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EatSafe - Evidence and Action Towards Safe, Nutritious Food

Analysis of Food Safety Investments in Nigeria: A Review

September 2020

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This EatSafe report presents evidence that will help engage and empower consumers and market actors to better obtain safe nutritious food. It will be used to design and test consumer-centered food safety interventions in informal markets through the EatSafe program.

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For additional information, please contact:

Bonnie McClafferty, EatSafe Project Director
Global Alliance for Improved Nutrition (GAIN)
1701 Rhode Island Ave NW
Washington, D.C. 20026
Email: bmcclafferty@gainhealth.org

Caroline Smith DeWaal, EatSafe Deputy Director
Global Alliance for Improved Nutrition (GAIN)
1701 Rhode Island Ave NW
Washington, D.C. 20026
Email: cdewaal@gainhealth.org

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

Below is a list of all acronyms and abbreviations used in the report.

BMGF	Bill & Melinda Gates Foundation
CAC	Codex Alimentarius Commission
DG DEVCO	Directorate-General for International Cooperation and Development
DG SANTE	Directorate-General for Health and Food Safety
EC	European Community
ECOWAS	Economic Community of West African States
EU	European Union
FAO	Food and Agriculture Organization
FBD	Foodborne Diseases
FS	Food Safety
GFSP	Global Food Safety Partnership
HACCP	Hazard Analysis Critical Control Point
ICCO	International Cocoa Organization
IITA	International Institute of Tropical Agriculture
LMICs	Low- and Middle-income Countries
NAFDAC	National Agency for Food and Drug Administration and Control
NGO	Non-Governmental Organizations
SDG	Sustainable Development Goals
SON	Standards Organization of Nigeria
SPS	Sanitary and Phytosanitary
STDF	Standards and Trade Development Facility
US	United States
USD	United States Dollar
USAID	United States Agency for International Development
USDA-FAS	United States Department of Agriculture-Foreign Agriculture Service
WFP	World Food Program
WHO	World Health Organization
WTO	World Trade Organization

EXECUTIVE SUMMARY

Food safety is a global concern. It not only impacts human health but also food security and economic development. Starting in April 2020, the United States Agency for International Development (USAID) started supporting a new five-year food safety project in Nigeria titled, EatSafe: Evidence and Action Towards Safe, Nutritious Food. In order to learn from past endeavors in Nigeria, a desk review of previous investments in food safety in Nigeria was undertaken using the available database of the Global Food Safety Partnership (GFSP), a public private initiative hosted by the World Bank. This effort is aimed at gauging the level of funding directed at food safety compared to other components of projects funded. The findings are expected to provide a better picture of the food safety investment situation at the country level. EatSafe also sees value in this review as a resource for policy makers who can use the findings to determine the food safety investments for the country, and to assess the need for increased donor support to fund food safety projects.

In 2017-2018, the Global Food Safety Partnership undertook an intensive analysis of recent food safety investment in sub-Saharan Africa (2010-2017). The database was reviewed, and data specific for Nigeria extracted. A total of 45 projects were analyzed. Fifteen (15) lasted for at least one year and 18 were "short-term" (workshops and trainings). Six of the 15 (>1 year) projects were implemented in Nigeria only. The average food safety project in the country lasted three years and are currently coming to a close. A majority (>50%) of the projects were implemented by non-government entities. Nine of the 15 projects (60%) addressed aflatoxin, two were on microbiological hazards, and one was on pesticide reduction in cocoa. Approximately half of the projects were focused on African markets versus export outside the continent. The public health link was not clear in majority of the projects. We could not find any project that specifically addressed food safety in informal markets focusing on the consumer and the related public health impact – EatSafe's proposition. In addition, we found very few rigorous evaluations of donor funded investments. However, the projects tended to focus on formal private sector enterprises and legislation which likely benefits the richer entrepreneurs and consumers more (than the domestic consumers).

The following conclusions can be drawn (based on findings from the Nigeria review):

- current donor investment in food safety is focused on access to regional and overseas export markets;
- there is an enormous under-investment in food safety relative to its public health and economic impacts;
- risk-based approaches to prioritization and of incentive-based approaches to interventions are lacking, with too much emphasis on the "trivial many" hazards and not enough on the "vital few";
- evaluation is difficult to find and lacking in rigor; and lastly,
- donors and national governments should consider a new strategic approach to capacity building.

1. INTRODUCTION

Food safety is a global public health concern. Contaminated food impairs food security and interferes with livelihoods. In 2015, the World Health Organization (WHO) analyzed 31 foodborne disease hazards and found their burden to be similar to that of major infectious diseases including malaria and tuberculosis (1). An estimated 600 million people became sick and 420,000 died that year. World Bank estimates that unsafe food costs about $110 billion in low– and middle- income countries (LMICs) ($95.2 billion is lost productivity and $15 billion is medical cost/ year) (2). Another part of this study looked at the impact of an additional burden from four foodborne metals: this estimate that in 2015, ingestion of arsenic, methylmercury, lead, and cadmium resulted in more than one million illnesses, over 56,000 deaths, and more than 9 million disability-adjusted life years (DALYs) worldwide. It is likely that the impact in developing countries is even higher because of the inadequacies in surveillance systems and perceptions linked to foodborne diseases. Food safety will play a key role in achieving several of the 2030 United Nations Sustainable Development Goals (2) (2, 3); ending poverty (SDG1), ending hunger (SDG2), good health and well-being (SDG3), gender equality (SDG5), clean water and sanitation (SDG6), decent work and economic growth (SDG8), sustainable cities and communities (SDG 11), and responsible production and consumption (SDG12).

Despite the fact that the impact of unsafe foods is better understood, policy makers have not given the topic the attention it requires (food safety only tends to capture attention when there is a crisis) (2, 4). It is now evident that much of the previous attention has been on investments that promote access to regional and international markets (5); with less focus on safety of what is sold in domestic markets. There is no doubt that exports are important for national development, however, unsafe foods present significant challenges to domestic consumers who access much of their food through informal market channels (4). Fresh products are implicated in FBD outbreaks (6); animal source foods may be responsible for 35% or more of global burden of foodborne diseases (7) and vegetables transmit a number of foodborne pathogens (8). Besides animal source products and fresh produce, interventions should also consider safety of the “ready-to-eat” (street) foods, with the intention to safeguard the benefits they provide (9).

The Global Food Safety Partnership (GFSP) is a public-private partnership that fosters capacity building on food safety (https://www.gfsp.org/). The GFSP *Food Safety in Africa* database, released to the public in February 2019, contains 518 donor investments in food safety in sub-Saharan Africa from 2010-2017. The projects were identified through online, keyword searches and validated with each of the 31 donors (United Nations organizations, bilateral donors, multi-donor trust funds, foundations, and development banks). Reports on FAO and WHO activities from the Codex Alimentarius Commission (CAC) Africa (10) and Capacity Building (11). Committees were also used to identify projects and activities, as were the WTO

Committee on SPS communications regarding SPS-related technical assistance provided by the EU, US, Japan, and Canada since 2010 (12). Data on each project was obtained from official descriptions and report documents available online or through donors. Although it does not include 2018-2020 projects, the database is the most comprehensive compilation available and provides a fair basis for analyzing patterns and trends in food safety investments.

For this analysis, the GFSP database was reviewed, and projects specific to Nigeria were extracted and synthesized into a report. We did not extend the analysis beyond the GFSP database, which covered 2010-2017 (final year was partial), and many of these investments are ongoing through 2020. The findings are expected to provide a better picture of the food safety investment situation at the country level and inform activities of the EatSafe project. In addition, policy makers can also use the findings to determine the food safety investments for the country and assess the need for increased donor support. It is the responsibility of national government to ensure safety of products available for consumption. They can use the resources that become available to implement projects that have clear links to public health, in addition to providing a regulatory mechanism that is supportive of the needs of the different food actors.

2. METHODOLOGY

The Global Food Safety Partnership (GFSP) food safety database was sorted to include only those projects implemented in Nigeria. The development of the database is described in depth in the GFSP report (5). In brief, data was collected through public, online sources, with an emphasis on donor websites. Sources were searched using key words and a template was developed to extract information on each project. Summaries were shared with donor institutes to validate accuracy.

3. RESULTS

3.1 Number of investments

There were 15 investments lasting at least one year and 18 “short-term” projects (including workshops and trainings). Twelve additional projects were identified as having some food safety components. These were mostly focused on trade and market access for cash crops such as cashews, fruits, and vegetables. Results presented below are for the 15 investments (>1 year in length) and those that were focused on food safety. Forty percent (6) of these projects were implemented in Nigeria only. Among the regional projects, 4 projects were implemented in 6 or more countries, including Nigeria.

3.2 Implementing organizations

Over half of the projects were implemented by non-government entities including international research organizations such as the International Institute of Tropical Agriculture (IITA), global organizations such as the International Cocoa Organization (ICCO) and civil society organizations such as Rural Development Institute Ltd. (now Landesa) (collectively designated as non-governmental organizations (NGOs). The second most important implementors were multilateral organizations included FAO, WHO, and the African Union. Other actors had minor roles (Figure 1).

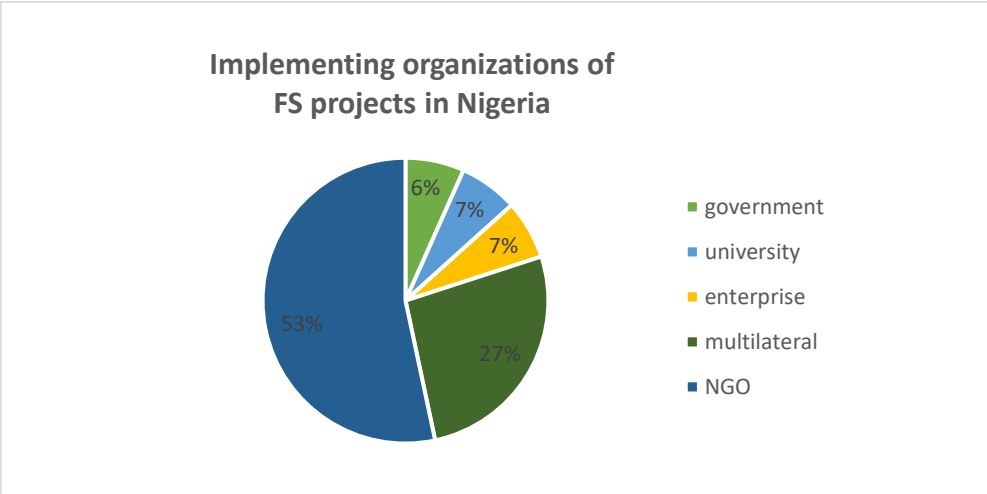

Figure 1. Project Implementors

3.3 Time of implementation

The number of projects trended up between 2010 and 2017 (Figure 2). Note that data collection only occurred through mid-2017, thus the apparent drop in project number that year is likely artificial. This growth may reflect the "Trade not Aid" strategy which became popular in the 2000s. Nigeria has a strong history of export of agricultural commodities, but recent decades have seen a decline of Nigeria's share of world agricultural exports and an increase in agricultural imports. Increasing numbers of projects is also compatible both with the growing consumer concerns over food safety, a common feature of urbanization, and growing donor concerns over food safety as evidence emerged on the enormous health and economic burden of foodborne disease in domestic (national) markets.

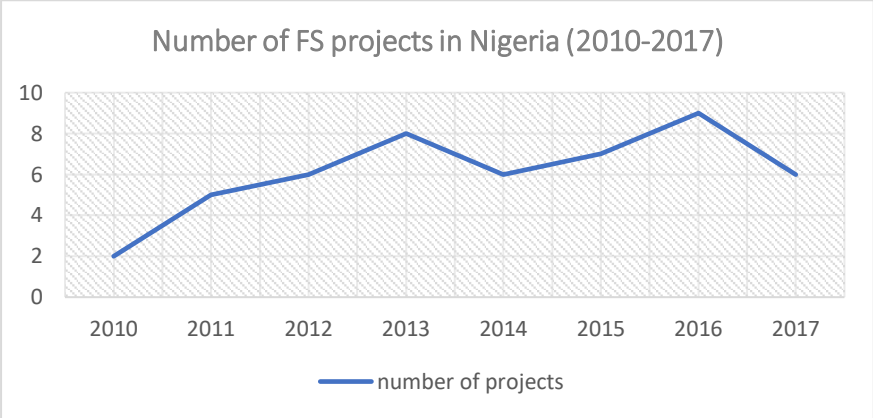

Figure 2. Project Number

3.4 Duration of projects

The average food safety project in Nigeria lasted 3 years. There were no projects lasting 6 or more years (Figure 3). Many development experts believe it is difficult to attain lasting change with short duration projects and that time frames of ten or more years are optimal for impact. The short duration of projects is, hence, unfortunate.

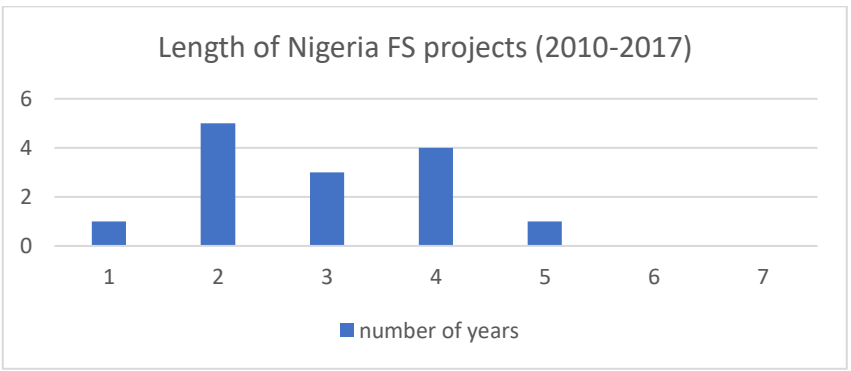

Figure 3. Project Length

We identified 18 projects lasting less than 1 year (not included in the above analysis). Ten of these projects were implemented in Nigeria only, while the other 8 were regional/multi-country.

- USDA-FAS had 7 projects. These were trainings, workshops, and fellowships dedicated to HACCP, good laboratory practices, and food safety policy. USAID funded an additional 5 projects with similar themes.
- FAO funded a risk-based Microbiological Food Safety Management workshop and follow up (2 projects)
- EC (DG SANTE) held 2 food testing workshops, on mycotoxins and veterinary drugs. DG DEVCO funded some work on the SPS harmonization within ECOWAS.

- WFP reported investments in capacity building for high-level officials of public sector partners: the National Agency for Food and Drug Administration and Control (NAFDAC) and the Standards Organization of Nigeria (SON). They aimed to build local capacity to certify safety and quality of locally procured foods and develop specific standards and specifications.

3.5 Foods and hazards addressed

Nine of the 15 projects (60%) addressed aflatoxin. According to the WHO, in the Africa D region where Nigeria is located, aflatoxins are responsible for 2% of the total domestic food safety disease burden. This focus on aflatoxins may reflect a lack of prioritization of domestic health or understanding on which are the priority hazards for human health. In addition, IITA is based in Nigeria and have been leaders in research into all aspects of aflatoxins, helping develop a powerful advocacy community to address this problem. Moreover, aflatoxicosis outbreaks have killed dozens of people in highly visible outbreaks: this makes them much more salient than the microbial "silent killers" which, while having many more victims, attract much less publicity.

Programs addressed one or more of the following commodities: groundnut (6 projects), maize and other grains (5 projects), chili peppers (1 project), sesame seed and sheanut butter (1 project). According to the WHO, most of these commodities are low risk commodities although several are exported and for several the main hazard is aflatoxin. This supports the prioritization issues highlighted by choice of hazard.

Two projects were focused on microbiological hazards in unspecified foods, and one project aimed to reduce pesticides in cocoa. The remainder of the projects dealt with Nigeria's national control system and food safety policy more generally, thus foods/hazards were unspecified. Most of the risky food (fresh animal source food and vegetables) are sold in traditional markets which are under-served by the national control system. Approximately half of the Nigerian FS projects were focused on African markets versus export outside the continent.

3.6 Investment and Donors

Budgets were not available for 3 food safety projects. The sum of the other 12 project budgets was $80.9M, split between the different focal donors (Table 1). The mean budget of the 12 programs was $7.5million, ranging from $165,000-$33.66M. Three multi-year programs had budgets over $10M: the 2 *PACA (Partnership for Aflatoxin Control in Africa)* projects (phases I and II) and AgResults' *Aflasafe™ Pull Mechanism Pilot Project*, to Incentivize Adoption of aflasafe™. Unfortunately, it was not possible to define how much of a multi-country/regional project was spent in a single country. However, the total FS investment in Nigeria alone between 2010-17 over 6 projects was approximately $14M. World Bank estimates the cost

of foodborne illness in Nigeria, in lost human capital alone, to be more than $6 billion USD per annum, showing a huge discrepancy between the investments and extent of the problem.

Table 1. Investment in Nigerian FS Projects, by Donor (2010-2017)

	Amount of investment (USD)	Number of projects	Nigeria-only projects
AgResults	12,680,000	1	1
BMGF	36,920,000	4	0
EC (DG SANTE)	1,176,550	1	0
Germany	n/a	1	1
Japan	165,000	1	0
FAO	495,000	1	1
WHO	n/a	1	0
USAID	22,399,856	5	2
STDF	7,057,602	3	1

Despite the exiguity of investments relative to the extent of the problem, Nigeria was among the top ten countries for investment in sub-Saharan Africa (Figure 4).

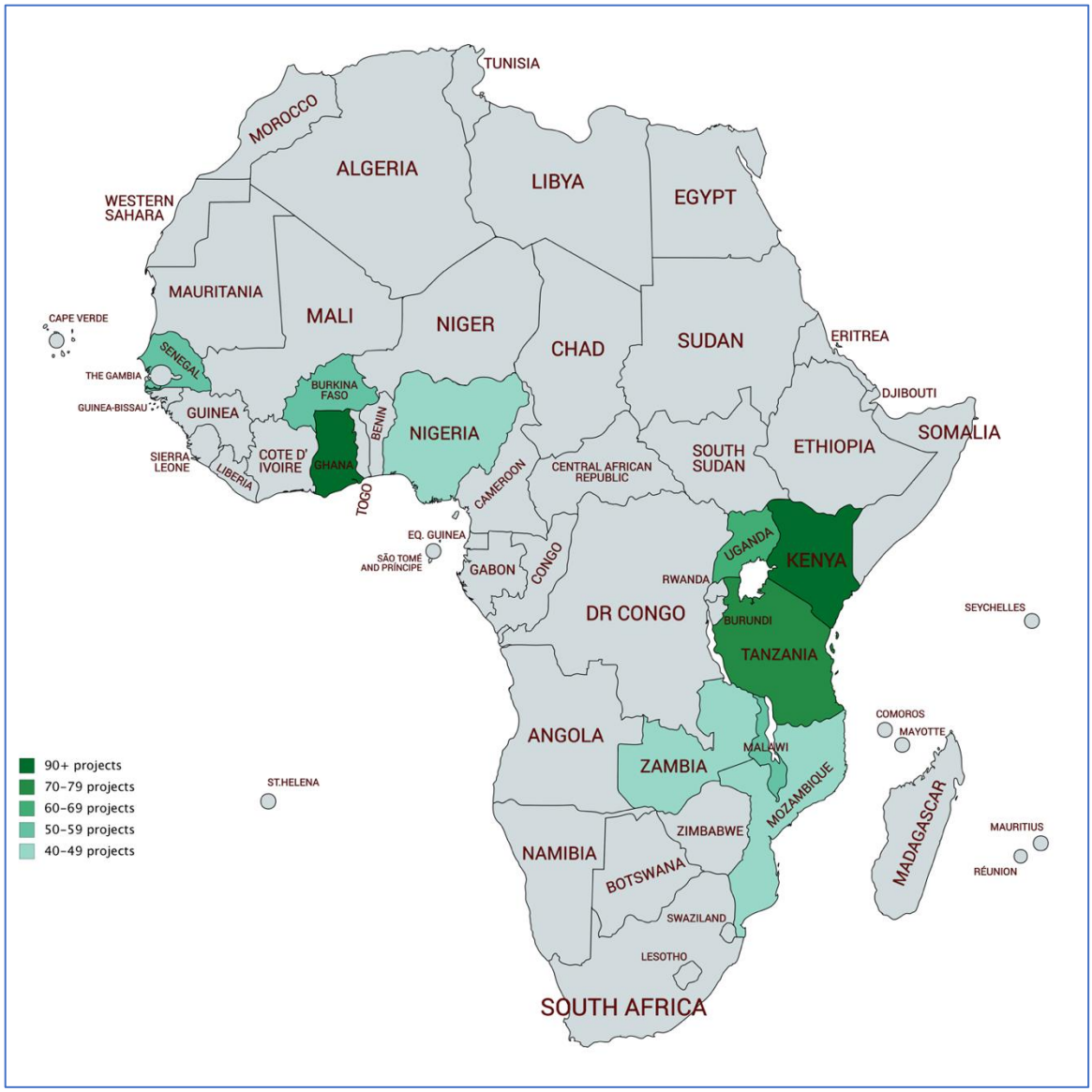

Figure 4. Top Ten Countries for FS Investment in Sub-Saharan Africa

3.7 Food Safety Activities

Looking at the specific activities of all 45 food safety projects in Nigeria ('short' & 'long' term), the most common were:

- Public sector staff/certification (22 projects)
- Extension/education/training for private sector enterprises (19 projects)
- Legislation/policy/standards development (19 projects)
- Research on hazards & interventions (11 projects)
- Laboratory methods & training (11 projects)

Although useful in other contexts, most of the activities were quite remote from benefiting the health of the poor domestic consumer. Public sector staff/certification and laboratory

methods is often aimed at benefiting the export sector. Projects tended to focus on formal private sector enterprises and legislation which benefits the richer entrepreneurs and consumers. Research on hazards is most likely to support rational prioritization but this does not seem to translate to action on the ground. Only research on interventions is directly linked to reduction in risk (whether for domestic consumers or consumers of exported products is not clear).

3.8 Food safety & nutrition

While there has been considerable investment in improving nutrition in Nigeria, we found very little investment in Nigerian food safety (i.e. one that is directly tied to improving nutritional status in the country). A few large projects were designed to increase food safety and quality of fruits and vegetables (e.g. PIP2 and Fit for Market, funded by EC), but these were primarily concerned with securing market access abroad. Moreover, there was only one small investment, a *Better Training for Safer Food* workshop on food testing, that built food safety capacity related to animal source foods, which are important sources of protein. Nigeria was one of four countries chosen for STDF's Total Diet Study (2014-2017) (Benin, Cameroon, Mali and Nigeria). The project value was $1,333,853. The study was restricted to chemical hazards such as persistent organic pollutants (PCBs and organochlorine pesticides), mycotoxins, heavy metals, veterinary drug residues, and pesticide residues (3). Eight study sites were involved including Nigeria`s Lagos (301 households) and Kano (765 households). A total of 872 analytes were screened. Exposure was determined by multiplying the estimated consumption (84 foods: units/kg bodyweight) with the mean occurrence of food chemical concentration (table 2). Exposure levels were then compared with the chemical hazard characterisation established by Joint Food and Agriculture Organization of the United Nations (FAO) and WHO Expert Committees. A total of 305 food chemicals were detected. No major public health issue was shown by arsenic, cadmium, and mercury.

Risk associated with dietary exposures to 68 detected chemicals was estimated (aluminium, arsenic, cadmium, mercury, lead, 11 mycotoxins, 13 polycyclic aromatic hydrocarbons, and 39 pesticides), based on availability of toxicological references and in consultation with national stakeholders (3). Liver cancer cases per 100,000 per year was 0.4 (in Lagos) and 1.4 (in Kano). Fumonisin exposure beyond the provisional maximum tolerable daily intake was 12% (in Lagos) and 39% (in Kano). Ochratoxin A exposure beyond the provisional tolerable weekly intake was 0% (in Lagos) and 23% (in Kano). For lead, intelligence quotient point loss was 2.4 (in Lagos) and 4.4 (in Kano). Blood pressure increase due to lead (mm Hg) was 1.1 (in Lagos) and 2.2 (in Kano). For the 13 polycyclic aromatic hydrocarbons, margin of exposure was 4226 (in Lagos) and 3657 (in Kano).

Table 2. Human Dietary Exposure Levels in Lagos and Kano, Nigeria (3)

	Lagos	Kano
Aflatoxin B1, ng/kg bodyweight per day	10 (10; 32)	37 (40; 125)
Sterigmatocystin, ng/kg bodyweight per day	5·5 (3·8; 12·3)	4·0 (3·1; 10·0)
Fumonisin (sum of B1, B2, B3, B4), ng/kg bodyweight per day	855 (1323; 3658)	2352 (2888; 8656)
Ochratoxin A, ng/kg bodyweight per week	15·5 (7·4; 29·3)	78·0 (82·6; 243·5)
Citrinin, ng/kg bodyweight per day	0·68 (0·39; 1·43)	169 (173; 544)
Lead, µg/kg bodyweight per day	650 (362; 1316)	1·24 (0·75; 2·65)
Aluminium, µg/kg bodyweight per week	71 (78; 225)	787 (403; 1613)
Polycyclic aromatic hydrocarbons (sum of the 13 carcinogens and genotoxic compounds), ng/kg bodyweight per day	10 (8; 24)	9 (10; 27)
Chlorpyrifos, ng/kg bodyweight per day	34 (27; 75)	28 (32; 91)

3.9 Evaluation

We found very few rigorous evaluations of donor funded investments. In particular there was a paucity of peer-reviewed publications. Although information was not available in the sources we accessed, it is likely that many projects were not designed in a way which allowed evaluation. One of the few projects where evaluation was substantive and available was one of the largest – the AgResults project which aimed to leverage market mechanisms to reduce aflatoxin in maize in Nigeria at scale (13). Although this project was not without successes and benefits, its evaluation is illustrative of some of the challenges in trying to understand which donor investments are most impactful.

3. CONCLUSIONS

Our conclusions for Nigeria were not different from the overall conclusions of food safety investments in Africa.

1. Current donor investment in food safety is substantially focused on access to regional and overseas export markets, with emphasis on oversight by national control systems to facilitate trade, but relatively little is being done to reduce foodborne illness among African consumers.

2. There is enormous under-investment in food safety relative to the public health and economic impacts.

3. There is an absence of risk-based approaches to prioritization and of incentive-based approaches to interventions.

4. Evaluation is difficult to find and lacking in rigor reducing opportunities for learning from previous investments.

5. Much donor investment involves training and laboratory activities that are not linked to a holistic strategy.

6. Donors and national governments should consider a new strategic approach to capacity building. This new approach should have increased public health focus and investment and greater emphasis on harnessing consumer awareness and market forces to drive progress.

Recommendations for Intervention Design and Future Studies under EatSafe

EatSafe [Nigeria] aims to generate the evidence and knowledge on leveraging the potential for increased consumer demand for safe food to substantially improve the safety of nutritious foods in informal market settings in Nigeria and other countries where EatSafe may operate. Central to EatSafe's work is understanding (and potentially shaping) the motivations, attitudes, beliefs, and practices of consumers and food vendors. While EatSafe will undertake novel primary research on consumer and vendor motivations and practices, it is essential to ensure that this work is informed by and builds on what has already been done—both in terms of methods used and results obtained. The following lessons emerging from this document can be considered to influence the design of EatSafe's interventions going forward:

- The interconnection between investments in food safety and potential positive public health outcomes and business partnerships in the food sector.
- To make it easier for operators in the informal sector to invest in food safety, the regulatory environment should be conducive to allow for continued food safety improvements and generating an environment for investment.
- Investment to improve safety of foods sold through informal markets is key in safeguarding the health and wellbeing of domestic consumers (the majority of whom are dependent on these markets for their foods).
- Investments aimed at overcoming critical issues surrounding food safety in Nigeria require a multi-sectoral and consumer-centric approaches, considering that contamination can occur at any level of the food value chain, and should be considered when planning for interventions.
- New Investments to support improvements in food safety in informal markets should recognize the interconnection between consumers, gender and individual roles, and tailor food safety training components and other technical assistance to reach actors at both the state and LGA level, including women, who stand to benefit the most, and translate such information to make greater impact on food safety in Nigeria.

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APPENDIX ONE: PROJECT COLLABORATORS

Academic	***Rutgers University*** ***University of Göttingen (Germany)*** ***Mississippi State University***
Private Sector	*Poultry Association of Nigeria (PAN)* *Association of Sheanut Producers of Nigeria* *National Association of Sesame Seed Producers of Nigeria* *Manufacturer Association of Nigeria (MAN)* *International Cocoa Organization (ICCO)*
Civil Society	*African Agricultural Technology Foundation (AATF)* *CropLifeAfrica*
Government	*Consumer Protection Council* *Nigerian Export Promotion Council (NEPC)* *National Agency for Food and Drugs Administration and Control (NAFDAC)* *Commercial Agriculture Development Project of the Federal Ministry of Agriculture and Water Resources* *National Horticultural Research Institute (NIHORT)* *Standards Organization of Nigeria (SON)* *Federal Ministry of Commerce and Industry (Now Federal Ministry of Industry, Trade, and Investment (FMITI)* *Federal Produce Inspection Services* *National Centre for Agricultural Mechanization (NCAM)* *Nigeria Agriculture Quarantine Service (NAQS)* *Nigerian Institute for Oil Palm Research (NIFOR)* *Federal Ministry of Health (FMOH)* *National Bureau of Statistics (NBS)*
Other	*United Nations Industrial Development Organization (UNIDO)* *Economic Community of West African States (ECOWAS)*

APPENDIX TWO: DESCRIPTION OF PROJECTS (2010-2017)

Project name	Donor	Years	Budget, if known
Aflasafe™ Pull Mechanism Pilot Project to Incentivize Adoption of aflasafe™ *Incentivize organizations with contract farming arrangements to work with smallholder maize farmers to adopt aflasafe™, building a core group of participants to anchor the market for aflasafe™. Features payments for performance that incentivize 'implementers' to help smallholder farmers to produce maize treated with aflasafe™. The pull mechanism also features technical assistance with the goal of increasing yields of participating farmers.*	AgResults	2013-2017	$12,680,000
Development and commercialization of biological control of aflatoxins in Kenya and Nigeria *Collect baseline data on the incidence of aflatoxin in Kenya and Nigeria; enable commercialization and availability of aflasafe™ for maize and groundnut in Nigeria; enhance capacity of Kenyan institutions to conduct biocontrol research; create awareness, train farmers and strengthen stakeholder capacity for aflatoxin management in Nigeria and Kenya; conduct field testing with maize and groundnut; construction of a new, modern laboratory facility; construction of a small-scale plant that will manufacture KE01™.*	Bill & Melinda Gates Foundation, USDA, USAID, DfiD	2011-2013	$1,320,000
Partnership for Aflatoxin Control in Africa (PACA) *To develop an Africa-based and Africa-led partnership, and to substantially control aflatoxin contamination in key staple crops across sub-Saharan Africa.*	Bill & Melinda Gates Foundation, USAID, DfiD	2011-2016	$33,600,000
Partnership for Aflatoxin Control in Africa (PACA) II *To generate an evidence base on the prevalence of aflatoxin in Africa, disseminate knowledge about tools and strategies to combat aflatoxins and*	Bill & Melinda Gates Foundation	2016-2020	$4,000,000

engage with public and private sector stakeholders to increase an aflatoxin-free food supply			
Strengthening the Nigeria National Food Control System and Safety *To strengthen public health by reducing the risk of foodborne illness and protect consumers from unsanitary, unwholesome, mislabeled, and adulterated food.*	FAO	2014-2016	$495,000
Cost effective, farmer- and environment-friendly biocontrol of aflatoxin in chili peppers *To test the efficacy of the aflatoxin biocontrol technology (aflasafe™) in chili peppers in Nigeria.*	Germany	2012-2013	.
Strengthening Safety Management System of Agricultural Products *This program's aims are to encourage participants' comprehension of Japan's safety management systems of agricultural products and to enhance the participants' capacity for improving safety management systems of agricultural products in their countries through site visits and lectures by Japanese government officials, farmers, distributors and processors.*	Japan	2015-2017	$165,000
Regional total diet study for sub-Saharan Africa *Contribute to strengthen capacity of risk managers to implement international standards based on a good knowledge of hazards, risks and exposure levels to harmful substances in commonly produced and consumed food. The expected long term impacts of this project are threefold: (1) improved market access for producers of foodstuffs by increasing compliance with international standards; (2) mitigated effects of poverty through the reduction of burden of foodborne diseases; and (3) increased contribution of African countries to the work of the Codex Alimentarius Commission.*	STDF	2014-2017	$1,206,208
Expanding Nigeria's exports of sesame seeds and sheanut/butter through improved SPS capacity building for private and public sector *To implement quality control along the sesame and shea product supply and value chains, rather than reliance on end-point food quality and aflatoxin analysis just prior to export.*	STDF	2010-2013	$545,040
SPS capacity building in Africa to mitigate the harmful effects of pesticide residues in cocoa and to maintain market access	STDF	2011-2013	$5,306,354

To maintain and improve market access for cocoa beans from Africa through enhancing the capacity of cocoa producing countries to comply with SPS requirements.			
Aflagoggles for Aflatoxin Detection, within Innovation Lab for Collaborative Research on Peanut Productivity and Mycotoxin Control *To develop a portable, rapid, and non-invasive technology that can detect aflatoxin through the fluorescence of contaminated kernels or nuts.*	USAID	2013-2017	$399,856
Development of National Food Safety Policy--within Nigeria Expanded Trade and Transport (NEXTT) project *To support the Nigerian government effort to expand trade domestically, within the ECOWAS sub-region and beyond, and to improve its efficiency so that trade, particularly in agricultural products, can provide inclusive economic growth and development in Nigeria. The project will build on the successes of its predecessors - MARKETS (Trade & Transport component) and NEEP - in addressing trade policy and trade facilitation constraints.*	USAID	2013-2016	.
Aflasafe™ technology Transfer and Commercialization (ATTC) Program *Identify strategic options for partnership with private companies or government entities, execute those partnerships and help ensure aflasafe™ products reach millions of farmers.*	USAID, Bill & Melinda Gates Foundation	2016-2020	$20,000,000
Project: Research on enteric pathogens from human, animal and food sources including antimicrobial resistance	WHO	????-2016	.
BTSF Africa: establishing a reference framework on food hygiene, regional workshops *Regional workshops to support improvements to national and regional animal health and food safety legal frameworks*	DG SANTE	2010-2012	$1,176,550

APPENDIX THREE: LIST OF SHORT-TERM PROJECTS (2010-2017)

- BTSF: Food testing workshop, Mycotoxins
- BTSF: Food testing workshop, Veterinary Drugs
- Support to the implementation of a program on microbiological and chemical risk management for West African countries
- Workshop: Risk-based Microbiological Food Safety Management workshop series and follow-up
- Advice for national food safety policy stakeholders meeting
- Nigeria NFSC Follow on Meeting
- Workshop: West Africa Regional HACCP Workshop
- HACCP Implementation Plan Activity
- Workshop: Regional Good Laboratory Practices Workshop for Sub-Saharan Africa
- Good Manufacturing Practice (GMP)
- HACCP Road Show
- Advice: Aflatoxin stakeholder sensitization and biocontrol pre-registration consultation
- Cochran Fellow 2012 (Nigeria): Emerging food safety issues and concepts, US and International food safety regulatory systems, food safety policy development, risk analysis, and food safety program implementation
- Cochran Fellow 2014 (Nigeria): Training for food safety related to policy and the catering industry
- Establishment of National Food Safety Committee (NFSC)
- Cochran Fellow 2015 (Nigeria): Training on the US Cold Chain Management System Including Production and Processing to Post-harvest Management, Cold Storage, Prevention of Contamination and Food Illness, Distribution, and International Trade Policy (Nigeria)
- Food safety capacity building in Nigeria
- Evaluation finale du Programme Qualite Afrique de l'Ouest "Appui a la competitivite et l'harmonisation des mesures OTC et SPS"