

International Livestock Research Institute




Food safety in East Africa: Report of a stakeholder workshop
organized by the International Livestock Research Institute and
the Food and Agriculture Organization of the United Nations



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Contents

Acronyms and abbreviations.....	iii
Acknowledgements.....	iv
Executive summary.....	v
Background.....	1
Workshop objectives.....	2
Session highlights	3
Official opening	3
Stakeholder presentations	3
Technical presentations.....	6
Plenary discussions	10
Annex 1: List of participants.....	12
Annex 2: Workshop agenda.....	13

Acronyms and abbreviations

A4NH	CGIAR Research Program on Agriculture for Nutrition and Health
AU-IBAR	African Union–Interafrican Bureau for Animal Resources
Beca	Biosciences eastern and central Africa
CDC	Centers for Disease Control and Prevention
DVS	Department of Veterinary Services
ECTAD	Emergency Centre for Transboundary Animal Diseases
FAO	Food and Agriculture Organization of the United Nations
HACCP	Hazard Analysis and Critical Control Point
ILRI	International Livestock Research Institute
OIE	World Organization for Animal Health
KEBS	Kenya Bureau of Standards
KMC	Kenya Meat Commission
KEMRI	Kenya Medical Research Institute
WHO	World Health Organization

Acknowledgements

We greatly appreciate the participation and contribution of the stakeholders, whose views, comments and experiences led to a very rich discussion. Special thanks to Lindsey McCrickard for her contribution to this report. The workshop was supported by the agriculture-associated diseases theme of the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH).

Executive summary

The International Livestock Research Institute (ILRI) and the Food and Agriculture Organization of the United Nations (FAO) organized a workshop of local, regional and international food safety stakeholders. The workshop was held at the ILRI Nairobi campus on 24 February 2014. The main objective of the workshop was to introduce current and new projects on food safety to stakeholders. Thirty-two participants attended the meeting, representing the main institutions involved in food safety in East Africa, including the African Union–Interafrican Bureau for Animal Resources (AU-IBAR), Centers for Disease Control and Prevention (CDC), the Department of Veterinary Services (DVS) in Kenya’s Ministry of Agriculture, Livestock and Fisheries, FAO, ILRI, the Kenya Bureau of Standards (KEBS), the Kenya Medical Research Institute (KEMRI), the Kenya Meat Commission (KMC), the World Organization for Animal Health (OIE) and the World Health Organization (WHO).

The meeting was divided in three main sections. During the first part, each stakeholder institution was introduced and its representative gave a short five-minute presentation about institution’s goals and priorities on food safety. The second section featured technical presentations from FAO and ILRI representatives in relation to ongoing or future projects on food safety. In particular, FAO’s key food safety initiatives are (i) risk-based inspection systems/import; (ii) good practices throughout the food chain; (iii) data generation on various food safety issues (for example, mycotoxins, chemical hazards, pathogens and antimicrobial residues); (iv) multi-factorial policy and decision-making; (v) risk analysis toolkit; (vi) early warning/rapid alert surveillance and (vii) effective response to emergencies.

The meeting ended with a plenary discussion about the technical presentations by ILRI and FAO. Some relevant points were: (i) informal markets cannot be too regulated due to the risk of hiding, increasing the public health risk; (ii) decision-making needs to use a mix of methods; (iii) there is a need for a coordinated surveillance; (iv) although food safety standards exist, there is weak capacity to enforce them; and (v) there is lack of knowledge about the main foodborne pathogens and their impact, the levels at which they cause harm and the likely consequences of taking no action to reduce risk.

Background

Cristobal Verdugo represented ILRI at an “Early warning – rapid alert” workshop organized by FAO in Rome in October 2013. During that meeting, he held several bilateral meetings with representatives from the other attending organizations, among them Andrew Edewa, food safety officer at AU-IBAR. Considering the possible synergy between ILRI and AU-IBAR, Verdugo proposed a meeting between both institutions in Nairobi to explore possible areas of collaboration on food safety issues. A meeting proposal was presented to ILRI and FAO managers, who then decided to scale up the proposal and invite other stakeholders to better understand the needs of the several actors involved in food safety in East Africa and explore possible areas of collaboration among the participating institutions. With these objectives in mind, a workshop was organized at the ILRI Nairobi campus, bringing together key stakeholders in food safety in East Africa.

Workshop objectives

The objectives of the meeting were to:

1. Present new or current activities in the area of food safety that ILRI expects to implement, or has implemented, in Africa.
2. Present new activities in the area of food safety that FAO expects to implement in Africa.
3. Obtain feedback from stakeholders about the presented project activities.
4. Understand the needs and challenges of stakeholders in the area of food safety.
5. Create links between stakeholder institutions and explore possibilities of research collaboration.

Session highlights

Official opening

Opening remarks by Jimmy Smith, Delia Grace and Jean Kamanzi

Stakeholder presentations

Stakeholder representatives gave brief presentations (3-5 minutes) on their institutions' food safety interests and the priorities for the future.

Abigaël Obura (CDC Kenya): CDC Kenya is an agency of the government of the United States of America that works with the Government of Kenya in control and prevention of diseases (malaria, tuberculosis and HIV/AIDS) using the One Health approach and has sentinel sites for disease surveillance. Aflatoxins are a major food safety issue; CDC Kenya was involved in responding to the aflatoxicosis outbreak in Kenya in 2004. An aflatoxin serosurvey carried out in 2011 revealed that 78% of analyzed samples had detectable levels of aflatoxins and aflatoxin exposure cut across socioeconomic levels, indicating that this is a general public health problem. In light of the porous borders in the region, the serosurvey will be extended to the eastern Africa region (Tanzania, Uganda, Ethiopia and Rwanda) to target public health interventions after identifying populations at risk.

- Priority: Aflatoxins

Christopher Mutungi (Egerton University): Food safety work is carried out by the Department of Dairy and Food Science and Technology. Work is being done on mycotoxin and pesticide residues; effect of hermetic grain storage systems on reducing aflatoxin levels in stored grain; mycotoxin residues in animal products and breast milk and food losses in the dairy chain.

- Priority: Adoption of a holistic approach to food safety in line with changing food production and processing practices.

Joyce Thaiya (DVS): This is a specialized department in the Ministry of Agriculture, Livestock and Fisheries. The veterinary public health section focuses on the safety of animal-source foods and carries out inspection and certification of meat and milk products. Meat inspection is carried out at all abattoirs in the country and along the value chain. Food safety guidelines and standards are being developed for use at the county level, with monitoring being done by

the national government. Monitoring of drug residues in animal-source foods (milk and meat) and antimicrobial resistance are carried out. Sanitary inspections are done at ports of entry.

- Challenge: Food safety is a divided function among several ministries; there is a policy in place to move this function to fall under one food safety authority. Devolution of services to the county level is another challenge.

Bouna Diop (FAO Emergency Centre for Transboundary Animal Diseases [ECTAD]): The FAO regional office works on food safety and zoonoses in East Africa and the Democratic Republic of the Congo. It supports the development of strategies for control of transboundary animal diseases, some of which can be transmitted through food. Country focal points play a role in communication and information sharing. FAO is involved in capacity building through development of laboratory quality management systems. The regional office also provides support to the Zoonotic Diseases Unit in Kenya. Together with OIE, AU-IBAR and regional economic communities, is involved in veterinary governance in Africa and development of livestock policies that are linked to national policies.

- Priority: There is interest in doing more work on food safety under the One Health approach and some discussions are taking place to explore this.

Immaculate Odwori (KEBS): KEBS was established in 1974. It falls under the Ministry of Industrialization and Enterprise Development and its mandate is to develop food standards as well as other quality standards. It carries out conformity inspection, testing and calibration, as well as training for the industry. KEBS recently developed a general food safety standard KS2455 (2013) that covers various food products, including dairy and meat products. Most of the other food standards deal with microbiological quality. There is a regional standard that covers food hygiene (EAS 39). The Kenya national working agreement for the catering industry covers food safety certification for hotels and other catering establishments. Quality assurance in food processing factories includes a process inspection report, certification and the KEBS standardization mark of quality. With regard to food inspection in the market, aflatoxin in maize products was found to be widespread, mainly because the maize is contaminated at the farm level.

- Challenges: Training of food manufacturers, limited testing facilities and infrastructure at food factories and communication of food safety information.

Charles Mbakaya (KEMRI): He discussed the link between the environment, nutrition and health based on a conference paper to be presented soon.

Mary Mburu and Esther Ngari (KMC): KMC is a parastatal organization established in 1950. It has two plants, one in Athi River that has a daily processing capacity of 1000 cattle and 1600 small stock and the other in Kibarani, Mombasa with a capacity of 250 cattle and 500 small

stock per day. It falls under the Ministry of Agriculture, Livestock and Fisheries. It slaughters, processes and sells meat products, mostly beef, sheep and goats and occasionally camels. Products are whole lamb and goats (chilled) and frozen quarter beef carcasses. It collaborates with the DVS which carries out ante and post mortem examination and certification. Food safety and animal disease control are important to enable access to local and export markets. They are interested in traceability of animal diseases to improve value and enable increased market access particularly to the Middle East where there is high demand for the taste of meat from pasture-fed animals. Ranching and feedlots would make it easier to get the volumes required that meet specifications. Meat processing infrastructure is old and needs to be upgraded. The processing plant has ISO-22000 certification, is aligned with Hazard Analysis and Critical Control Point (HACCP) and has a complete cold chain. An in-house laboratory analyses raw material, in-process products and final processed products for microbiological quality (total viable counts and coliform counts). There are three levels of quality certification for each consignment of products destined for export: veterinary, public health and KEBS; a single certification body would be more efficient.

Patrick Bastiaensen (OIE): OIE develops international standards for animal health. The animal production and food safety working group develops standards together with technical expert groups. There is some overlap between OIE and Codex Alimentarius of the FAO with some standards being jointly developed and accessible from both organizations. OIE is involved in capacity building activities towards increased understanding of the standards. National food safety specialists act as focal points on animal health issues. Aquatic food safety is an important area from the point of view of antimicrobial residues. OIE has four regional offices in Africa, each of which is linked to the regional economic communities operating there. In East Africa, they are working with the East African Community and the Intergovernmental Authority for Development to raise awareness on animal health and food safety standards. There is a network of international reference laboratories with expertise on disease; others have wider expertise on food safety. Currently there are no reference laboratories in Africa but there is a twinning arrangement in Namibia and Uganda focused on upgrading the regional laboratories to become reference labs in future. It was noted that there is a need to have reference laboratories in Africa that have capacity for food safety analysis, such as dioxin and pesticide residues.

Solomon Nzioka (WHO): WHO is the directing and coordinating authority for health within the United Nations. It is a member states' organization with ministers of health forming members of the governing council. The food safety mandate of WHO includes policy review, development and management; food safety in emergencies; development of standards and guidelines with ISO (such as the *Five Keys to Food Safety*); and support to Codex Alimentarius on surveillance and notification through a co-advisory team with FAO.

Andrew Edewa (AU-IBAR): Sanitary and food safety concerns affect trade in the region. Some of the challenges include outmoded food safety standards across the continent and weak enforcement. In addition, there is weak coordination of policy implementation among food safety actors. AU-IBAR is involved in implementing Pillar 2 of the Comprehensive African Agriculture Development Programme which deals with trade policies that promote food safety. The African Union Commission hosts the Partnership for Aflatoxin Control in Africa which was set up in 2011 to address aflatoxin control on the continent in light of the impacts of aflatoxin on health and trade. AU-IBAR also supports setting of national sanitary standards through the *Participation of African Nations in Sanitary and Phytosanitary Standard Setting Organizations* program. They are setting up a database on food safety experts and have developed handbooks on Codex Alimentarius. The organization supports African countries to attend Codex meetings on food safety standards' setting. In the East African Community, AU-IBAR is supporting the development of food safety frameworks for the five member states; this is soon to be finalized. An African Union food safety coordination mechanism is to be set up and linked to country systems.

Technical presentations

This session included two sets of technical presentations about current or new projects in the area of food safety. The first block was delivered by Mary Kenny and Jean Kamanzi from FAO. The second block was delivered by Tom Randolph and Delia Grace from ILRI. A summary of those presentations is discussed next.

Presentations by FAO

Food safety in FAO (Mary Kenny)

The five main strategic objectives of FAO were introduced. These are (i) eradicate hunger, food insecurity and malnutrition, (ii) improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner, (iii) reduce rural poverty, (iv) enable more inclusive and efficient food and agricultural systems at local, national and international levels, and (v) increase the resilience of livelihoods to threats and crises.

Following those objectives, the main challenges in the area of food safety were presented: (i) lack of food safety programs, (ii) poor coordination of actors, (iii) lack of commitment and (iv) lack of capacity to participate in formal markets.

The FAO food safety unit was introduced and its structure presented. Its core activities are (i) scientific advice, (ii) capacity building, (iii) support policy development, (iv) supporting the

participation of member countries in the Codex Alimentarius Commission and (v) facilitating global access to information and the development of food safety.

Current key initiatives conducted by FAO in the area of food safety were presented. These include (i) risk-based inspection systems and import, (ii) good practices throughout the food chain, (iii) data generation on various food safety issues (for example, mycotoxins, chemical hazards, pathogens and antimicrobial residues), (iv) multi-factorial policy and decision-making, (v) risk analysis toolkit, (vi) early warning and rapid alert surveillance and (vii) effective response to emergencies.

The results of a recent survey on food safety needs in East Africa were presented, observing important needs across the spectrum of food safety activities. In particular, the needs between high-income countries and low- and medium-income countries were compared. Both groups of countries presented a need to improve their laboratory capacity and food inspection systems (a lower score was assigned to high-income countries). However, the low- and middle-income countries had an additional need to improve elements related to education and outreach on food safety hazards.

The presentation finished with some forthcoming opportunities, such as: (i) a regional early warning and rapid alert surveillance workshop on food safety (East Africa), (ii) a regional multi-factorial policymaking workshop, (iii) food safety situational analysis for East Africa and (iv) a food safety strategy for East Africa.

Specific FAO project activities (Jean Kamanzi)

The presentation began by highlighting the current focus of FAO projects on food safety, namely, (i) practical training materials and toolkit on risk analysis, (ii) food safety policy and risk management decision-making using a multi-factor approach, (iii) supporting countries to more effectively participate in meetings of the Codex Alimentarius Commission, (iv) expert scientific advice and data input to FAO and WHO, (v) data collection on levels of mycotoxins in sorghum, (vi) legal frameworks and food control systems and (vii) support of value chain operators.

Additional tools to strengthen scientific approaches include (i) a tool to assess the performance of sampling plans, (ii) a user-friendly web-based tool to guide sampling plans for mycotoxin detection, (iii) a risk management tool for control of *Campylobacter* and *Salmonella* in chicken meat and (iv) a tool to assess the performance of presence/absence sampling plans and concentration-based sampling plans for microbiological hazards.

An account was given of ongoing and pipeline projects in Africa:

- Project to strengthen coordinating capacity in Africa
- Projects to strengthen national Codex infrastructure
 - Central Africa: Cameroon, Gabon and Central African Republic (ongoing 2013–14)
 - Eastern Africa: Ethiopia, Rwanda and Burundi (pipeline)
 - Southern Africa: Zimbabwe, Swaziland and Lesotho (pipeline)

The presenter highlighted scientific input requests from Codex (and member countries), addressed by groups of experts, in the areas of (i) veterinary drugs and food additives, (ii) prioritization of parasites at global level and (iii) risks with low-moisture foods. He gave practical examples of each of the above points. In a particular example, a multi-factor approach conducted in Uganda recognized five food safety issues as important. These were (i) *Brucella* spp. in dairy products, (ii) aflatoxins in maize, (iii) acute diarrhoea in children under five years of age, (iv) *Taenia solium* cysticercosis in pork and (v) methanol in unregulated alcohol.

Support has been given to the development of value chains, focusing of the use of good agricultural practice, good manufacturing practice, good hygiene practices and HACCP. In this regard, training on production of tomato, maize, meat and cashewnut has been carried out in Tanzania for public and private groups. Monitoring and evaluation through following up with participants on the impact of training informs future needs. Similarly, a workshop has been conducted in Rwanda for public and private groups on safe production of milk, passion fruits, rice and maize chains.

Presentations by ILRI

CGIAR Research Program on Livestock and Fish (Tom Randolph)

The presentation gave an overview of the research program. ILRI's research has been mainly focused on food safety of animal origin. However, in recent years, the institute has adopted a multidimensional approach to research on food systems. The approach focuses on small-scale farming and informal market systems which mainly provide animal-source food to the poor. The short-term objective is to increase productivity for smallholder farmers and informal marketing.

Food safety in informal markets (Delia Grace)

An introduction about ILRI was given, highlighting a staff of more than 130 international scientists, many from developing countries, two large campuses in Kenya and Ethiopia, and several offices in other areas of Africa and Asia.

ILRI supports projects on food safety in informal markets. Recent projects have shown that informal markets can perform better than formal ones in some developing countries. In East Africa, over 80% of animal-source foods are sold in informal markets and supermarkets are fairly limited. Interestingly, it has been observed that in some regions, supermarkets are less safe than wet markets. Studies by Jabbar et al. and Lapar et al. showed the willingness to pay more for food safety.

Another important research output highlighted during the presentation was the high levels of *Trichinella* in pork and the risk of *Cryptosporidium* in Nairobi from eating raw vegetables grown using manure from cows. Additionally, it has been observed that microbiological hazards are generally the most important.

Past and current food safety projects by ILRI were then described. These include (i) safety of pig feed (Uganda), (ii) multi-pathogen surveys (Tanzania), (iii) Safe Food, Fair Food project (several countries), (iv) rapid assessment of food safety and nutrition research opportunities (several countries), (v) nutrition in value chains (several countries), (vi) pork safety (several countries), (vii) 'More Pork' and (viii) 'Cow Killer'. In general, chosen value chains are on contextual issues related to current policies and their enforcement and the practice on the ground.

There are a number of food safety research activities on aflatoxin, namely, (i) risk assessment of aflatoxins in the dairy chain, (ii) aflatoxin: review and mapping of aflatoxin and impact on livestock, and (iii) work at the Biosciences eastern and central Africa (BecA) hub at ILRI on screening maize varieties for aflatoxin resistance as well as decontamination. Projects on aflatoxins developed in partnership with other institutions are: (i) market incentives for aflatoxin management (with the International Food Policy Research Institute), (ii) aflasafe (with the International Institute for Tropical Agriculture) and (iii) control of aflatoxin in groundnuts (with the International Crops Research Institute for the Semi-Arid Tropics).

Other projects managed by ILRI's Food Safety and Zoonoses program and indirectly related to food safety are under the *Dynamic drivers of disease in Africa* project. These include: diseases associated with irrigation, assessing and developing livestock traceability systems, and risk of Ebola emergence in Uganda. The presentation ended with a discussion on scaling up of food safety projects.

Plenary discussions

Needs, gaps and opportunities

Plenary discussions followed the technical presentations. The main issues discussed are highlighted below.

On the question of how to strengthen domestic markets, it was noted that informal markets contribute towards a significant proportion of the national gross domestic product of developed countries. Over-regulation is likely to lead to informal traders going underground, thereby increasing public health risks. Thus, there is need for pro-poor policies as well as stakeholder information and education. Due to limited resources, the main focus has been on export markets.

On the question of how to get data, it was recognized that there is a lack of capacity in public institutions in addition to a lack of data within domestic markets, especially informal ones. In this regard, it was stated that ILRI's objective is to generate evidence whereas FAO is attempting to look at the core data that exist, specifically, what data are available, gender issues and food security elements around decision-making. These last two points triggered a discussion about how one would weight each of these areas (gender and food security) and how to measure them. The discussion led to the statement that policymaking needs to use a mix of methods and we need to be sure that research outputs are truly useful. Moreover, research should include participatory methods to ensure that stakeholders have the opportunity to provide some input.

We need to generate data on the pathogenic microorganisms of importance to food safety, the minimum and maximum levels at which they cause harm and the likely impact of potential food safety issues: what are the potential threats, what would happen if they escalate and what would happen if we do nothing. Similar questions were also stated for chemical issues.

Another point was the need for a better surveillance approach. For example, the baseline levels of several food safety issues are currently unknown. It is important for surveillance to be conducted in markets through a food chain approach that considers economic issues. Moreover, there is a need for coordination between the various stakeholders and with the intelligence that we have already.

Regarding the need for food safety standards and finding the middle ground between providing food safety without sacrificing food security, it was stated that standards exist but the problem is the weak capacity to comply.

Some institutions provided information regarding specific needs that they have identified in relation to food safety.

DVS

- Codes of inspection
- Profiling of diseases
- Level of antimicrobial and drug residues in the meat and milk
- Capacity building along the food chain to support food safety
- Laboratory services
- Self-assessment in food production; something specific for farmers or producers to use to ensure that the food that they produce will be safe.

CDC Kenya

- Surveillance: from a public health point of view, there is need to move from reactive to proactive approaches.
- Some surveillance data from rumour mills; not in a structured way but there is some follow up through DVS. There are not enough personnel to do this in a very intensive way.

University of Nairobi

- Problem with surveillance is due the huge fragmentation of the data.
- DVS aids at the slaughterhouse and a different group at the butchery.
- There is need for a more integrated approach to food safety management.
- Data may exist but it is uncoordinated; a coordinated approach is needed.

BecA-ILRI hub

- Variation in the laboratory results obtained
- Lack of quality assurance between laboratories
- Lack of accredited laboratories in Africa

Annex 1: List of participants

Name	Institution
Abigael Obura	CDC Kenya
Andrew Edewa	AU-IBAR
Andrijana Rajic	FAO
Bouna Diop	FAO
Cameline Mwai	Department of Veterinary Public Health, Kenya Ministry of Agriculture
Charles Mbakaya	Centre of Public Health Research, KEMRI
Christopher Mutungi	Egerton University
Cristobal Verdugo	ILRI
Delia Grace	ILRI
Erastus Kang'ethe	University of Nairobi
Esther Ngari	Kenya Meat Commission
Immaculate Odwori	Kenya Bureau of Standards
Jane Loyero	Department of Veterinary Public Health, Kenya Ministry of Agriculture
Jimmy Smith	ILRI
Johanna Lindahl	ILRI
Jean Kamanzi	FAO Food Security Unit
Josephine Birungi	BecA-ILRI Hub
Joyce Thaiya	Department of Veterinary Services
Lindsey McCrickard	FAO
Mary Kenny	FAO Food Safety Unit
Mary Mburu	Kenya Meat Commission
Nicholas Ayore	Department of Veterinary Public Health
Pablo Alarcon	ILRI/Royal Veterinary College
Patrick Bastiaensen	OIE East Africa Regional Office
Paula Dominguez-Salas	ILRI/Royal Veterinary College
Sam Okuthe	FAO ECTAD
Sara Ahlberg	ILRI
Silvia Alonso	ILRI
Solomon Nzioka	WHO
Stella Kiambi	ILRI
Tom Randolph	CGIAR Research Program on Livestock and Fish
Walter Masiga	OIE East Africa Regional Office

Annex 2: Workshop agenda

Time	Session	Resource person
8.30–9.00	Registration	
9.00–9.30	Session 1: Official opening	
	Opening ceremony	
	Welcome address by the DG of ILRI	Jimmy Smith
	Welcome address by leader of ILRI's Food Safety and Zoonoses program	Delia Grace
	Remarks by FAO representative	FAO
9.30–10.00	COFFEE BREAK AND GROUP PHOTO	
Session 2: Overview on food safety activities (Chair: Delia Grace)		
10.00–10.45	Stakeholders' presentations	
10.45–11.30	Presentation on flagship programs	FAO
11.30–13.00	Roundtable discussion	Delia Grace
13.00–14.00	LUNCH	
Session 3: Overview on food safety activities (Chair: Andrijana Rajic)		
14.30–15.00	ILRI Food Safety and Zoonoses program	Delia Grace
15.00–15.30	CGIAR Research Program on Livestock and Fish	Tom Randolph
15.30–16.00	COFFEE BREAK	
16.00–17.00	Roundtable discussion	Andrijana Rajic
17.00–19:00	Cocktail	