dry fish, and 2) the use of quick screening for the detection of and semi-quantitative measurement of aflatoxin in support of the PACA strategy for Nigeria.

Background:

Several stakeholders identified the need for reduction and control of aflatoxin in agricultural commodities (including fish) which is one of the major barriers to international trade. Stakeholder awareness of aflatoxin is low among farmers, food processors, and traditional marketers, which leads to preventable exposure for the population and diminished trade access. Indeed, Nigeria experiences border rejections of agricultural commodities due to aflatoxin contamination, particularly in the EU market.

Project Description:

In partnership with technical partners in Nigeria, the project team will convene regulator, industry, farmer, and consumer representatives to evaluate the levels of knowledge about the hazard, risk, and mitigation measures in the different groups. They will adapt technical training materials for each group and support the best delivery mechanisms (for example, through Extension services, academic training and industry group publications or meetings).

A laboratory standard operating procedures (SOP) manual will be published in collaboration with other beneficiaries of the PACA to promote the deployment of harmonized practices in aflatoxin monitoring. This action will be supported by capacity building for the relevant regulatory laboratories to educate on the SOPS and communicate the positive public health impact that the additional workload may create. A communication strategy will also be proposed, ideally using a hybrid online and in-person model, to educate stakeholders on detection, control, and mitigation strategies for mycotoxins, with aflatoxin as a priority target.

STAKEHOLDERS CONSULTED

S/N	FIRST NAME	LAST NAME	GENDER	Title/DESIGNATION/Role Description	AGENCY
1	Maimuna	Abdullahi Habib	F	Chief Veterinary Officer of Nigeria, Federal Ministry of Agriculture and Development, Federal Department of Veterinary and Pest Control Services, FCDA Complex, 1 Capital Drive, Area II Gariki Abuja.	Federal Min. of Agric. & Rural Dev. Abuja
2	Michael David	Michael David	M	Consultant, Nigeria/SSA US Soybean Export Council 16305, Swingley Ridge Road, Suit 200 , Chesterfield, MO USA	Federal Min. of Agric. & Rural Dev. Abuja
3	Mabel	Aworh - Ajumobi	F	Assistant Director/Epidemiologist/FF Fellow AMR AMR Surveillance Lead Dept. of Veterinary & Pests Control Services, Former CODEX Contact Point	Federal Min. of Agric. & Rural Dev. Abuja
4	Stephen	OluFemi	M	National Coordinator, Food Safety & Quality Programme	Federal Ministry of Health
5	Philomina	Nwobosi	F	ACSO/Food Safety & Quality Programme	Federal Ministry of Health
6	Ann	Chichinueka	F	SOI/Food Safety & Quality Programme	Federal Ministry of Health

7	Ebosi	Onyebuchi		EHT	Federal Ministry of Health
8	Emmanuel	Onyedikechukwu	M		Federal Ministry of Health
9	Joseph	Olugun Taiye	M	Director	Federal Ministry of Health
10	Isah	Sumaila	M	SO II	Federal Ministry of Health
11	John	Atanda	M	Chair National Codex Committee, Coordinator for National Food Safety Bill Steering Committee	Federal Ministry of Health
12	Onallo	S. Akpa	M	Director General	Poultry Association of Nigeria
13	Enejo	Dolapo	F	Program Manager	NESG
14	Gloria	Ekpo	F	Facilitator, Agric. & FS Policy Commission	NESG
15	Nsikan	Essien	F	Lead, National Assembly, Business Environment Roundtable	NESG
16	Tayo	Aduloju	M	Chief Operations Officer	NESG

17	Vincent	Isegbe	M	Director, Nigeria Agricultural Quarantine Service	NAQS
18	Ebenezer	Idachaba	M	NPPO, Nigeria	NAQS
19	Uwechie	Alozie	M	Director, Aquatic Resources	NAQS
20	Chigozie	Nwodo	M	Special Assistant to the Comptroller General	NAQS
21	Fitzgibon	Ekpo	M	Deputy Director	Nigeria Institute of Animal Science (NIAS)
22	Erikanobeng	Effiong	M	Principal Animal Scientist	Nigeria Institute of Animal Science (NIAS)
23	Harry Ifeanyi	Njoagwuani	M	Deputy Director (Head, Regulatory Affairs)	Nigeria Institute of Animal Science (NIAS)
24	Babafemi	Lawal	F	AD (Nutrition)	FDA/FMARD
25	Umakaltume	Abubakar	M	AD	VPCS/FMARD
26	Supra T.	Mahmood	F	Deputy Director, Irrigation & Crop Development	FMARD

27	Rasaq	Oyeleke	M	Deputy Director	FMARD
28	Julius	Adanlawo	M	Assistant Chief Agric. Officer	FMARD
29	John	Ikawu	M	Assistant Chief Agric. Officer	FMARD
30	Kingsley	Onigwe	M	Principal Agricultural Officer	FMARD
31	A.T.	Aminu	M	AD	FMARD
32	Victor	Knayo N.	M	CAO	FMARD
33	Jazmian	Ohanyere	F	Feed the Future Team Lead	USAID
34	Gerald	Smith	M	Agricultural Counselor	USDA-FAS