# FIVE-YEAR COMMUNICATION STRATEGY

# FOR AN AFLATOXIN-SAFE EAST AFRICAN COMMUNITY

# EXECUTIVE SUMMARY

Aflatoxin is a highly carcinogenic toxin produced by the fungus *Aspergillus flavus*. It occurs naturally in soils around the world within the latitudes of 40o north and 40o south, including all of the countries of the East African Community (EAC). Aflatoxin contaminates common staple foods in the EAC, such as maize, groundnuts, and cassava, as well as key cash crops, such as cotton and chili peppers. Aflatoxin also can be transmitted to livestock through exposed feed, contaminating milk, poultry, farmed fish, and other animal products. Highly concentrated doses of aflatoxin can lead to immediate death. Chronic exposure at lower levels is associated with low birth weight, childhood stunting, immune system suppression, rapid progression of hepatitis B, and increased prevalence of liver cancer.

Aflatoxin exposure is endemic throughout East Africa, with both food and feed often exceeding safe limits. Episodes of acute aflatoxin poisoning, *aflatoxicosis*, occur regularly, most notably in eastern Kenya, where they have resulted in hundreds of human deaths.

The threat of aflatoxin is both urgent and pervasive. Aflatoxin affects the entire food chain from “field to fork.” Its impacts on human and animal health, the environment, agricultural production, and trade are cross-sectoral, extensive, and complex. However, because aflatoxin is invisible, tasteless, and odorless, it is difficult to detect. A weak regulatory environment, coupled with national food security concerns, further confounds efforts to control aflatoxin. High levels of on-farm consumption across the East Africa region also inhibit the monitoring of aflatoxin in household diets. As a result, aflatoxin-contaminated foods and feed move through the food chain largely unchecked, and estimates of aflatoxin contamination in staple foods are as high as 60 percent in some areas within the EAC.

Public awareness and understanding of aflatoxin risks, prevalence, and prevention are negligible, even in highly affected areas. Low-risk perception is shared across the full spectrum of stakeholders from farmers, traders, food producers, and consumers, as well as at all levels of public and private influencers and decision makers. Moreover, even where there is aflatoxin awareness, it rarely translates into a clear understanding of risks and actions needed to address them.

This “Five-Year Communications Strategy for an Aflatoxin-Safe East African Community” presents a regional strategic communications framework designed to influence public policy development, inform the migration of policies into programs and activities, encourage social change, and promote individual behaviors across the wide spectrum of stakeholders that can facilitate cost-effective, efficient, and sustainable reductions in aflatoxin exposure. It is meant to help build awareness, drive information sharing, support interagency and inter-sector coordination, and advance policy and program implementation across the five EAC countries to mitigate aflatoxin risks and strengthen food safety systems.

The communications strategy is grounded in the scientific knowledge base and policy recommendations established through the development of 12 technical papers on aflatoxin. The technical papers and policy recommendations were produced by a team of international and regional experts, collaborating with the relevant EAC expert working groups and the International Institute of Tropical Agriculture (IITA). Each paper summarizes research from the published literature and reflects the findings of situational analyses conducted across the five EAC countries of Burundi, Kenya, Rwanda, Tanzania, and Uganda. The technical papers describe the currently known impacts of aflatoxin across the core topics of human and animal health, good agricultural practices (GAPs), regional standards for food and feed, alternative uses and disposal systems, and economic impacts on trade. They make specific recommendations for a comprehensive policy framework for the EAC.

The technical papers also underscore the complexity of aflatoxin control and the need for cross-cutting participation from the health, agriculture, environment, and trade sectors—as well as the commitment of regional bodies, government ministries, and policy makers within the EAC partner states. They further emphasize the importance of engaging with donors and other potential partners that are addressing related issues, such as improved livelihoods, natural resource management, climate change, and famine early warning systems, which closely link to successful aflatoxin abatement efforts.

The communications strategy identifies the types of key stakeholders to be involved at the regional, national, and local levels, ranging from leading government entities and international organizations to the private sector, producer and trader associations, local groups, and civil society. It describes how to support their effective participation and feedback, and it brings together the strengths of both top-down and bottom-up approaches to distinguish between initiatives that need to be undertaken at national or regional levels and those that should be addressed more locally. It further provides a synthesis of critical issues and pathways of information needed among these groups to realize an aflatoxin-safe EAC.

One key objective of the communications strategy is to establish linkages between the regional framework and targeted national communications plans that will reflect country-level needs, opportunities, and priorities. It outlines the program and policy objectives to be supported by communication activities across each of the four sectors of agriculture, health, environment, and trade. Distinctions are made between short-, medium-, and long-term objectives and activities. For example, short-term activities can focus on dietary diversity and the integration of aflatoxin alerts into early warning systems, while medium-term objectives could include the integration of diagnosis and care of aflatoxicosis into medical and nursing school curricula. The realization of a fully functional regulatory environment would be an example of a longer term objective.

The framework also identifies key positive behaviors, such as those related to good agricultural practices, hepatitis A and B vaccination, or access to affordable aflatoxin testing, to be promoted across the four sectors in the design of country-level communications plans. Suggested multi-level communication channels are included for each sector ranging from mass media, “edutainment,” and special events to the use of SMS, school-based programs, folk media, and linkages with other related public outreach programs.

The importance of feedback mechanisms is highlighted, along with monitoring and evaluation to capture stakeholder inputs that can further inform policy and program implementation, support shared learning, and increase the relevance and effectiveness of communications activities. Recommendations are made for regular regional meetings so that national and regional representatives can share lessons learned, best practices, and innovative ideas to enhance regional coordination and capacity for building an aflatoxin-safe EAC.

Finally, the strategy presents aflatoxin policy recommendations for each of the sectors of health, agriculture, trade, and environment. The recommendations are derived from the findings of the technical papers and situation analyses, and they provide a regional policy framework for the development and implementation of responsive programs and activities at regional, national, community, and household levels.

Policy recommendations for the communications strategy include:

1. A multisectoral 5-Year communications strategy to build an aflatoxin safe East Africa Region will be designed and implemented by the EAC partner states. This will cover the health, agriculture, trade, and environment sectors.
2. The policy recommendations for communications programs validated by the EAC Regional Expert Working Groups will be incorporated into the communications strategy. This includes human and animal health, expansion of hepatitis A & B vaccination programs, standards for food and feed, good agricultural practices (GAP) including the biological control of aflatoxin, addressing economic impacts on trade, and the development of alternatives uses and disposal systems for contaminated commodities.
3. A specialized communications package focusing on vulnerable groups will be developed as a priority under the larger communications initiative.
4. The strategy and programs will include short, medium and long term objectives to allow for phased implementation, a monitoring and evaluation system providing real time information, and incremental resource allocations.
5. Behavioral change and communications (BCC) programs directed at consumers and livestock producers will be delivered in a timely manner to ensure that the demand for aflatoxin safe food and feed is harmonious with the supply of these same products.
6. Ministry-based communication staff within each of the focus sectors will collaborate with technical advisers and donors to ensure appropriate aflatoxin communications are embedded into production, value chain development, and food and feed processing activities for aflatoxin prone crops, and that adequate resources are allocated to support these programs.
7. The 5-year communication strategy will embrace the concept of an aflatoxin safe EAC “from field to fork”.
8. The EAC Communications Secretariat will take a leadership role in the formulation and delivery of communications on aflatoxin issues to inform partner state legislators, policy makers, donors, and other influential stakeholders to ensure their support of the strategy.

# II. Introduction

Aflatoxin: A Public Health Emergency with Economic Consequences

Aflatoxin is a highly carcinogenic toxin commonly found in tropical soils. It occurs naturally and is produced by the fungus, *Aspergillus flavus*. Aflatoxin contaminates key staple foods across the countries of the EAC, such as maize, groundnuts, and cassava. It also affects cash crops like chili peppers that are important for trade and economic development. The fungus migrates from the soil to susceptible plants through direct contact or via air-borne spores. It also can be transmitted to livestock through contaminated feed, exposing milk, poultry, farmed fish, and other animal products. Highly concentrated doses of aflatoxin can lead to immediate death. Chronic exposure at lower levels is associated with low birth weight, childhood stunting, immune system suppression, rapid progression of hepatitis B, and increased prevalence of liver cancer.

The threat of aflatoxin is both urgent and pervasive. It affects 25 percent of the world’s food crops and touches an estimated *4.5 billion* men, women, and children worldwide, regardless of socioeconomic status, education levels, occupation, age, and gender.Aflatoxin impacts the entire food chain from “field to fork,” affecting production, storage, processing, trade, and consumption of both plant and animal products. Its impacts on human health, livestock, agricultural production, the environment, and trade are extensive and overlapping.

**Aflatoxin in East Africa**

Aflatoxin is endemic in the EAC, which presents the ideal environmental conditions for the *Aspergillus* fungi, particularly in arid and semi-arid areas. The fungi thrive in drought-prone environments, which weaken plants’ resistance, as well as in poor post-harvest conditions, where pests, humidity, and temperatures are not well controlled. Additional environmental stresses, such as high heat, poor soil fertility, or insect damage to crops, also promote aflatoxin contamination.

A weak regulatory environment—characterized by a lack of resources and infrastructure for testing, monitoring, and control—further contributes to high exposure levels. Reluctance on the part of the private sector to incur the additional costs of tighter food safety standards is a challenge, particularly in the absence of either sanctions or price differentiation for aflatoxin-safe food and feed. In this context, aflatoxin-contaminated foods and feed move through the food chain largely unchecked. In addition, 70 percent of people in the East Africa region consume food they grow themselves or that is traded on the informal market. These high levels of on-farm consumption present a significant challenge for the monitoring of aflatoxin in households diets.

As a result of all these factors, both food and feed in the East Africa region often exceed safe limits, leading to widespread chronic exposure among humans and animals.

Episodes of acute aflatoxin poisoning, known as aflatoxicosis, occur regularly—most notably in eastern Kenya, where they have resulted in hundreds of human deaths. Moreover, epidemiologists warn that further cases or clusters of aflatoxin poisoning likely go unrecognized, and that for every identified case of aflatoxicosis, there are probably several other persons who have been exposed to unsafe levels and are at risk of adverse consequences.[[1]](#endnote-6)

The presence of aflatoxin in key staple foods is especially insidious as it threatens the food security and livelihoods of those people—many of them poor—who depend on these foods the most. For example, 90 percent of the rural households in Kenya grow maize, and the average Kenyan consumes 400 g of maize per person each day. In Tanzania, 85 percent of the population depends on maize for their food and livelihood, and the average maize consumption is 144 g per person each day. Milk consumption is at the center of nutrition and development initiatives in Rwanda, which are promoting a policy of “one cow per poor family.” Average milk consumption in Rwanda is 38 kg per person each year, and it is even higher in Kenya, Uganda, and Tanzania, where the averages are 145 kg, 53 kg, and 42 kg per person/year, respectively. In Uganda, tubers such as cassava make up a significant portion of daily calories, and groundnuts are the third most important staple crop. Likewise, cassava is a key staple for over 85 percent of households in Burundi.

**At-Risk Foods for Aflatoxin**

**The list of foods at high risk for aflatoxin contamination includes key dietary staples for East Africa, such as maize, milk, groundnuts, cassava, and their products. Other susceptible foods and commodities include dried fish, dried fruits, beans, tree nuts, yams, chili peppers, rice, wheat, millet, sorghum, and cotton.**

**Special populations**

While aflatoxin exposure is potentially harmful to people of every age and walk of life, certain populations are especially at risk. Infants are very susceptible to aflatoxin contamination, particularly during the first 1,000 days of life, from conception to age 2 years. They can be exposed to aflatoxin during pregnancy, through breastfeeding, and with the introduction of maize, groundnut, or milk-based baby foods that are often highly contaminated. Such early exposure may lead to low birth weight, childhood stunting, and immune system suppression. It can exacerbate malnutrition, arrest childhood development, and increase the risk of health problems later in life, such as cancer and heart disease. Likewise, individuals infected with HIV or hepatitis and those with compromised immune systems are more vulnerable to the effects of aflatoxin exposure, which may accelerate disease progression and heighten the risk of liver cancer.

**Cross-sector effects on health, agriculture, environment, and trade**

Aflatoxin is highly toxic to animals and humans. As noted above, acute exposure of humans to high levels of aflatoxin can be fatal, and chronic exposure at lower levels is associated with immune suppression, liver cirrhosis, childhood stunting, aggravation of the effects of malnutrition, and a higher prevalence of liver cancer—especially among individuals with HIV or hepatitis B infection. Among livestock, aflatoxin exposure leads to immunosuppression, higher disease risk, decreases in fertility and productivity, and increased deaths. Pigs, ducks, and rabbits are most vulnerable to aflatoxin, followed by turkeys, sheep, and calves. Chickens and cattle are more resistant, and fish vary according to the species.

Aflatoxin carries heavy costs in terms of livestock production. By-products from both maize and groundnuts are commonly used as animal feeds, as are stocks of products deemed unfit for human consumption. These practices result in aflatoxin-contaminated milk, fish, poultry, and other animal products. As a result, aflatoxin contamination has deleterious effects on both livestock production and on the safe use and sale of animal products.

Poor use or disposal of aflatoxin-tainted foods has serious environmental consequences. It can further propagate the spread of the toxin and make land unsuitable for safe crop and livestock production.

**A Science-Based Approach**

The Five-Year Communications Strategy for an Aflatoxin-Safe East African Community is based in science. It reflects the latest research on aflatoxin from 12 technical papers that were produced by a team of international and regional experts working with the EAC and International Institute of Tropical Agriculture (IITA) to establish a scientific knowledge base and policy platform on aflatoxin. The papers address the impacts of aflatoxin across multiple topics affecting human and animal health, GAPs, regional standards for food and feed, alternative uses and disposal systems, and economic impacts on trade. Each paper summarizes research from the published literature and reflects the findings of situational analyses conducted across the five EAC countries of Burundi, Kenya, Rwanda, Tanzania, and Uganda.

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# III. Communications Strategy – BACKGROUND RESEARCH

Impacts of Communications Strategies – Examples from the Literature

*Knowledge and information are seen as essential for people to respond successfully to the opportunities and challenges of social, economic, and technological changes – including those that help to improve agricultural productivity, food security, and rural livelihoods*.[[2]](#endnote-16)

There is a strong research base on the impacts of communications strategies, particularly in the context of international development goals and agendas. Below are examples of ways strategic communications initiatives have affected social, economic, technical, and behavioral changes across multiple sectors. Measurable impacts are presented, as is the importance of feedback and interactive communications for building the trust, engagement, and credibility that are a necessary framework for change.

**Health**

Communication strategies regarding health issues often target individual health behavior changes that can further health promotion, disease prevention, or improved treatment and outcomes. However, they may also target broader social attitudes or government policies. A multisectoral campaign in Nepal mobilized district offices, NGOs, and local leaders to raise awareness of vitamin A deficiency (VAD) and change both opinions and behaviors regarding the value of vitamin A supplements. The result was greater awareness and use of vitamin A supplementation such that VAD is no longer a public health threat in the country.[[3]](#endnote-17) With the aim of reforming national policies affecting access to antiretroviral drugs for people with HIV/AIDS, the Treatment Action Campaign in South Africa used communication tools for advocacy, mass movement, and political pressure. The result was successful in expanding access to lifesaving treatment.[[4]](#endnote-18)

Numerous initiatives have used educational entertainment programs, known as “edutainment,” and interactive approaches to advance knowledge sharing and behavioral transformation for health promotion activities. Examples of edutainment activities include the use of television and radio soap operas, call-in shows, and folk media, such as songs, plays, and puppet shows. South Africa’s Soul City Initiative demonstrated the effectiveness of edutainment methods using television and radio dramas, along with information booklets, to promote safer sexual practices. Individuals exposed to the shows and materials were found to have a four-fold increase in condom use compared to those with no exposure.[[5]](#endnote-19) Similarly, educational campaigns, including interactive media, in Cambodia successfully increased condom use by more than 36 percent among men and by 77 percent among women. Communications channels used in the initiative included a television soap opera, radio phone-in shows, discussion programs, and public service announcements on radio and television.[[6]](#endnote-20) The Suami SIAGA Campaign in Indonesia also used multimedia edutainment— in this case to successfully increase the involvement of husbands in safe motherhood and birth preparedness aimed at improving birth outcomes.[[7]](#endnote-21)

In Yemen, an initiative that involved the use of radio, film, and community workshops targeted at countering early marriage resulted in both increased awareness of the benefits of delayed marriage and in the postponement and prevention of a number of child marriages, along with greater buy-in from political and religious leaders.[[8]](#endnote-22) A project in Nepal used multiple communications interventions to help empower women in spousal relationships around family planning. They included two edutainment radio serials, along with radio spots, national-level orientation workshops, district-level training workshops, and printed materials. Short-term results indicated that women gained a greater voice in contraceptive decision making, and longer term results (5 years) suggested broader shifts in gender relations.[[9]](#endnote-23)

The Polio Eradication Initiative in India and Pakistan demonstrated the value of intensive one-on-one communications approaches, as well as broader initiatives to stimulate social mobilization around the promotion of polio vaccination among the most hard-to-reach populations in each country. Activities included repeated house-to-house visits by trained healthcare workers and communicators, as well as sustained communication with community and religious leaders at the national, sub-district, and village levels. Muslim training institutions also were engaged in building public confidence and the credibility of the polio eradication campaign. Results of data from 2000–2007 showed that the communication strategies contributed to increased levels of polio immunity, particularly among the most underserved and hard-to-reach groups. A national agenda for polio eradication was established. Demand for vaccination increased, as did booth attendance during National Immunization Days and demand for universal vaccine coverage. The communication elements contributed by mobilizing social networks and leaders, creating political will, increasing knowledge, creating individual- and community-level demand, overcoming gender barriers and resistance to vaccination, and reaching out to the poorest and most marginalized populations.[[10]](#endnote-24)

A program of youth dialogs in Ethiopia demonstrated the effectiveness of engaging young people, who represent the largest demographic group in Sub-Saharan Africa, as well as its future workers, leaders, and innovators. Ethiopia has a broad-based, self-organized youth movement, which was tapped to create dialog sites with more than 20,000 youths in five regions. Meeting twice a week at youth clubs, the dialogs spurred individual and group actions, including increased demand for and use of condoms, increased demand for youth-friendly services, and greater uptake of voluntary HIV/AIDS counseling and testing. With a variety of partners, hundreds of clubs are now engaged in a nationwide effort to have an impact on the norms governing HIV/AIDS behavior. [[11]](#endnote-25)

**Agriculture**

Information and communication technology systems are providing new ways for farmers, agricultural extension officers, and other agricultural practitioners to share vital knowledge on agriculture, which can help improve yields in farms. In addition, they are increasing farmers’ access to information on market prices, which has been shown repeatedly to increase their bargaining power and incomes. For example, in Tanzania, the Linking Local Learners approach of the First Mile Project shared market price information with farmers using mobile phones and other communication techniques. As a result, farmers raised the amount of money they obtained for a ton of rice from US$100 to US$600. A US$200,000 investment for the program resulted in US$1.8 million of gross income for farmers. The approach also has increased farmers’ capacity for knowledge sharing through the use of peer-to-peer learning and exchanges and their introduction to the use of modern information communications technologies. Farmers are willing to pay for the mobile phone calls because they can see their benefits. These factors have helped to ensure the sustainability of the advances beyond the lifespan of the program.[[12]](#endnote-26)

Likewise, the Ethiopia-based Apposit system uses radio and mobile phone-based messages and an interactive voice response application to provide farmers with agricultural tips and practices, information on market prices, and general information. Besides strengthening the agricultural management and marketing skills of the farmers, the system also provides real-time data that improve logistics and warehouse management decisions due to access to more time-relevant information.[[13]](#endnote-27)

Presenters at the ICT4ag International Conference held in Kigali, Rwanda (4–8 November 2013) emphasized the extent to which women and youths are taking up information and communication technologies at a rapid rate to get the best market prices, keep records, and find crops in high demand. The technologies are being used to obtain information on pest and disease control, access new farming practices and agricultural technologies, communicate with other farmers, and raise awareness. The communication tools include Internet and social media, especially Facebook. Other popular media include SMS, videos, radio, TV, and online media newspapers, magazines, and brochures. The popularity of Facebook is evident among the more than 45,000 followers of Mkulima Young (Young Farmer)’s Facebook page, which provides a social forum for youths to market their products, ask questions, and create their own networks.[[14]](#endnote-28)

**Environment**

Participatory communications practices can be very effective at addressing environmental issues, especially when they actively tap into local knowledge and participation. A dengue fever control project in Cuba employed a variety of community-based group communication methods to successfully reduce mosquito breeding grounds through the use of community gatherings and debates, interactive puppet shows, drawing competitions, educational events for children, and drama sessions at senior citizen clubs. Results indicated that the numbers of houses and containers infested with mosquito larvae declined dramatically in the intervention area, while those in the control area remained unchanged.[[15]](#endnote-29)

The Livelihood Adaptation to Climate Change project in Bangladesh demonstrated how communications can combine global scientific knowledge with local knowledge systems to help farmers put into place adaptation practices for coping with climate change.[[16]](#endnote-30) Lessons from FAO programs in rural Bolivia, Bangladesh, Jamaica, and the Democratic Republic of Congo suggest that communications-based approaches using participatory research and horizontal knowledge sharing improve technical innovation, enhance adaptation, bridge gaps between global research and local knowledge, and strengthen policy dialog between institutions and small farmers.[[17]](#endnote-31)

Participatory communication activities, such as community surveys, participatory variety selection, and the creation of formal forums for farmers’ inputs were used effectively by the Platform for Agrobiodiversity Research in Bolivia and Malaysia to build trust between farmers and gene banks and to identify and preserve traditional varieties of potatoes and rice that may play an important role in adapting to climate changes. Farmers shared innovative ideas for contributing to the preservation of valuable crop-genetic material within a cultural context that would be acceptable to local communities. Their feedback also informed the research agenda, changing scientists’ perceptions of seed exchange from mere gene flow to a type of intellectual property that needs to be protected.[[18]](#endnote-32)

A study of a World Bank program designed to reform the water sector in Delhi, India showed that communications strategies were vital for building political commitment and addressing opposition and lack of understanding from local organizations and the general public.[[19]](#endnote-33) Another study in Orissa, India found that the use of intensive information, education, and communication (IEC) activities aimed at promoting social mobilization for sanitation had a substantial and statistically significant effect on the use and adoption of latrines.[[20]](#endnote-34)

Communications strategies also have been shown to be central for emergency preparedness and response. Following a devastating earthquake in 2008 in Sichuan province, China, a mobile-phone-based communication system replaced the decimated public communication system, which allowed for quick detection and response to prevent outbreaks of infectious diseases.[[21]](#endnote-35)

**Trade**

An evaluation of the communication activities of the Directorate General for Trade of the European Commission assessed their effectiveness at meeting the stated aims of raising awareness of the impacts of the European Union (EU) in global trade, supporting the achievement of trade goals, and publicizing the EU’s positions on trade issues. Findings suggested that the communications strategy needed to be revised to become more engaging and interactive to enhance the credibility and reach of communication efforts. An important aspect of the recommendations was to increase the Directorate’s communication footprint by further building on relationships with natural partners, offering training for non-specialist journalists, and by creating interactive forums, where alternative views could be discussed openly.[[22]](#endnote-36)

**Challenges**

Numerous challenges confront aflatoxin control efforts. Awareness of these can be used to inform aflatoxin communication strategies and broader objectives to combat its threats.

Examples of challenges include:

* The lack of awareness and low-risk perception
* The dependence on aflatoxin-susceptible crops as staple foods and feed
* The low involvement on the part of decision makers – regional governments must commit resources and energy for the long run to bring the aflatoxin problem under control
* The lack of a silver bullet or single solution – integration and coordinated actions are needed
* The high rates of on-farm consumption and dependence on informal markets and trading that leave a majority of food unchecked
* The fact that small-scale producers are the least likely to have access to necessary resources and technologies for aflatoxin control
* The need to involve millers, processors, and traders, without whose engagement the battle cannot be won
* The need to balance what can be done in the short term with the need for solutions that will require longer term investments and commitments
* The need to make aflatoxin culturally relevant and not overwhelmingly negative
* The dynamic tension between accelerating demand before there is a supply of aflatoxin-safe foods
* The additional costs to be incurred through the implementation of stricter controls

**Issues underlying the Regional Communications Strategy**

**Urgency**

The threat of aflatoxin represents a crisis of truly staggering scale. Numerous sampling studies suggest that the costs and burdens of aflatoxin are heavily compromising the health, economies, environment, growth perspectives, and future generations of African countries. Comparative exposure studies have found detectable levels of aflatoxin in over 90 percent of young children in Gambia and Benin, with high exposure in all age groups.[[23]](#endnote-37) In Tanzania, studies of blood samples from children under the age of 2 years and from the milk of breastfeeding mothers found that 67–100 percent contained aflatoxin and other mycotoxins.[[24]](#endnote-38) In Kenya, the U.S. Centers for Disease Control and Prevention carried out aflatoxin studies as part of the Kenya AIDS Indicator Survey (KAIS) of 2011, and found that approximately 80 percent of participants had detectable levels.[[25]](#endnote-39)

Studies of aflatoxin contamination in staple foods consistently show unsafe levels as well. Four separate studies in Uganda undertaken during the 1990s found levels above the maximum 20 ppb allowed at the time, particularly in groundnuts and groundnut products. Baby foods were of particular concern as the more affordable ones are locally manufactured, commonly use groundnuts, and are not regulated. Similarly, testing studies in Kenya have found high levels (38%) of contamination in peanut samples.[[26]](#endnote-40) An assessment of maize samples in Eastern Kenya found aflatoxin levels exceeding 20 ppb in 41 percent and 51 percent of samples for 2005 and 2006, which were aflatoxin outbreak years. The highest levels were found in homegrown maize samples*.[[27]](#endnote-41)*. Aflatoxin contamination has been reported in studies on maize in Tanzania, as well as in locally processed fish. Locally brewed alcoholic beverages made from aflatoxin-susceptible crops are of concern in Tanzania and other parts of East Africa, as they are commonly consumed and untested.

The attendant costs of aflatoxin exposure are significant. Health costs can be measured in terms of premature death, morbidity, pain, suffering, anxiety, and reduction of quality of life. A study in Tanzania assessing the long-term effects of child stunting found cost estimates reaching into the billions of dollars in terms of lost human productivity.[[28]](#endnote-42) Estimated costs associated with reductions in disability-adjusted life years (DALYs) due to aflatoxin-related liver cancer cases, alone, equal $18,000–$72,000 in Burundi; $49,000–$207,000 in Kenya; $33,000–$134,000 in Rwanda; $37,000–$161,000 in Tanzania; and $31,000–$128,000 in Uganda. Trade costs, due to lost revenues from rejected food exports are estimated to total some $1.2 billion per year for the African continent.[[29]](#endnote-43)

The report from a 2014 COMESA Regional Workshop on Aflatoxin in Eastern and Southern Africa puts it this way:

*The aflatoxin challenge constitutes a significant threat to food and economic security, and undermines poverty eradication in Africa. It is a major cause of post-harvest loss that further constrains the quantum of food reaching our markets and households across the African continent. In addition, aflatoxin poses a major public health challenge to consumers all over the continent and can result in foregone revenues and profit from domestic and regional commerce and international trade.[[30]](#endnote-44) (COMESA, 2014)*

From the regional and national perspective, aflatoxin needs to be treated with the same urgency as any other public health epidemic. In terms of funding allocations, program planning and coordination, partnership building, and public policy development and implementation, aflatoxin must be addressed as a top priority.

**Avoiding panic**

*Don’t scare people. They won’t even hear the message.*

Burundi, situational analysis respondent

Panic is a poor communications strategy. So, although aflatoxin needs to be treated with utmost urgency at the regional and national levels, communications initiatives targeting local levels and the general public need to focus on positive interventions and avoid the generation of public alarm. Numerous behaviors, policies, and practices can do much to help mitigate the spread and impacts of aflatoxin exposure. Examples are presented below in **Exhibit 3**.

**Exhibit 3: Mitigation Behavior, Policies, and Practices**

| **Setting** | | **Intervention** |
| --- | --- | --- |
| Agricultural | Preharvest | * Choice of suitable cultivars * Breeding for resistance (e.g., drought, pests, flood) * Biocontrol * Chemical control (insecticides, fungicides) * Good agricultural practices (e.g., soil and water management, timing of planting and harvest, crop management) * Antioxidants (e.g., caffeic acid, gallic acid) |
| Postharvest | * Cleaning * Improved storage / drying / transportation conditions * Affordable, effective, easy-to-use testing * Ammonization * Chemical control (insecticides, fungicides) * Sorting and segregation * Alternative use or disposal of contaminated crops |
| Dietary | | * Dietary diversification away from high-risk crops and food products * Extended breastfeeding, delay of solid food introduction Enterosorbents (e.g., calcium aluminosilicates, chlorophyllin) * Chemopreventive agents (e.g., Oltipraz, isothiocyanates, triterpenoids) * COX-2 inhibitors * Green tea polyphenols |
| Clinical | | * Hepatitis A and B vaccination * Early diagnosis and treatment of aflatoxin exposure |

Adapted from Wu and Khlangwiset, 2010.[[31]](#endnote-45)

Fortunately, many of the practices that promote aflatoxin mitigation overlap with strategies and behaviors central to other high-priority initiatives, such as climate change adaptation, disease prevention, and the promotion of greater resilience and better livelihoods among small-scale farmers and livestock keepers. For example, the promotion of dietary diversification may be part of nutrition campaigns or initiatives designed to help mitigate crop risks from drought, pests, or other climate change-related challenges. Activities may include the greater use of crops, such as millet or feed grasses, for livestock that are more adapted to climate changes and also less susceptible to aflatoxin contamination. The extension of hepatitis vaccination programs overlaps with both cancer prevention objectives and the lessening of aflatoxin risks. Likewise, efforts to promote GAPs may meet multiple objectives for improving land management, increasing agricultural production, improving livelihoods for smallholder farmers and herders, and reducing aflatoxin contamination.

Consequently, communications interventions designed to help support the positive individual or social behaviors that promote aflatoxin mitigation may function alone, or through collaboration and linkages with other program or partner initiatives that share related, and mutually beneficial, objectives.

**A two-pronged approach**

This communications strategy takes a two-pronged approach. One prong is dedicated to the promotion of regional- and national-level policy and program developments that respond to the urgency and complexity involved in combatting aflatoxin. It includes activities to coordinate efforts across ministries, countries, and multiple sectors in collaboration with partners such as donors, other aflatoxin control entities, other regional commissions (e.g., African Union, COMESA, SADC) international NGOs, research institutions, and private-sector stakeholders. It addresses cross-national issues such as trade, regulation, and climate change. It also builds on existing programs, partnerships, and opportunities.

The second prong addresses interventions targeting the broader public or more locally identified stakeholders. It is aimed at promoting the positive behaviors and technologies at the local and individual levels that promote aflatoxin mitigation. Because they coincide with other GAPs and interventions that improve health, environmental, trade, and economic outcomes, the focus is also on finding creative ways to coordinate with other programs and partners addressing issues that can be interconnected with aflatoxin reduction goals and activities.

**Integrating feedback**

Communications is as much about listening as it is about telling. As underscored by the research literature, the inclusion of participatory methods and horizontal knowledge sharing in communications-based approaches is important for improving technical innovation, enhancing adaptation, bridging gaps between global research and local knowledge, and strengthening policy dialog between institutions and small farmers. Participatory approaches foster dialog through interactive methods that give voice to multiple points of view, especially those that reflect the varying social, cultural, and economic contexts of key stakeholders. Key principles to guide participatory approaches are presented in **Exhibit 4**, below.

**Exhibit 4: Key Principles to Guide Participatory Approaches**

Source: adapted from http://www.participatorymethods.org/page/about-participatory-methods

**The right to participate –** all people have a right to play a part in shaping the decisions that affect their lives; maximizing the participation of the less powerful is key.

**Hearing unheard voices –** actively seeking out unheard voices and creating the safe spaces that allow them to be heard. It is often people who have the least say in decisions about their lives who have the most to gain or lose.

**Seeking local knowledge and diversity –** an important starting point, recognizing that within local communities there exist diverse perspectives, experiences, interpretations, and realities.

**Reversing learning –** by letting go of preconceptions, strategies can learn from the wisdom of community members, which may require “unlearning” preconceived ideas and knowledge.

**Using diverse methods – adapted to varying conditions and needs, reflecting cultural differences and realities on the ground (e.g., literacy levels, access to electricity or information technology)**.

**Handing over the stick (or pen, or chalk) –** keeping quiet and allowing space for others to participate, reversing the common imbalance between those who have the power to speak and those who do not.

**Being willing to change attitudes and behaviors – not only among stakeholders on the ground, but also among decision makers, planners, and policy makers.**

**Collaborating with other partners and programs that share related goals –** reaching beyond the boundaries of one initiative to embrace commonalities and shared purposes to enhance reach, effect, and efficiencies.

The collection and incorporation of feedback into the communications process helps to build buy-in, incorporate unexpected issues, and address problems. It also informs the research and planning agendas and contributes to evidence-based policy. Interactive communication strategies strengthen rapid-response capacity and help build credibility for communication actors, activities, and agendas. Finally, participatory approaches and feedback mechanisms help to ground communications activities in both real-time and on-the-ground realities. As a result, the communications strategy framework needs to be supple, not static, and able to incorporate different input and ideas, along with new opportunities, shifting priorities, funding fluctuations, and other changes. As described by the Participatory Methods website:

*Participatory communications recognizes the importance and value of iterative processes, not just of a final communications product, which emerges from the last stages of a linear project process, or a public relations or marketing exercise. Integrating communications into each stage of research or practice – from inception to evaluation – allows for the creation of more nuanced products, often representative of a greater number of viewpoints*.[[32]](#endnote-46)

Participatory communications methods follow a two-way, horizontal model and not the traditional one-way, vertical model of sender-message-channel-receiver. They increasingly make use of emerging interactive communications forms made possible through new technologies, such as mobile phones. Traditional unidirectional methods, such as campaigns, also can include field-testing, feedback, or monitoring to boost the inclusion of diverse priorities, perceptions, and levels of knowledge.

Examples of communications channels that promote stakeholder dialog, input, and engagement include:

* Town hall-style meetings
* Networking activities and platforms
* Stakeholder meetings/workshops
* Policy forums
* Field visits to elicit feedback
* Surveys
* SMS, to convey information and gather questions and feedback
* Call-in radio or television programs
* Agricultural shows, fairs, trade fairs
* Interactive art projects and shows
* Participatory mapping (land use, changing landscapes, traditional knowledge/practices, etc.)
* Face-to-face trainings
* Social media platforms
* Interviews and focus groups
* Media trainings and forums
* Youth clubs and youth dialogs
* Digital storytelling and participatory video

**Monitoring and evaluation**

M&E are an integral part of the communications strategy to ensure that activities are being implemented according to planned timelines and priorities. M&E of the communications strategy will build on the existing models and structures of the EAC. It will need to be coordinated with the existing EAC M&E team, which holds quarterly meetings and reports out to the EAC every 6 months. Further coordination should also include collaboration with regional and national committees working on related issues, such as non-tariff barriers to trade, where assessments and feedback will inform shared priorities.

Annual progress reviews will include rapid assessment of implementation, with indicators such as:

* Communications strategy timelines and milestones – are they being followed/met?
* Allocation of resources (funds, time, people) to communications activities
* Evidence of linkages for tapping into other resources, partners, regional networks, etc.
* New policies introduced, adapted, and implemented
* Media engagement
* New or increased donor engagement

**Providing a regional framework**

This 5-year multi-sector communications strategy explains the role of strategic communications in the promotion of an aflatoxin-safe EAC. It addresses communications challenges regarding aflatoxin awareness and control, and it describes ways that the engagement in multi-sector strategic communications can spur the development of effective policies, positive behavior changes, and stronger capacity for mitigating aflatoxin risks. The strategy emphasizes the importance of including feedback mechanisms to capture stakeholder inputs that can inform policy planning and implementation, support shared learning, and increase the relevance and effectiveness of communications activities.

The aim of the regional communications strategy is to serve as a framework for more targeted national communications plans that will reflect country-level needs, opportunities, and priorities. The regional strategy thus outlines communication goals, key stakeholders, positive behaviors, policies, and channels of communication to be considered in the design of country-level communications plans across the four sectors of agriculture, health, environment, and trade.

Finally, the strategy offers recommendations for regular regional meetings so that national and regional representatives can share lessons learned, best practices, and innovative ideas to enhance regional coordination and capacity for building an aflatoxin-safe EAC.

**Stakeholders and implementers**

*Communications for development is, first and foremost, about people and the process needed to facilitate their sharing of knowledge and perceptions in order to effect positive developmental change. Media and technology are tools to this end, but they are not ends in themselves.[[33]](#endnote-47)*

This section highlights the broad groups of regional and national stakeholders that make up the people and processes need to facilitate knowledge sharing, policy implementation, and the promotion of positive changes that can reduce the risks and burdens of aflatoxin exposure. More sector-specific regional and national stakeholders are described later in this strategy. Country-level plans will need to highlight the relevant national and local audiences in more detail for designated policies, programs, and activities, depending on local needs, priorities, and conditions.

Several overarching principles are relevant at all levels when identifying stakeholders. Examples include:

* The need to consider cultural representation – remembering that there are many types of cultures (e.g., regional and ethnic culture, culture of youth, organizational or bureaucratic cultures)
* The need to consider gender representation and gender-linked differences in how to include and engage men and women
* The need to reach across sectors or entities to identify the different players and stakeholders engaged, particularly in issues and topics
* The need to build on existing partnerships, networks, and structures – avoiding duplication of efforts
* The advantage of leveraging talents and roles across different sectors (e.g., partnering with media or local leaders)

The key regional and national-level stakeholders for the communications strategy may be both target audiences and influencers. **Exhibit 5** shows the potential communications roles of different stakeholders as initiators and recipients of communications efforts.

**Exhibit 5: Regional- and National-Level Stakeholders**

| Stakeholders | As Initiators of Communications | As Recipients of Communications |
| --- | --- | --- |
| Government ministries and bodies in charge of topics related to Agriculture, Health, Environment, and Trade | * Communicate policies, programs, and evolving procedures * Put in place communications tools, structures, and programs that increase capacity, access to tools and resources, surveillance, monitoring, regulation, testing, etc. * Collaborate with other national- and regional-level partners/programs to leverage communications resources and objectives | * Increased internal communications, coordination across agencies * Greater awareness of aflatoxin issues and urgency * Increased institutional capacity and ability to respond to/warn of outbreaks, risks * Greater alignment of regulations and policies regarding aflatoxin |
| Other national-, local-, and regional-level policy and decision makers | * Communicate policies, programs, and evolving procedures * Put in place communications tools, structures, and programs that increase capacity, access to tools and resources, surveillance, monitoring, regulation, testing, etc. * Collaborate with other national-/regional-level partners/programs to leverage communications resources and objectives | * Increased internal communications, coordination across agencies * Greater awareness of aflatoxin issues and urgency * Greater leveraging of common communications aims and program objectives around issues that help mitigate aflatoxin risks |
| National and regional communications/ information staff | * Communicate appropriate, non-technical information that provides evidence to promote and support policies and activities that address aflatoxin issues * Support greater internal communications across ministries and partners (newsletters, web postings) * Partner with media (trainings, site visits, press releases) | * Greater awareness of aflatoxin and messages that can be conveyed that are newsworthy but not apt to create panic * Great communications partnerships with other organizations and entities working on aflatoxin-related issues |
| Donors/investors | * Support for initiatives and activities * High-level visibility | * Greater awareness of aflatoxin prevention/ mitigation technologies and their potential benefits across multiple development issues across the sectors of health, agriculture, environment, and trade * Good stories to bring back to their stakeholders (boards) * Good exposure and linkages with efforts aimed at addressing a major health, environmental, and development challenge and at improving lives |
| Private-sector stakeholders (who may be involved in such things as certification, development/  dissemination of new technologies, and public/private partnerships to promote awareness, training, new technologies, etc.) | * Integration of policies, expansion of technologies, collaboration around regulations and the promotion of positive practices that help prevent or mitigate aflatoxin exposure | * Greater awareness of aflatoxin prevention/ mitigation technologies and their potential economic benefits * Greater linkages with public and other initiatives |
| International/ regional media | * Sharing stories of practices that promote aflatoxin mitigation, including in the context of its overlapping with other “hot” topics, such as climate change adaptation * Sharing stories of ways behavior changes have bettered lives/livelihoods while also promoting the aflatoxin-safe agenda * Sharing stories highlighting the benefits of new technologies (e.g., SMS, AflaSafe™, diet diversification) | * Good stories that are science-based, especially as connected to news-worthy topics and events * Reliable sources of information on regional/national issues |
| International NGOs, programs/partners, research organizations, cross-cutting initiatives | * Sharing knowledge and communications activities that help motivate and mobilize their addressed audiences to take action and commit themselves to newly promoted practices * Linking communications efforts to leverage resources and impacts | * Greater awareness of aflatoxin prevention/ mitigation technologies and their potentially overlapping benefits that help promote other health, agricultural, environmental, and trade agendas * Stronger partnerships with EAC * Better informed research and program agendas |
| Advocacy organizations | * Advocating for issues, changes, policies, and support * Linking aflatoxin prevention/ mitigation with advocacy issues (e.g., cancer prevention, climate-smart development, safe food, livestock development) | * Stronger linkages with other organizations/cross-cutting initiatives * Greater awareness of aflatoxin prevention/ mitigation technologies and their potentially overlapping benefits that help promote their agendas |
| Community-level trusted influencers (e.g., community/ religious leaders) | * Sharing messages, undertaking efforts to build public confidence and address myths, concerns, and resistance * Providing input back to program and policy planners, researchers, and communications specialists | * Greater recognition from regional and national levels and ways to build profile and appreciation at local and national levels * Stronger linkages with services provided by government or partner organizations |
| Extension/outreach services | * Translating knowledge into practices; teaching, and encouraging changes in beliefs, behaviors, and practices based on new information, technologies, services, resources, etc. * Giving feedback on policies and activities, sharing ideas and innovations | * Access to new information and technologies * Access to programs and efforts that support their objectives |
| Special populations (e.g., pregnant/lactating women, children, people with HIV/AIDS or hepatitis B, individuals living in high-risk areas) | * Giving feedback * Sharing traditional knowledge and methods * Becoming sharers of knowledge (train the trainer) | * Targeted and focused information and interventions that meet their special needs and situations |
| Consumers | * Giving feedback * Providing demand for changes, particularly regarding marketed products | * Information on nutrition, health, best practices, climate smart approaches, etc. |

**Communications channels**

Specific suggestions regarding potential communication channels for aflatoxin activities were collected from stakeholder interviews conducted as part of the situational analyses for the development of this communications strategy. They are presented later in this strategy, in the situational analyses by country, and in later sections of this strategy, by sector.

Below are a few general themes concerning potential communications channels that are useful to consider from the EAC and regional perspective:

* Build on existing communications channels. The EAC has in place a number of working groups, scheduled meetings and times for reporting out, websites, etc. (***Note:*** *To be filled out further during discussions in April.*)
* Partner with international and regional media. Journalists like and need good stories that reflect current events and new or unexpected angles. They appreciate information and interviews that reflect science and trusted sources. Interactions, such as media breakfasts, trainings, educational site visits, and interviews, help to nurture mutually beneficial relationships with journalists and bloggers.
* Use what is already working. For example, a wide-scale program in Uganda on government decentralization of services used call-in radio, which was widely popular and considered to be more cost effective than the alternative, which involved setting up a call center.
* Take advantage of communications technologies, such as SMS and other mobile device-based services.
* Recognize the power of the “voice” of regional- and national-level messages and messengers. Messages presented in high-level speeches or events will get a wider audience and pickup.
* Take advantage of regional and international meetings, forums. Remember that policy makers and donors appreciate easily digested facts and figures.
* Collaborate with donors and international organizations to link with their regional or international communications initiatives (blogs and social media presence, workshops, meetings, conferences, initiatives) and to take advantage of their high visibility. Invite them to media trainings and site visits. Take photos/videos of their visits and share them on your sites and with donor social media staff.
* Prioritize the strategies and channels that make the most sense from the regional and cross-national perspective.
* Ensure stories and drama are highly appreciated. They help make information and examples of positive (or negative) behaviors more accessible and interesting. They also help to contextualize messages.
* Consider that people are more open to change than is commonly assumed.
* Consider costs.

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# V. Strategic communications framework, by sector

This section presents the sector-by-sector framework for elaborating the regional communications strategy. It is rooted in the knowledge platforms and policy recommendations presented in the technical papers, as well as in the feedback from the situational analyses, and recommendations from the research literature on strategic communications and communications for development.

****Each section highlights the programmatic and policy objectives, which drive communications activities and serve as measures against which those activities can be evaluated. It presents key stakeholders for the sector, as well as the positive behaviors that not only help reduce aflatoxin risks and exposure, but often also promote further positive changes or outcomes, such as better land management or improved maternal and child health. Policy recommendations from the technical papers are presented, as are the types of communications channels suggested by stakeholders and media specialists for each sector.

**AGRICULTURE**

Staple and other susceptible crops grown in East Africa, such as maize, groundnuts, cotton, chili peppers, and cassava are at risk of exposure to the *Aspergillus* fungus. Common pre-harvest stressors make plants more vulnerable, including such factors as high heat, drought, too much rain, poor soil fertility, insect damage to crops, and poor harvest practices. Further contamination continues post-harvest when there is poor drying and ongoing insect and moisture damage during storage and transit to market. The outcome of this cycle of contamination results in the production, marketing, and consumption of both human food and animal feed that often exceed both national and internationally established tolerances for safe levels of aflatoxin.

**Objectives driving communications activities**

Long term:

* To produce sufficient amounts of aflatoxin-safe food and feed products to meet the needs and demands of humans, livestock, and trade.

Medium term:

* To commercialize affordable technology that addresses the harvesting constraints of small-scale farmers.
* Widespread adoption of GAPs, especially in aflatoxin hot spots.

Short term:

* To heighten consumer awareness and demand for food products that are tested and confirmed to be aflatoxin-safe.
* To commercialize affordable and easy-to-use aflatoxin testing techniques (e.g., mobile phone-based devices) for farmers.

**Stakeholders**

|  |  |
| --- | --- |
| **Regional/National-Level Stakeholders** | **Community-Level Stakeholders** |
| * EAC * Other regional associations (AU, COMESA, SADC) * Ministry of Agriculture * Ministry of Livestock, Fisheries, and other agriculturally related ministries * International/national agricultural research institutes/programs * Veterinarians and veterinary training programs * Universities and other academic institutions * International programs and agencies targeting agricultural development, food security * Private-sector agricultural/livestock producers and processors * Private-sector entities engaged in developing/disseminating new technologies for agriculture, including input companies and dealers * National and international media | * Extension services * Farmer/livestock cooperatives, associations, and committees * Small- and medium-sized processors and millers * Community-level associations, committees, and facilitators * Trusted influencers (e.g., religious leaders, community leaders, elected farmer representatives) * Schools, youth organizations/programs * Local media * Consumers   Special populations:   * Producers and livestock keepers residing or working in aflatoxin “hot spot” zones |

**Positive behaviors that can mitigate aflatoxin risks/impacts**

More than 70 percent of the population in the countries of the EAC relies on home-grown food for consumption and income generation. As a result, most aflatoxin-prone staple foods and animal products are eaten without any quality control. Promoting the behaviors that can minimize aflatoxin contamination from farm to folk is critical and must involve farmers, producers, processors, and consumers in appropriate production, handling, and storage methods at all stages.[[34]](#endnote-52)

Awareness building, while important, is not sufficient. Small-scale farmers and processors, especially, need access to necessary resources and infrastructure for control measures.[[35]](#endnote-53)

The scale-up of appropriate behaviors and technology requires a strong extension service capacity and training programs focused on the technical transfer of knowledge, practice, and oversight to those most closely associated with aflatoxin control and mitigation. Thus, for example, the adoption of AflaSafeTM by small farmers will require not only distribution, outreach, and training, but also an appropriate business model that increases access and affordability. Potential models exist, such as where capitalized entrepreneurs aggregate small-scale farmers under their corporate umbrella to purchase and provide inputs with the aim of increasing both production and food safety.

Below are key behaviors that have been identified for the region. Each country will need to prioritize the behaviors, taking into account their particular context, needs, priorities, and barriers. Once this is done, individual messages will need to be developed in locally appropriate languages targeting the priority groups in the country.

Examples of positive behaviors in agriculture include:

* Use of early warning systems for aflatoxin abatement
* Land-use planning to promote alternative crops/use in high-risk areas
* GAPs:
  1. Use of drought and insect-resistant varieties
  2. Selection of healthy seeds
  3. Early planting
  4. Crop selection, rotation (avoidance of monocropping), and diversification – use of crops less susceptible to aflatoxin
  5. Well-timed planting and harvest
  6. Use of biological control agents to prevent aflatoxin from entering the crops in the first place
  7. Application of inputs to ensure soil and plant (e.g., tillage, fertilization, water management)
  8. Appropriate pesticide use in field and storage
  9. Appropriate drying methods to discourage growth of fungi and bacteria, both on-farm and throughout the value chain
  10. Storage techniques to preserve quality and integrity, with improved ventilation to reduce moisture (e.g., for groundnuts, drying them on mats and storing them in natural fiber bags raised on wooden pallets to reduce pest access and improve ventilation)
  11. Hand sorting of damaged grains/crops
  12. Training and access to equipment to change inappropriate practices, e.g., facilitating access to mechanized shellers to replace hand shelling
  13. Application of processing methods that mitigate aflatoxin exposure (e.g., chemical processing, including ammonization)
  14. Proper sorting and disposal of contaminated products
* Use of implementation packages. GAPs are more effective if used in combination. Research shows that implementing a package or set of procedures to prevent aflatoxin contamination in crops is more effective than individual practices alone. [[36]](#endnote-54)
* Livestock feed practices:

1. Use of ammonization to decontaminate affected feed
2. Use of binders
3. Blending of contaminated feed with clean feed reduces the concentrations of toxins, but is not allowed in some EAC member countries
4. Alkaline treatment, including the use of ammonia, urea, and calcium hydroxide (nixtamalization), can reduce the levels of aflatoxins in maize and cottonseed by 50 to 99 percent
5. Physical processes, such as sorting, fractionation (wet and dry milling), and floatation can also reduce aflatoxins by similar percentages
6. Increasing protein and vitamins in feed acts as a palliative for livestock; providing exercise, good environmental conditions, and reducing other stressors on livestock and fish also help reduce aflatoxin exposure risks

**Biological Control**

Biological controls offer one of the most promising and cost-effective solutions for preventing aflatoxin contamination, by curbing its development at the point of production in farmers’ fields.

Biocontrol products work by encouraging the growth of robust but non-toxic strains of *Aspergillus flavus* that crowd out the toxin-producing strains. They have been used successfully in the United States and Europe for decades to control aflatoxin in maize, groundnuts, almonds, and cotton, and more recently have expanded to Kenya, Nigeria, Mali, Senegal, and Zambia. The biocontrol product AflaSafe™ was developed specifically for African conditions and has been shown to successfully reduce the total aflatoxin contamination in crops by at least 75 percent in Kenya. The efficacy increases with each subsequent application, reducing toxin to very low levels. With good post-harvest handling practices, the benefits are maintained throughout the value chain from harvest to consumption.

Although AflaSafe™ is available for purchase, there may be other mechanisms for supplying it to farmers, either on an emergency basis or through governmental or nongovernmental organizational programs.

**Policy recommendations**

***General recommendations:***

* To facilitate development/dissemination of aflatoxin control technologies (biocontrols, resistant varieties, drying technology, etc.).
* To target commercial production control of food products, which are susceptible to high levels of aflatoxin contamination, such as peanut butter and ugali.

***Specific recommendations from the scientific papers:***

**Biocontrol:**

* Biocontrol for aflatoxin abatement activities should be adopted by the EAC and partner states as a key component of the agriculture plan within the 5-year strategy to achieve an aflatoxin-safe East Africa region.
* The EAC Five-Year Communications Strategy should include a comprehensive biocontrol component that will reach all stakeholders along the value chain: consumers, government, and regional trade and regulatory bodies, and legislators. This communications initiative will be both a prerequisite for country-specific pilots and an expanding network for the scale-up of biocontrol technologies.
* The EAC, COMESA, and partner state ministries of agriculture, trade and industry, and other relevant regulatory agencies, should work together to fast track and facilitate the regionally harmonized registration of biocontrol products for the East Africa region.
* Business models for the distribution of biocontrol products—to farmers at all income levels, especially those living below the poverty line—should be designed, implemented, and evaluated within each of the EAC partner states. The models should be country specific and include a scale-up strategy.
* International donor agencies, such as the WFP and USAID FFP, working consistently in agriculture-linked emergency relief and development, school feeding, contract farming, and/or local commodity purchases, should be encouraged and supported to include biocontrol products and extension support services for their use.
* The FEWSNET and FAO Early Warning Systems should be adapted to include variables that signal the need for biocontrol application in specific and/or new areas in response to drought, insect infestation, and, for the longer term, global climate change.
* As a necessary element of a comprehensive aflatoxin control initiative, and especially for successful biocontrol programs, an inventory and analysis of test kits to be used along critical points of the production cycle and the value chain should be conducted.
* Regional and national manufacturing capabilities for biocontrol products should be incorporated into the biocontrol strategic framework.
* Centers of Excellence should be established throughout the East Africa region to ensure the highest quality of research, development, product assurance, scale-up, and sustainability for biocontrol.

**Post-harvest losses:**

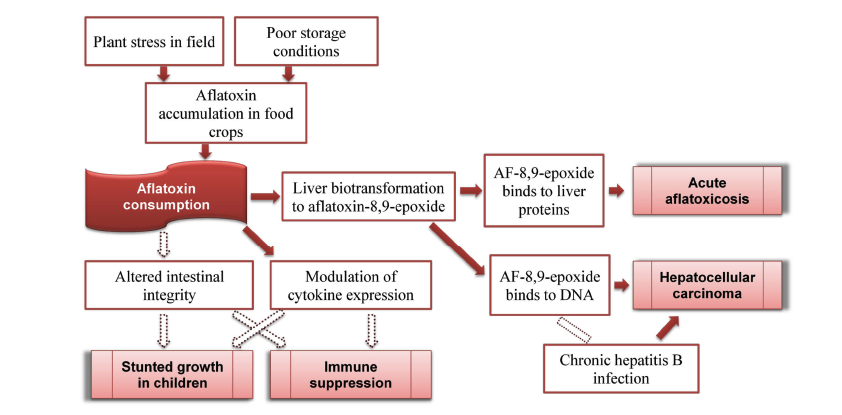
* In the interest of regional food security and the public, give immediate attention and prioritized resource allocation to addressing PHL for the aflatoxin-prone staple food crops.
* Give the greatest urgency to maize, groundnuts, and milk, but also devote adequate attention to sorghum, sweet potato, and pulses wherever they are widely grown, consumed, and/or traded.
* Within the priority commodity systems, take a comprehensive approach that begins with GAPs, extends through GHPs, and continues along the value chain through GMPs.
* For post-harvest management, broadly defined, focus interventions on locally adapted and validated best practices for harvesting, drying, sorting, and storing to reduce PHL.
* To guide policy and program development for post-harvest interventions at the household, farm, marketing, and processing levels, further qualitative and qualitative analysis should be undertaken on key crops and best practices for aflatoxin abatement.
* The EAC should play a leadership role in a region-wide initiative to inform farmers, aggregators, and traders of the breadth of issues related to aflatoxin and PHL, while also providing them with affordable options for improvement.
* Establish monitoring, reporting, and information systems, beginning with the known aflatoxin “hot spots,” and using existing tools, such as APHLIS and FEWSNET, to create baseline information, and assess progress. Expand the breadth and depth of these systems as resources allow.
* For prevention purposes, support and expand the use of proven biological control methods such as AflaSafe™, but also explore others such as *Trichoderma viridae* and compost enriched with *Pseudomonas aeruginosa.*
* Take steps to identify, describe, and address aflatoxin issues related to gender, climate change, HIV/AIDS, and other cross-cutting issues.
* Reduce EAC and COMESA tariff schedules to increase economic access to modernized post-harvest handling, storage, and testing equipment, and encourage the rapid inflow of other aflatoxin control tools and technologies.
* Invest in BCC programs that are customized by gender, language and literacy levels to:
* Raise the level of awareness among small farmers, rural households, vulnerable groups, actors within affected value chains, and providers of technology generation and transfer services.
* Launch a national campaign to reduce aflatoxin contamination that would involve all major stakeholders in the public and private sector, civil society, and the academic community.
* Actively support the PACA to serve as the lead knowledge platform for aflatoxin control across the region.

**Channels of communication**

* Channels routinely used by the MOA and partners (e.g., extension services, farmer field schools, training of trainers, regular newsletters and announcements, etc.)
* SMS systems for exchanging information with farmers, traders, and others
* SMS for testing (smartphone with camera technologies)
* National media, local-language media (talk shows, call-in shows, shows specifically from MOA…)
* Media familiarity trips, specialized media training, media roundtables
* “Edutainment”: Popular issue-oriented soap operas and drama shows
* Curricula and trainings for extension workers, as well as students in high school and agriculture training institutes (training coordinated with radio programs and feedback from radio shows to refine training materials)
* Agricultural shows, special “days” and events
* Presentations by recognized leaders (politicians, celebrities, etc.)
* Printed materials (leaflets, posters, fact sheets)
* Face-to-face/stakeholder meetings
* Folk media (using communication methods already in place, song/dance/story telling)
* Linking with and leveraging other agricultural communications activities focused on food security, climate change, or resilience-building (e.g., crop rotation, elimination of certain crops in hot spot areas, food diversification) that may have overlapping elements with aflatoxin prevention/mitigation

**HUMAN AND LIVESTOCK HEALTH**

Aflatoxin is highly toxic to humans and animals. With over 90 percent of samples from young children in East and West Africa showing detectable levels of aflatoxin—compared to less than 1 percent in the developed world—aflatoxin exposure is clearly a public health burden of alarming dimensions for the EAC

The human health effects of aflatoxins were reported as early as the 1960s. However, it has rarely received high-level public or policy maker attention, particularly in the face of other health, social, or economic priorities. **Exhibit 6**, below, illustrates the connection between aflatoxin and various disease pathways in humans. The darker arrows denote linkages that have been well established in agricultural and toxicological research. White arrows denote linkages with less scientific backing.

**Exhibit 6: Aflatoxin-Human Disease Pathways Connection**

Source: Wu, 2010

With the exception of periodic acute outbreaks of aflatoxin poisoning (aflatoxicosis), most cases of aflatoxin exposure are chronic, leading to slower, more insidious health effects that garner little attention. Yet from a societal perspective, the health impacts of aflatoxin exposure are substantial, affecting not only human well-being, but also the development and productivity potential of current and future populations.

The impacts of aflatoxin are particularly significant during the first 1,000 days of life (conception to age 2). The toxin exacerbates child malnutrition, suppresses immunity, and interferes with complex processes affecting not only early growth and development, but also longer term intellectual capacity and susceptibility to health problems, such as cancer and heart disease. Exposure may be transmitted through pregnancy, breastfeeding, and the introduction of baby foods made from contaminated products, such as maize, milk, and groundnuts.

The most clearly established health outcome associated with chronic aflatoxin exposure is primary hepatocellular carcinoma (liver cancer), which is common in regions with high aflatoxin exposure and endemic hepatitis B infection. The EAC community faces high rates of hepatitis B, as well as hepatitis A, HIV/AIDS, and malnutrition. The combination with aflatoxin exposure results in a double-disease burden that increases disease severity, reduces survivability, and heightens liver cancer prevalence.

**Aflatoxin and Liver Cancer**

Hepatocellular carcinoma (liver cancer) is the third leading cause of cancer deaths in the world.

Chronic hepatitis B infection is the most common cause of liver cancer, accounting for 23 percent of cases worldwide and up to 80 percent of cases in regions where hepatitis B is endemic, as seen in the EAC. Aflatoxin acts synergistically with hepatitis B to increase liver cancer risk, and studies in Kenya and Swaziland point to dietary aflatoxin exposure as an explanation for the high incidence of liver cancer in certain African countries.

A recent systematic review and meta-analysis determined that the risk of developing liver cancer was over 6 times higher in individuals with detectable aflatoxin exposure than in those without, more than 11 times higher in individuals with chronic hepatitis B infection than in those without, and 73 times higher in individuals with both detectable aflatoxin exposure and hepatitis B.[[37]](#endnote-55) Since liver cancer is the third-leading cause of cancer deaths worldwide, and mortality rapidly follows diagnosis, the contribution of aflatoxins to this deadly cancer is significant.

Studies presented in the technical paper on hepatitis A and B estimate annual Disability Adjusted Life Years (DALYs) lost due to aflatoxin contamination-related liver cancer cases for EAC partner countries from the added burden of aflatoxin-related liver cancer cases. The cost metric used is the Value per a Statistical Life (VSL). Ranges per EAC country were as follows:

Burundi – $18,000–$72,000 VSL

Kenya – $49,000–$207,000 VSL

Rwanda – $33,000–$134,000 VSL

Tanzania – $37,000–$161,000 VSL

Uganda – $31,000–$128,000 VSL

Vaccination against hepatitis is an important measure for combatting both the negative impacts of the virus and its complicating factors with aflatoxin. The hepatitis B vaccine was introduced in the EAC in 2002. It is part of the primary infant immunization program, delivered in combination with the diphtheria-tetanus-pertussis (DTP) and haemophilus influenza type B (Hib) vaccines. Children ages 0–12 years are thus protected, with a reported coverage rate of 70–90 percent. The hepatitis A vaccine is not covered by the program. As a result, large portions of the population are not protected against hepatitis A or hepatitis B.

Among livestock, as with humans, exposure to highly concentrated levels of aflatoxin causes acute toxicosis and death. Chronic consumption at lower levels can cause liver damage and gastrointestinal dysfunction. It decreases appetite, reproductive function, growth, and production and increases susceptibility to other diseases due to immune suppression. These effects are accentuated when there is co-contamination with other mycotoxins.

**Objectives driving communications activities**

Long term:

* To ensure everyone is eating aflatoxin-safe food
* To improve systems for tracking the etiology and epidemiology of aflatoxin-associated health impacts (registries, records, diagnostics, etc.)

Medium term:

* To increase dietary diversity with greater quantities of foods that are less susceptible to aflatoxin contamination
* To integrate aflatoxin into curricula for medical/vet/nursing/nutrition/public health programs
* To expand vaccination for hepatitis B and to introduce or strengthen vaccination for hepatitis A and C
* To revise nutrition education curriculums to promote aflatoxin-safe foods during first 1,000 days of life

Short term:

* To comply with existing hepatitis B vaccination protocols
* To ensure aflatoxin-safe foods for the first 1,000 days of life (reaching children and mothers through schools, feeding programs, antenatal care, etc.)
* To integrate the promotion of aflatoxin-safe foods into public health outreach and clinical services

**Key stakeholders**

*Ordinary people do not feel they have influence, so they hold back on communicating the issues that concern them; however, health issues are a link into Communication for Development—everyone likes to talk about their health.[[38]](#endnote-56)*

| **Regional/National-Level Stakeholders** | **Community-Level Stakeholders** |
| --- | --- |
| * EAC * Ministry of Health * International/national health research organizations and programs * Universities, medical schools, and other academic health institutions * Food safety inspectors/regulators * Large-scale healthcare providers (public, private, NGO) * Health care provider associations * Large-scale health care campaigns and programs (e.g., One Health Initiative; Scaling Up Nutrition; U.S. President's Emergency Plan for AIDS Relief; Global Fund for Malaria, Tuberculosis. and AIDS; GAVI) and Millennium Development Goals policy and program leaders * International organizations (e.g., UNICEF) * Private-sector entities engaged in developing/disseminating new technologies applicable to health promotion and surveillance * National and international media | * Health outreach services * Local clinics and health programs * Community-level health associations, committees, facilitators * Trusted influencers (e.g., religious leaders, other local leaders) * Schools * Local media * Consumers   Special populations   * Pregnant/lactating women * Infants, children (first 1,000 days of life) * People with HIV/AIDS or hepatitis A, B, or C * “Out-of-clinic catchment” population * Persons residing in aflatoxin “hot spot” zones |

**Positive behaviors that can mitigate aflatoxin risks/impacts**

* Strengthening vaccination against hepatitis A and C – currently, not widely available or used.
* Expanding vaccination against hepatitis B – should be expanded to follow current protocols, and ultimately to reach further populations (e.g., youths over age 16, adults)
* Dietary diversification – using a wider assortment of food staples, including those less susceptible (e.g., millet, sorghum) to aflatoxin contamination and those (e.g., leafy greens, broccoli) that have detoxifying effects. Both lesson exposure risks and contribute to a more nutritionally diversified diet.[[39]](#endnote-57)
* Uptake of antenatal care, which offers an opportunity for engagement and education
* Extended exclusive breastfeeding (beyond 4 months) – evidence suggests that encouraging exclusive breastfeeding for 6 months is more beneficial for infant health and will result in lower levels of aflatoxin exposure in comparison to early introduction of complementary foods. Even if the breast milk is exposed, it is less toxic than exposure through baby food.
* Early diagnosis of aflatoxin exposure, with application of appropriate treatment (adsorbent, chemoprevention, detoxification)
  1. Chemical treatments (e.g., Oltipraz) boosts the body’s defenses to the effects of aflatoxin by inducing *glutathione S. transferase* (GST) enzymes responsible for detoxification of aflatoxin.
  2. Natural dietary components: Green tea contains polyphenol compounds that have been shown to be effective at inhibiting induction of aflatoxin-induced liver cancer in rats. Glucosinolates, such as glucoraphanin in broccoli sprouts, can be metabolized by gut micro flora to yield sulforaphane, which is an inducer of detoxification enzymes. Chlorophyllin is a natural product found in green leaves that has the capacity to bind to aflatoxin in the gastrointestinal tract.
  3. NovaSil clay is processed calcium montmorillonite clay that is commonly used as an anti-caking agent in animal feeds. It has been shown to bind preferentially to aflatoxin in the gastrointestinal tract and thereby reduces the bioavailability of aflatoxin in the blood, liver, and other organs.
  4. Olitpraz, a probiotic bacteria
* Application and dissemination of epidemiological surveillance systems in high-risk areas, and application of early warning systems with response protocols.
* For livestock:

1. General methods of aflatoxin management (plant breeding, biocontrol, pre- and post-harvest practices, and nutritional strategies)
2. Binders: The addition of binding agents, such as zeolite clays and aluminosilicates, is effective in reducing toxicity. When binding agents are included in feed at a ratio of 200 parts feed to 1 part binding agent, they reduce most of the harmful effects of aflatoxins at levels of 1,000 ppb for pigs and 7,000 ppb for poultry.
3. Blending: One method of reducing moderate levels of aflatoxin contamination is to blend contaminated grain with clean grain (blending 1 kilogram of grain with aflatoxin contamination five times above the limit with 9 kilograms of grain exhibiting no detectable aflatoxins would result in 10 kilograms of grain with aflatoxins at 50 percent of the permissible amount.
4. ****Decontamination: Ammonization is a safe and effective way to decontaminate aflatoxins; it has been used with success in many countries, yet is not legal in others. Nixtamalization, a traditional alkaline treatment, can reduce toxicity and has the potential for wider applications. Other chemical and biological agents have been effective in experiments but are not yet commercially developed.

**Policy recommendations**

**Aflatoxin and human health:**

1. The EAC will develop and implement a 5-year multi-sector communications strategy on aflatoxin issues in the areas of human health, animal health, agriculture, trade, and environment. This will strengthen the knowledge base and increase awareness at all levels of stakeholders, and especially among key decision makers. Human, the most affected, and agriculture, the most likely to provide solutions, will be considered as priority sectors.
2. The EAC will assume a leadership role in the development and coordination of regional policies and programs critical to aflatoxin abatement activities of regional importance. This may begin with the design of a 5-year road map developed in conjunction with member states, donor partners, and regional and global experts.
3. The EAC member states will establish cancer registries and other relevant epidemiological surveillance systems to monitor the impact of chronic consumption of foods exceeding allowable standards, and acute aflatoxicosis on human health. If such registries exist, the member states will strengthen and expand their focus to adequately address health outcomes associated with aflatoxin.
4. The EAC member states will collaborate with the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund for Malaria, Tuberculosis and AIDS, One Health initiatives, relevant ministries and institutions, donor organizations, and NGOs to design and implement aflatoxin risk reduction dietary protocols for immunosuppressed individuals and other vulnerable groups.
5. The EAC member states will develop a comprehensive curriculum on the science, etiology, diagnosis, and management of aflatoxin and aflatoxicosis. The curriculum will be implemented for school health promotion programs, community health workers, undergraduate and post-graduate university medical sciences, and schools of midwifery, nursing, nutrition, and public health.
6. The EAC member states will give special attention to vaccination campaigns that dovetail with aflatoxin control efforts. Based on the assumption of inordinately high risk among the general population across the East Africa region, hepatitis A and B vaccination protocols currently approved for infants and young children will receive special emphasis to ensure their rigorous adherence. In addition, adolescent and adult immunization campaigns will be launched in conjunction with supporting health communications messaging programs. HCV screening should be strengthened, as this is a vulnerable group.
7. EAC member states will encourage a rigorous public health nutrition program to encourage and guide dietary diversity for the purpose of reducing the risks of aflatoxin ingestion, without compromising sound nutritional practices, including review. This should be done in tandem with review and of staple food enrichment and fortification protocols to take into consideration the risk of inadvertently increasing aflatoxin ingestion among the general population.
8. EAC member states will intensify monitoring systems for food products that are susceptible to high levels of aflatoxin contamination, such as peanut butter and ugali.
9. EAC member states will integrate seasonal risk mapping and early warning systems to predict high-risk zones for aflatoxicosis outbreaks into food security forecasting models, such as FEWSNET and the FAO Early Warning Systems. This can then be used to initiate quick-response mechanisms to reduce the consumption of dangerously high levels of aflatoxin, especially those associated with on-farm consumption.
10. EAC member states, in the development of all policies, programs, regulations, and practices, should be cognizant of and responsive to differences in aflatoxin abatement approaches required for on-farm consumption vs. commercial products, formal and informal trading systems, and the larger context of food insecurity across the region.

**Aflatoxin and Hepatitis A and B:**

1. Currently, 20 percent of children and adolescents ages 0–15 years, who should have been immunized for hepatitis B under current Ministry of Health-approved immunization protocols, have not been vaccinated. We recommend a clinic-based effort to reach this group.
2. All persons in the age groups of 16 years and beyond fell outside of the revised hepatitis B immunization programs for the region. For this subpopulation, we also recommend an adult immunization catch-up campaign against the HBV.
3. In accordance with new WHO recommendations, the hepatitis B “birth dose” should be adopted as part of the routine immunization program.
4. Given the high percentage of births occurring outside of the clinical setting across the East Africa region, special programs should be designed and implemented to reach these infants with the hepatitis B birth dose.
5. EAC partner states should coordinate with GAVI to hasten discussions on supply, logistics, and costs associated with the introduction of the hepatitis B birth dose, vaccination of the 20 percent of 0–15 year olds missed, and the fully unvaccinated adults.
6. Operational and logistical aspects of HBV and HAV immunization activities need to be carefully planned and implemented to ensure quality, especially for the cold chain supply. This would include health workforce strengthening.
7. Partner states should proceed to establish dialogue for human and financial resources, and programmatic and technical support to launch the hepatitis A vaccination initiatives through UNICEF and GAVI, in tandem with establishing their own national strategy and policy for HAV.
8. Inclusion and full coverage for the hepatitis A and B immunization campaigns, and establishment of routine vaccination protocols should be included in the EAC’s “Zero Policy Draft for an Aflatoxin-Safe EAC.”
9. Social marketing for the proposed catch-up campaigns should also be a key component of the EAC’s Five-Year Communications Strategy for an Aflatoxin-Safe East Africa Region.
10. Regional and national cancer registries should be strengthened to more accurately capture the actual incidence and prevalence of HCC.
11. Partner states and the EAC should seek funding for further research to better understand the relationships between the consumption of aflatoxin-contaminated commodities in the region and its impact on the incidence of hepatocellular carcinoma, and interactions with the hepatitis A, B, and C viruses.
12. Information on aflatoxin, liver disease, preventive care, and diagnostics should be integrated into the curricula of medical and nursing schools, schools of public health, and training programs for community nutritionist and other health workers throughout the region.

**Aflatoxin and the 1,000 days:**

1. Encourage longer exclusive breastfeeding, which is more beneficial for infant health and will result in lower levels of aflatoxin exposure in comparison to early introduction of complementary foods.
2. Due to the urgency of ameliorating the negative impacts of aflatoxin within the 1,000 days, priority should be given to actions that will affect modifications to dietary patterns, the rigorous enforcement of standards for foods specifically for infants and young children, and other interventions to promote aflatoxin abatement measures at the community and household level.
3. Collaborate with the SUN and MDG policy and program leaders to design and integrate food safety goals and objectives that include aflatoxin abatement measures for the 1,000 days’ population, both mothers and children.
4. Work with national governments and the EAC to include aflatoxin control activities in SUN, MDG, and other food security and nutrition policies and programs for the 1,000 days’ population.
5. Continue to promote exclusive breastfeeding for the first 6 months of life to minimize and delay the premature introduction of harmful and higher levels of aflatoxin found in complementary foods.
6. Design and implement beneficiary-specific nutrition education modules for reduced aflatoxin ingestion during the 1,000-day period working with ministries of health, and particularly to reach midwives, trained birth attendants, community health aids, nurses, nutritionists, and doctors who are primary caregivers for pregnant and lactating women and their young children.
7. Conduct national reviews of the current dietary recommendations and nutrition programs recommendations that may be inadvertently advocating the consumption of aflatoxin-prone foods.
8. Through the EAC Five-Year Communications Strategy, promote dietary diversity for pregnant and lactating women as an affordable and rapid-response mechanism to reduce the transmission of aflatoxin to infants and unborn children.
9. Advocate for research to better quantify the impacts of aflatoxin on morbidity and mortality outcomes during the 1,000 days, especially stunting and pediatric AIDS.
10. Facilitate coordination between the One Health Initiative, ministries of health and ministries of trade and industry, private-sector food processors and importers, and regional economic organizations to ensure that the regulatory environment and standards for food and feed adequately address the special needs of the 1,000 days’ population and other vulnerable groups.

**Animal Health and Productivity:**

1. Demand for animal source foods in the EAC will continue to rise as the urban base widens and income grows, expanding the middle-class population. To use livestock as a ladder to increase rural incomes and sustain livelihoods, a comprehensive set of policies and programs to address development of forages, pasture, and specific cereal crops for animal feeds should be pursued within the East Africa region. These should address the threat of aflatoxin.
2. Given the economic and nutritional importance of animal products for the partner states of the EAC, legislation, policies, regulations, and practices to develop an aflatoxin-safe feed supply should be given priority.
3. Countries need to reevaluate the livestock and fish subsectors of the GDP, which are grossly undervalued, to equitably budget funds for long-term development in proportion to their contribution now and in the future.
4. The EAC partner states should collaborate to undertake a detailed study covering all the agro-ecological zones, livestock, and fish production systems, and seasonal factors to determine the magnitude of the aflatoxin problem in animal and fish feeds, animal products, and milk.
5. Based on the findings of this study, an action plan to address constraints and formulate solutions should be designed and implemented.
6. The majority of the stakeholders have a very low awareness of the sources and effects of aflatoxin contamination, and of the tools available to mitigate aflatoxin contamination in animal and fish feeds, animal products, and milk. Creation of awareness along the industry value chains is a prerequisite to a harmonized standard for the control of aflatoxin. This initiative should be launched through the “Five-Year Communications Strategy for an Aflatoxin-Safe East African Community” in January 2015.
7. Toxin binders are widely used in all the EAC partner states. Studies should be done to study their efficacy in the EAC context and to decide whether or not to legalize or prohibit their use based on sound scientific evidence.
8. Livestock development strategies (Livestock Sector Development Program 2011 Tanzania; Draft Livestock Policy 2008 Kenya) and the CAADP do not address the problem of aflatoxin. It is necessary to expedite the development of a multisectoral package of policies for the EAC states to guide aflatoxin management, affording due consideration to the importance of a safe and nutritious food and feed supply to ensure human and animal health, as well as sustainable economic growth across the East Africa region.

**Channels of communication**

* Channels routinely used by the MOH and partners (e.g., newsletters, announcements, SMS, alerts)
* Health care outreach services
* Clinics and mobile services, including antenatal care
* Vaccination programs
* National/international health awareness dates (e.g., World Cancer Day – 4 Feb; World Health Day – 7 Apr; World Immunization Week – last week of Apr; World Hepatitis Day – 28 Jul; World Breastfeeding Week – 1–7 Aug; World AIDS Day – 1 Dec)
* Health fairs
* Schools
* SMS systems for early warning, alerts
* National media, local-language media (talk shows, call-in shows, health programs, shows specifically from MOH)
* “Edutainment”: Popular issue-oriented soap operas and drama shows
* Curricula for care training institutions (medicine, nursing, nutrition, public, etc.)
* Training curricula/modules for care and outreach workers (coordinated with radio programs and feedback from radio shows to refine training materials)
* Training curricula/modules for students in high school and health sciences training institutes (coordinated with radio programs and feedback from radio shows to refine training materials)
* Face-to-face meetings/interventions
* Stakeholder meetings
* Folk media (using communication methods already in place, song/dance/story telling)
* Education, materials, posters, fact sheets, etc.
* Dovetailing with and leveraging other health program communications activities focused on food security, cancer prevention, vaccination, pregnant/lactating women, children, people with HIV/AIDS or hepatitis, etc.

****

**ENVIRONMENT**

Climate has a direct causal impact on crop growth and health. Strains of *Aspergillus flavus* are common between the latitudes of 40˚ North and 40˚ South worldwide, which includes all of the EAC region. Crop contamination occurs at temperatures between 24˚C and 35˚C with 7–10 percent relative humidity.[[40]](#endnote-58) Both dry and warm humid climates are affected, where the combination of heat and wetness facilitate fungal growth. Drought and extreme climates add stress to plants, undermining their health and vitality. This leaves them more susceptible to damage from pests and disease, which facilitates aflatoxin contamination. Crops are affected differently by climate conditions. For example, drought is a major factor in the contamination of corn and peanut crops, while rain and increased humidity correlate with contamination in cotton.

Crops and varieties that are more resistant to environmental stressors are less likely to be contaminated by the *Aspergillus flavus* fungus. Breeders have spent decades trying to develop aflatoxin-resistant crop varieties, but with little success. IITA has identified several maize lines with aflatoxin resistance, but their grain yields are too low to make them viable options. As a result, other aflatoxin management practices need to be put in place across the food value chain to reduce aflatoxin contamination and risk.

Ideally, aflatoxin management starts with the collection of crop-specific agronomic data and regional crop surveillance information that can assess risk levels, along with the areas and crops most likely to be affected. This information can then be used to inform decisions about the timing and types of crops to be planted. Clearly, any attempts to change planting practices need interventions that will be accepted, adopted, and maintained by smallholder farmers. As noted previously, the use of biocontrols is an effective way to mitigate aflatoxin contamination at its point of origin in farmers’ fields, and good pre- and post-harvest agricultural practices are important for limiting exposure along the food value chain.

However, until methods for eliminating aflatoxin exposure in food crops and animal feed are widely put into use, there remains a critical issue of what to do with contaminated crops or processed products, including detoxification, alternative uses, and proper disposal. The very idea of destroying food crops, even contaminated ones, meets great resistance in regions where food can be scarce and provides both needed sustenance and income. It should be a solution of last resort.

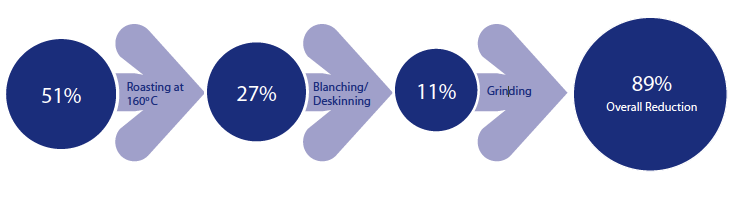
Safe alternatives to disposal involve chemical and physical processing to reduce aflatoxin levels. For example, the use of ammonia, urea, and calcium hydroxide (nixtamalization), can lower aflatoxin levels in maize and cottonseed by 50–99 percent. Physical processes, such as sorting, fractionation (wet and dry milling), and floatation, also reduce contamination by similar percentages, as can industrial processing (see **Exhibit X** below). The blending of contaminated products with uncontaminated ones is used for animal feed in some countries, but it is forbidden in many countries, including several EAC members.

All of the EAC countries consider aflatoxin-contaminated commodities destined for disposal to fit in the category of toxic waste. As a result, they require appropriate neutralization or detoxification prior to their disposal. Unfortunately, many of the processes that are used, such as milling and plowing products back into the field, putting them out to sea, burying them, or incineration, violate environmental statutes. Moreover, products designated as unfit for human or animal consumption frequently find their way back into informal markets to be sold as food or feed.

**Prevention through processing**

While processing procedures cannot completely eliminate aflatoxin exposure, certain processing methods can significantly decrease aflatoxin levels in end products. For example, in the production of peanut butter, each stage of processing from groundnut to finished product helps to diminish aflatoxin contamination levels, as illustrated below.[[41]](#endnote-59)

**Exhibit 7: Diminishing Levels of Contamination through Peanut Processing**



**Objectives driving communications activities**

Long term:

* To have an enabling environment for alternative uses to maximize food security
* To have fully functional disposal systems for contaminated commodities
* To find safe alternative uses for aflatoxin-contaminated products

Medium term:

* To identify and designate high-risk hot spots, identifying alternative land uses
* To initiate quick-response systems for aflatoxicosis outbreaks
* Connecting global climate change and aflatoxin control

Short term:

* To discourage the reintegration of contaminated commodities into the food chain
* To integrate seasonal risk mapping and early warning systems to predict high-risk zones for aflatoxicosis outbreaks into food security forecasting models, such as FEWSNET and the FAO Early Warning Systems. This can then be used to initiate quick-response mechanisms to reduce the consumption of dangerously high levels of aflatoxin, especially those associated with on-farm consumption

**Key stakeholders**

|  |  |
| --- | --- |
| **Regional/National-Level Stakeholders** | **Community-Level Stakeholders** |
| * EAC * Ministry of the Environment * Ministry of Lands, Water, Irrigation, etc. * Environmental regulators * Early warning partners (e.g., FEWSNET, FAO Early Warning System) * International environmental organizations * International/regional environmental programs * Universities and academic programs * Private partners/innovators working on improved technologies, practices, and systems to improve land use/management and reduce contamination * Climate change experts * National and international media | * Irrigation and land management services * Farmer cooperatives and committees * Community-level associations, committees, facilitators * Extension services * Trusted influencers (e.g., religious and other local leaders) * Schools, student groups * Community-mapping initiatives * Local media * Consumers   Special populations:   * People living in high-risk hot spots |

**Positive behaviors that can mitigate aflatoxin risks/impacts**

* Zoning of ecological systems in which the growth of the fungus is favored
* Adaptation of early warning systems so that they can be applied to help warn of aflatoxin and aflatoxicosis risks or events
* Use of biocontrol – application of AflaSafeTM to control toxic strains during production
* Efforts to promote soil (e.g., mulching, interplanting, or rotation of crops, which promote soil nutrition and decrease erosion)
* Good land and water management
* Crop rotation between those such as maize and groundnuts that are most susceptible to aflatoxin contamination with less susceptible crops
* Adoption of integrated pest management practices
* Planting with drought- and pest-resistant crops and crop varieties
* Application of alternative uses for contaminated crops, depending on levels (e.g., animal feed (low levels/mixtures), ethanol production)
* Proper disposal measures following EAC protocols, including neutralization and/or detoxification prior to disposal

**Policy recommendations**

**Alternative uses and disposal systems for aflatoxin-contaminated commodities:**

1. Develop and adopt a harmonized policy framework for alternative uses and disposal systems for the EAC, with this framework further reflected at the national level with individual partner states.
2. Consider a “cascading utilization” policy that would legally permit use of material unfit for one category of consumers to be used in another category of agricultural activity.
3. Promote modern decontamination processes, such as the use of alkalis.
4. Revise the permissible aflatoxin limits for livestock based on recent science regarding animal and productivity outcomes, and transmission rates into other products.
5. Establish regulatory harmonization guidelines and standards for alternative uses and disposal systems for key commodities of economic and food security importance.
6. Address differences between the formal and informal trade and agriculture sectors, which influence the effectiveness, socio-cultural, and economic viability of proposed alternative use and disposal systems.
7. Consider to the fullest extent possible the regional, national, community, and household food security needs of the EAC in the context of alternative use and disposal systems.

**Channels of communication**

* National media, local-language media (talk shows, call-in shows)
* “Edutainment”: Popular issue-oriented soap operas and drama shows
* Schools
* Farmer field schools
* SMS systems for early warnings and alerts
* Curricula and trainings for environmental engineers as well as students in high school and environmental sciences training institutes (training coordinated with radio programs and feedback from radio shows to refine training materials)
* Face-to-face/stakeholder meetings
* Folk media (using communication methods already in place, song/dance/story telling)
* Leveraging of and linking to other programs, particularly targeting sustainable development, land/water resource management, proper handling/disposal of contaminants, etc.



**TRADE**

*Aflatoxin-safe certified dog food is available in the EAC, whereas a similar certification of safety for infant cereals does not exist. This serves as a stark reminder of the need for empowering consumers to drive increased demand and thus motivate farmers and traders to respond with a safer supply.[[42]](#endnote-60)*

In the 1960s, Sub-Saharan Africa controlled 90 percent of the international groundnut market, valued in today’s money at US$220 million annually. Although the market has since rocketed to $1.2 billion, African shares have plummeted to just 5 percent.[[43]](#endnote-61) A key factor in this substantial decline in earnings has been the strict food import regulations on safe levels of aflatoxins imposed by highly regulated Western markets.

The World Bank estimates that the EU’s tightening of the Maximum Allowable Levels (MALs) of aflatoxins to four parts per billion has cost Sub-Saharan African countries $670 million in annual export losses of cereals, dried fruits, and nuts.[[44]](#endnote-62) Underinvestment in infrastructure and systems, coupled with a lack of incentives and information, has made it difficult for smallholders in Africa to respond to the market demands for better aflatoxin controls. China, Argentina, and the United States have emerged as global leaders by continuously investing and improving aflatoxin management practices.

Different legislations, codes, and standards are a major source of trade conflict, and harmonized standards (such as the *Codex Alimentarius*), have been shown to increase trade. However, where countries have different priorities, or different capacity to enforce regulations, it may not be possible or useful to move too quickly to harmonize regulations.

In East Africa, most farmers are smallholders; many farmers mix their own feeds or buy from small mills. Organic farmers and fair trade value chains may also need special consideration.

In Africa, food safety is often the responsibility of multiple agencies and departments. It is important to align and coordinate food safety legislation across sectors.[[45]](#endnote-63)

The EAC has set 10 µg/kg as the maximum permitted amount of aflatoxin in both foods and feeds. Two partner states, Burundi and Tanzania, have lowered the limit to 5 µg/kg for some food stuffs. These maximal limits align the region with international bodies, such as the Codex Alimentarius Commission.

The existence of MLs for aflatoxins in foods cannot be effective in the absence of effective and efficient compliance by the private sector, coupled with enforcement by governments. Whereas developed countries have very effective food control systems, such as the U.S. Food and Drug Administration—which regulates across both the public and private sectors—developing countries have very weak enforcement by regulatory agencies and largely uncontrolled food marketing and processing systems. This situation is exacerbated by high on-farm household consumption of food products, informal trading systems, and the threat of significant economic losses throughout the value chain, which could result from enforcement of standards. In rare cases when potentially contaminated commodities are scrutinized, the lack of quality control standardized testing protocols and sparse availability of laboratory facilities is a further hindrance. When contaminated commodities are rejected, they are often reintroduced into the marketplace for low-income consumers. Currently, the onus falls mainly on large-scale commercial exporters for global markets to ensure compliance with the importing countries’ requirements or risk significant financial losses.

With regard to animal feeds, most monitoring of aflatoxins is carried out by the private sector, while the public sector oversees the process. However, for small feed mills and small-scale farmers, the cost and complexity of monitoring aflatoxins is prohibitive.

In East Africa, most livestock is kept by smallholder farmers. They either produce their own livestock feed or purchase it from small, local mills. Likewise, the majority of livestock products are sold through the informal sector. Commercial farmers and large-scale millers provide only a small portion of livestock feed and products. They mostly operate under-capacity and will require “infant industry” government support to enable them to support the rapid intensification of livestock industries predicted to occur over the next decades.

**Objectives driving communications activities**

Long term – Formal Trade (Regional/International):

* To have aflatoxin-safe food and feed meet regional and international standards
* To boost East African regional and international trade
* To facilitate an effective and efficient regulatory environment

Long term – Informal Trade

* To have a specialized regulatory protocol that ensures contaminated products are not returned into the informal sector
* To provide informal traders with tools and knowledge to disaggregate products for consumption, alternative use, or disposal

Mid term – Formal Sector (International and Regional):

* To increase border inspection staff and capacity
* Standardized testing protocols
* Application of logos on aflatoxin-safe products

Mid term – Informal Sector

* Improved knowledge, attitude, and skills to comply with good practices for food safety

Short term – Formal Sector (International and Regional):

* To ensure low-cost test kits are readily available

Short term – Informal Sector:

* To ensure low-cost test kits are readily available

**Key stakeholders**

|  |  |
| --- | --- |
| **Regional/National-Level Stakeholders** | **Community-Level Stakeholders** |
| * EAC * Other regional associations (AU, COMESA, SADC) * Ministries of Trade, Economics, Development * Bureau of Standards (and relevant regulatory bodies within other Ministries of Health * Relevant regulatory bodies (e.g., within other ministries, Food and Drugs Authority) * Border patrol * World Food Programme and other food relief/development programs * International/national agricultural research institutes/programs, universities, and other academic institutions * Marketers/exporters/importers * Commodity boards * Supermarket chains * National and international media | * Local government – key agency with regard to enforcement through inspections because they license businesses * Development Authority, Fisheries, and other local enforcement agencies * Farmer cooperatives and committees * Community-level associations, committees, facilitators * Local production value chains * Local business and trade bureaus/chambers * Local media * Consumers |

**Positive behaviors that can mitigate aflatoxin risks/impacts**

* Increased use of testing in the informal market (with access to affordable, easy-to-use testing technology)
* Increased testing in the formal market
* Promotion of decontamination processes for both food and feed
* Implementation of policies that would legally permit use of aflatoxin-contaminated products unfit for human consumption to be processed to safe standards for use as animal feed
* Application of standards for aflatoxin limits according to food stuffs, products, and intended use
* Increased monitoring and enforcement of import/export standards
* Logos identifying aflatoxin-safe products
* Creating large-scale demand for aflatoxin-safe products (WFP Purchase 4 Progress)
* Creation of codes/guidelines appropriate for farmers, small-scale millers and processors, and small-scale feed manufacturers

**How High-Profile Partners Can Greatly Enhance Awareness and the Adoption of Positive Changes Regarding Aflatoxin Control**

The WFP—a United Nations humanitarian organization involved in emergency response, food relief, and food security—has developed a presence in local markets that provides a platform for raising awareness about aflatoxin and food quality. WFP’s Purchasing for Progress Programme buys maize from small-scale farmers offering fair prices to boost their incomes and livelihoods. Although WFP tries to purchase its grain supply locally, it also relies on commercial farmers and traders, who can supply the large quantities needed. Before any purchase, WFP uses independent inspection services to test that aflatoxin levels do not exceed 20 ppb.

In 2010, WFP rejected two sets of Kenyan and Indian maize consignments, finding levels of aflatoxin reaching up to 110 ppb. Following these findings, WFP introduced a Standard Operating Procedure for sampling and testing of maize grain at the farm gate. Adherence to program standards ensures that farmers enforce safety regulations while giving them access to a high-paying market for their products. Spillover effects include stronger links with local inspection authorities to influence policy design and execution as well as a shift from end-product testing to preventive measures not only for aflatoxin, but also regarding more general quality and safety parameters. The Programme is thus a promising partner and interface for transmitting innovative approaches and tools for the management of aflatoxin. [[46]](#endnote-64)

Sources: Kang’ethe, 2011 and Meaux et al., 2013.

**Policy recommendations**

**Aflatoxin standards for food:**

1. The EAC should continue the policy of standardization of MLs for aflatoxin in foods and animal feeds within the region.
2. The EAC should play a leadership role in standardization of methods to measure aflatoxin contamination across the tripartite and North African trade zones represented by COMESA, ECOWAS, SADC, and MENA on the continent, and seek to influence decisions, legislation, and the regulatory environment at those levels.
3. Adequate funding should be allocated to appropriate regional and national research institutions to assemble and analyze regional-specific data for the setting of aflatoxin MLs and other key food and feed regulations at national, regional, and international levels.
4. Partner states and the EAC should support and participate in international standards-setting bodies to ensure that the unique conditions of aflatoxin contamination and abatement in the EAC are transparently considered and addressed.
5. Regionally harmonized standards should be newly reviewed for the EAC based on current assessments that accurately reflect risks now known regarding the East Africa regional food supply contamination levels, dietary consumption patterns, status, and demographics.
6. These updated standards should include a subset for vulnerable populations who are more adversely impacted by aflatoxins, such as infants, and persons suffering from suppressed immune systems or co-infections from HIV/AIDS.
7. Affordable and appropriate technologies and testing protocols for monitoring and compliance systems to track aflatoxin in the food chain, from “field to fork,” need to be available and economically accessible to all stakeholders at the community, county, and national and regional levels.
8. The EAC and COMESA should support policies, which place the burden of proof for compliance with ML standards on the private-sector traders, processors, producers, wholesaler, and retailers, with partner state government agencies serving in a regulatory and oversight role.
9. Centers of Excellence for aflatoxin testing in humans and in foods should be identified or established in the East Africa region to ensure that adequate and accurate evidence and information for risk assessment and decision making is available and timely.
10. The EAC and COMESA, working with the private sector, and ministries of health, trade and agriculture, and bureaus of standards across the region, should harmonize procedures for enforcing MLs, sampling and testing protocols, and institute a uniform surveillance system. This should include an early warning and alert system based on weather and production patterns as well as an M&E component.

**Aflatoxin standards for feed:**

1. The primary consideration in formulating feed standards should be to safeguard human health. Standards should also provide consumer protection and support animal welfare and production; but in this case, the regulatory burden should be taken into account. Codification, recasting, and review clauses are recommended as ways to reduce regulatory burdens. Self-regulation and co-regulation can be considered as simpler alternatives to detailed rules.
2. Feed standards should comply with Codex Alimentarius standards, codes, guidelines, and recommendations. Harmonized regional standards should be adopted.
3. Risk analysis should be used in setting standards whose primary objective is to reduce the risk to human health in animal source foods. Where risk to human health is negligible, cost-benefit analysis, distributional effects evaluation, and regulatory impact assessments should be used to provide information on the benefits and costs of regulation.
4. Given the economic importance of milk to small farmers, and the prominence of milk in the diets of young children as a key source of protein, vitamins, and minerals, standards for feed for dairy cattle should be rigorously assessed and calibrated based on these factors.
5. Aflatoxin standards for feeds and feed materials should be based on tolerable ranges plus a margin of safety. Generally, tolerable ranges are: ≤50 ppb in young poultry, ≤100 ppb in adult poultry, ≤50 ppb in weaner pigs, ≤200 ppb in finishing pigs, <100 ppb in calves, <300 ppb in cattle, and <100 ppb in Nile tilapia. The current high levels of aflatoxins, tropical context, desirability of having an alternative use for contaminated foods, and implications for food security and livelihoods would support feed standards that are less rather than more strict. Protocols for sampling feed and feed ingredients should be developed and harmonized.
6. Countries should explore the modalities of approving safe and suitable AMAs for animal and fish feeds.
7. Feeding contaminated cereals and feeds to animals and fish may be an acceptable use that reduces risk to public health. Where blending of contaminated materials can be done accurately and safely, it should be considered as an alternative use. Feeds and feed materials more contaminated than domestic standards allow should not be imported or exported. Ammoniation and wet processing are safe and effective ways to decontaminate cereals intended for livestock and fish feeds. It should be considered as an alternative use where the resources for establishing and maintaining the necessary infrastructure are available.
8. Standard protocols should be developed and followed for sampling and testing feeds and feed ingredients for aflatoxins. Within laboratories, quality assurance systems need to be developed and monitored. In countries and regions, there should be a reference system whereby laboratories are accredited and ring tests are performed in EAC partner states.
9. Continue research and data collection and analyses. More information on the aflatoxin contamination levels in animal and fish feeds and milk and milk products across the EAC partner states, as well as strategies for aflatoxin abatement are required to inform policy and standards development.
10. EAC partner states at the national and regional level should work together to revise the existing animal feed standards to include aflatoxin analysis and permissible limits for animal and fish feeds and feed ingredients.
11. National government should separate their standards-setting agencies from their enforcement and compliance entities.
12. Regional, national, county, and community organizations should work together to create awareness of the benefits of aflatoxin contamination standards for farmers, industry, consumers, and other stakeholders.
13. A national structure of testing laboratories and a cadre of technically qualified personnel to monitor and test for aflatoxin contamination of human and animal food stuffs should be created within each partner state.
14. Other measures should be taken regionally and nationally to ensure that industry and the private sector share the burden of compliance with appropriate aflatoxin standards for animal and fish feed and products.
15. Programs and interventions to adequately address aflatoxin in feed and animal products consumed on-farm and/or sold through informal trade should be designed and implemented.
16. National and international codes and guidelines exist for feed manufacture. Regional guidelines should be based on these but adapted to the regional circumstances. Commercial feed manufacturers and large farmers should comply with these guidelines, but additional instruments are needed for small-scale farmers and feed producers.

**General recommendations:**

1. Standards for countries with similar conditions should be harmonized.
2. Standards for countries who wish to trade should be harmonized.
3. Standards should specify the species, age, and purpose of the animals to which they apply.
4. Standards should specify the type of feed to which the standard applies.
5. Standards should be based on the levels generally tolerated plus a margin of safety.
6. Standards should take into account the needs of stakeholders, especially smallholder farmers.

**Channels of communication**

* Trade and economics summits and meetings
* International trade and regulation bodies
* International organization and program (e.g., WFP) media (blogs, web features, newsletters, etc.)
* Regional/national regulation bodies, trade associations, business communities
* Business media
* Trade publications/media
* Other media partners covering trade, public policy, and African economic development

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# APPENDIX A: POLICY RECOMMENDATIONS FROM THE TECHNICAL PAPERS

MODULE I: HUMAN HEALTH

**Aflatoxin and Human Health: Knowledge Platform and Situational Analysis**

1. The EAC will develop and implement a 5-year multisectoral communications strategy on aflatoxin issues in the areas of human health, animal health, agriculture, trade, and environment. This will strengthen the knowledge base and increase awareness at all levels of stakeholders, especially among key decision makers. Human health—the most affected—and agriculture—the most likely to provide solutions—will be considered as priority sectors.
2. The EAC will assume a leadership role in the development and coordination of regional policies and programs critical to aflatoxin abatement activities of regional importance. This may begin with the design of a 5-year road map developed in conjunction with member states, donor partners, and regional and global experts.
3. The EAC member states will establish cancer registries and other relevant epidemiological surveillance systems to monitor the impact of chronic consumption of foods exceeding allowable standards, and acute aflatoxicosis on human health. If such registries exist, the member states will strengthen and expand their focus to adequately address health outcomes associated with aflatoxin.
4. The EAC member states will collaborate with the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund for Malaria, Tuberculosis and AIDS, One Health initiatives, relevant ministries and institutions, donor organizations, and nongovernmental organizations (NGOs) to design and implement aflatoxin risk reduction dietary protocols for immunosuppressed individuals and other vulnerable groups.
5. The EAC member states will develop a comprehensive curriculum on the science, etiology, diagnosis, and management of aflatoxin and aflatoxicosis. The curriculum will be implemented for school health promotion programs, community health workers, undergraduate and post-graduate university medical sciences, and schools of midwifery, nursing, nutrition, and public health.
6. The EAC member states will give special attention to vaccination campaigns that dovetail with aflatoxin control health efforts. Based on the assumption of inordinately high risk among the general population across the East Africa region, hepatitis A and B vaccination protocols currently approved for infants and young children will receive special emphasis to ensure their rigorous adherence. In addition, adolescent and adult immunization campaigns will be launched in conjunction with supporting communications messaging programs. Hepatitis C virus (HCV) screening should be strengthened, as this is a vulnerable group.
7. EAC member states will encourage a rigorous public health nutrition program to encourage and guide dietary diversity for the purpose of reducing the risks of aflatoxin ingestion without compromising sound nutritional practices, including review. This should be done in tandem with review and of staple food enrichment and fortification protocols to take into consideration the risk of inadvertently increasing aflatoxin ingestion among the general population.
8. EAC member states will intensify monitoring systems for food products that are susceptible to high levels of aflatoxin contamination, such as peanut butter and ugali.
9. EAC member states will integrate seasonal risk mapping and early warning systems to predict high-risk zones for aflatoxicosis outbreaks into food security forecasting models, such as Famine Early Warning Systems Network (FEWSNET) and the FAO Early Warning Systems. This can then be used to initiate quick-response mechanisms to reduce the consumption of dangerously high levels of aflatoxin, especially those associated with on-farm consumption.
10. EAC member states, in the development of all policies, programs, regulations, and practices, should be cognizant of and responsive to differences in aflatoxin abatement approaches required for on-farm consumption vs. commercial products, formal and informal trading systems, and the larger context of food insecurity across the region.

**Aflatoxin and Hepatitis A & B: Knowledge Platform and Situational Analysis**

1. Currently, 20 percent of children and adolescents ages 0–15 years, who should have been immunized for hepatitis B under a current Ministry of Health (MOH)-approved immunization protocol, have not been vaccinated. We recommend a clinic-based effort to reach this group.
2. All persons in the age groups of 16 years and beyond fell outside of the revised hepatitis B immunization programs for the region. For this subpopulation, we also recommend an adult immunization catch-up campaign against the hepatitis B virus.
3. In accordance with new World Health Organization (WHO) recommendations, the hepatitis B “birth dose” should be adopted as part of the routine immunization program.
4. Given the high percentage of births occurring outside of the clinical setting across the East Africa region, special programs should be designed and implemented to reach these infants with the hepatitis B birth dose.
5. EAC partner states should coordinate with GAVI Alliance (GAVI) to hasten discussions on supply, logistics, and costs associated with the introduction of the hepatitis B birth dose, vaccination of the 20 percent of 0–15 year olds missed, and the fully unvaccinated adults.
6. Operational and logistical aspects of hepatitis B virus (HBV) and hepatitis A virus (HAV) immunization activities need to be carefully planned and implemented to ensure quality, especially for the cold chain supply. This would include health workforce strengthening.
7. Partner states should proceed to establish dialogue for human and financial resources, and programmatic and technical support to launch the hepatitis A vaccination initiatives through UNICEF and GAVI, in tandem with establishing their own national strategy and policy for HAV.
8. Inclusion and full coverage for the hepatitis A and B immunization campaigns, and establishment of routine vaccination protocols should be included in the EAC’s “Zero Policy Draft for an Aflatoxin-Safe EAC.”
9. Social marketing for the proposed catch-up campaigns should also be a key component of the EAC’s Five-Year Communications Strategy for an Aflatoxin-Safe East Africa Region.
10. Regional and national cancer registries should be strengthened to more accurately capture the actual incidence and prevalence of hepatocellular carcinoma (HCC).
11. Partner states and the EAC should seek funding for further research to better understand the relationships between the consumption of aflatoxin-contaminated commodities in the region and its impact on the incidence of HCC, and interactions with the HAV, HBV, and hepatitis C (HCV) viruses.
12. Information on aflatoxin, liver disease, preventive care, and diagnostics should be integrated into the curricula of medical and nursing schools, schools of public health, and training programs for community nutritionists and other health workers throughout the region.

**Aflatoxin and the 1,000 Days: Knowledge Platform and Situational Analysis**

1. Encourage longer exclusive breastfeeding, which is more beneficial for infant health and will result in lower levels of aflatoxin exposure in comparison to early introduction of complementary foods.
2. Due to the urgency of ameliorating the negative impacts of aflatoxin within the 1,000 days, priority should be given to actions that will affect modifications to dietary patterns; the rigorous enforcement of standards for foods, specifically for infants and young children; and other interventions to promote aflatoxin abatement measures at the community and household level.
3. Collaborate with the Scaling Up Nutrition (SUN) and Millennium Development Goals (MDG) policy and program leaders to design and integrate food safety goals and objectives that include aflatoxin abatement measures for the 1,000 days’ population, both mothers and children.
4. Work with national governments and the EAC to include aflatoxin control activities in SUN, MDG, and other food security and nutrition policies and programs for the 1,000 days’ population.
5. Continue to promote exclusive breastfeeding for the first 6 months of life to minimize and delay the premature introduction of harmful and higher levels of aflatoxin found in complementary foods.
6. Design and implement beneficiary-specific nutrition education modules for reduced aflatoxin ingestion during the 1,000-day period by working with ministries of health, particularly to reach midwives, trained birth attendants, community health aids, nurses, nutritionists, and doctors who are primary caregivers for pregnant and lactating women and their young children.
7. Conduct national reviews of the current dietary recommendations and nutrition programs recommendations that may be inadvertently advocating the consumption of aflatoxin-prone foods.
8. Through the EAC 5-year communications strategy, promote dietary diversity for pregnant and lactating women as an affordable and rapid-response mechanism to reduce the transmission of aflatoxin to infants and unborn children.
9. Advocate for research to better quantify the impacts of aflatoxin on morbidity and mortality outcomes during the 1,000 days, especially stunting and pediatric AIDS.
10. Facilitate coordination between the One Health Initiative, ministries of health and ministries of trade and industry, private-sector food processors and importers, and regional economic organizations to ensure that the regulatory environment and standards for food and feed adequately address the special needs of the 1,000 days’ population and other vulnerable groups.

MODULE II: ANIMAL HEALTH

**Impact of Aflatoxins on Animal Health and Productivity: Knowledge Platform and Situational Analysis**

1. Demand for animal source foods in the EAC will continue to rise as the urban base widens and income grows, expanding the middle class population. To use livestock as a ladder to increase rural incomes and sustain livelihoods, a comprehensive set of policies and programs to address development of forages, pasture, and specific cereal crops for animal feeds should be pursued within the East Africa region. These should address the threat of aflatoxin.
2. Given the economic and nutritional importance of animal products for the partner states of the EAC, legislation, policies, regulations, and practices to develop an aflatoxin-safe feed supply should be given priority.
3. Countries need to reevaluate the livestock and fish subsectors of the Gross Domestic Product (GDP), which are grossly undervalued, to equitably budget funds for long-term development in proportion to their contribution now and in the future.
4. The EAC partner states should collaborate to undertake a detailed study covering all the agro-ecological zones, livestock, and fish production systems, as well as seasonal factors to determine the magnitude of the aflatoxin problem in animal and fish feeds, animal products, and milk.
5. Based on the findings of this study, an action plan to address constraints and formulate solutions should be designed and implemented.
6. The majority of the stakeholders have a very low awareness of the sources and effects of aflatoxin contamination, and of the tools available to mitigate aflatoxin contamination in animal and fish feeds, animal products, and milk. Creation of awareness along the industry value chains is a prerequisite to a harmonized standard for the control of aflatoxin. This initiative should be launched through the “Five-Year Communications Strategy for an Aflatoxin-Safe East African Community” in January 2015.
7. Toxin binders are widely used in all the EAC partner states. Studies should be done to study their efficacy in the EAC context and to decide whether or not to legalize or prohibit their use based on sound scientific evidence.
8. Livestock development strategies (Livestock Sector Development Program 2011 Tanzania; Draft Livestock Policy 2008 Kenya) and the Common Africa Agricultural Development Programs (CAADP) do not address the problem of aflatoxin. It is necessary to expedite the development of a multisectoral package of policies for the EAC states to guide aflatoxin management, affording due consideration to the importance of a safe and nutritious food and feed supply to ensure human and animal health, and sustainable economic growth across the East Africa region.

MODULE III: AFLATOXIN STANDARDS FOR FOOD and FEED

**Aflatoxin Standards for Food: Knowledge Platform and Situational Analysis**

1. The EAC should continue the policy of standardization of maximum levels (MLs) for aflatoxin in foods and animal feeds within the region.
2. The EAC should play a leadership role in standardization of methods to measure aflatoxin contamination across the tripartite and North African trade zones represented by the Common Market for Eastern and Southern Africa (COMESA), Economic Community Of West African States (ECOWAS), Southern African Development Community (SADC), and Middle East and North Africa (MENA) on the continent, and seek to influence decisions, legislation, and the regulatory environment at those levels.
3. Adequate funding should be allocated to appropriate regional and national research institutions to assemble and analyze regional-specific data for the setting of aflatoxin MLs and other key food and feed regulations at national, regional, and international levels.
4. Partner states and the EAC should support and participate in international standards-setting bodies to ensure that the unique conditions of aflatoxin contamination and abatement in the EAC are transparently considered and addressed.
5. Regionally harmonized standards should be newly reviewed for the EAC based on current assessments that accurately reflect risks now known regarding the East Africa regional food supply contamination levels, dietary consumption patterns, health status, and demographics.
6. These updated standards should include a subset for vulnerable populations who are more adversely impacted by aflatoxins, such as infants, and persons suffering from suppressed immune systems or co-infections from HIV/AIDS.
7. Affordable and appropriate technologies and testing protocols for monitoring and compliance systems to track aflatoxin in the food chain, from “field to fork,” need to be available and economically accessible to all stakeholders at the community, county, and national and regional levels.
8. The EAC and COMESA should support policies, which place the burden of proof for compliance with ML standards on the private-sector traders, processors, producers, wholesaler, and retailers, with partner state government agencies serving in a regulatory and oversight role.
9. Centers of excellence for aflatoxin testing in humans and in foods should be identified or established in the East Africa region to ensure that adequate and accurate evidence and information for risk assessment and decision making is available and timely.
10. The EAC and COMESA, working with the private sector, and ministries of health, trade and agriculture, and bureaus of standards across the region, should harmonize procedures for enforcing ML levels, sampling and testing protocols, and institute a uniform surveillance system. This should include an including early warning and alert system based on weather and production patterns as well as a monitoring and evaluation (M&E) component.

**Aflatoxin Standards for Feed – Knowledge Platform**

Specific recommendations:

1. The primary consideration in formulating feed standards should be to safeguard human health. Standards should also provide consumer protection and support animal welfare and production; however, in this case, the regulatory burden should be taken into account. Codification, recasting, and review clauses are recommended as ways to reduce regulatory burdens. Self-regulation and co-regulation can be considered as simpler alternatives to detailed rules.
2. Feed standards should comply with Codex Alimentarius standards, codes, guidelines, and recommendations. Harmonized regional standards should be adopted.
3. Risk analysis should be used in setting standards whose primary objective is to reduce the risk to human health in animal source foods. Where risk to human health is negligible, cost benefit analysis, distributional effects evaluation, and regulatory impact assessments should be used to provide information on the benefits and costs of regulation.
4. Given the economic importance of milk to small farmers, and the prominence of milk in the diets of young children as a key source of protein, vitamins, and minerals, standards for feed for dairy cattle should be rigorously assessed and calibrated based on these factors.
5. Aflatoxin standards for feeds and feed materials should be based on tolerable ranges plus a margin of safety. Generally, tolerable ranges are: ≤50 parts per billion (ppb) in young poultry, ≤100 ppb in adult poultry, ≤50 ppb in weaner pigs, ≤200 ppb in finishing pigs, <100 ppb in calves, <300 ppb in cattle, and <100 ppb in Nile tilapia. The current high levels of aflatoxins, tropical context, desirability of having an alternative use for contaminated foods, and implications for food security and livelihoods would support feed standards that are less, rather than more, strict. Protocols for sampling feed and feed ingredients should be developed and harmonized.
6. Countries should explore the modalities of approving safe and suitable anti-mycotoxin additives (AMAs) for animal and fish feeds.
7. Feeding contaminated cereals and feeds to animals and fish may be an acceptable use that reduces risk to public health. Where blending of contaminated materials can be done accurately and safely, it should be considered as an alternative use. Feeds and feed materials more contaminated than domestic standards allow should not be imported or exported. Ammonization and wet processing are safe and effective ways to decontaminate cereals intended for livestock and fish feeds. It should be considered as an alternative use where the resources for establishing and maintaining the necessary infrastructure are available.
8. Standard protocols should be developed and followed for sampling and testing feeds and feed ingredients for aflatoxins. Within laboratories, quality assurance systems need to be developed and monitored. In countries and regions, there should be a reference system whereby laboratories are accredited and ring tests are performed in EAC partner states.

General recommendations:

1. Standards for countries with similar conditions should be harmonized.
2. Standards for countries that wish to trade should be harmonized.
3. Standards should specify the species, age, and purpose of the animals to which they apply.
4. Standards should specify the type of feed to which the standard applies.
5. Standards should be based on the levels generally tolerated plus a margin of safety.
6. Standards should take into account the needs of stakeholders, especially small-holder farmers.
7. Regulators should focus on improving processes through good agricultural practices (GAPs) and good manufacturing practices (GMPs).

**Aflatoxin Standards for Feed: Situational Analysis**

1. Continue research and data collection and analyses. More information on the aflatoxin contamination levels in animal and fish feeds as well as milk and milk products across the EAC partner states, and the strategies for aflatoxin abatement are required to inform policy and standards development.
2. EAC partner states at the national and regional level should work together to revise the existing animal feed standards to include aflatoxin analysis and permissible limits for animal and fish feeds and feed ingredients.
3. National government should separate their standards-setting agencies from their enforcement and compliance entities.
4. Regional, national, county, and community organizations should work together to create awareness of the benefits of aflatoxin contamination standards for farmers, industry, consumers, and other stakeholders.
5. A national structure of testing laboratories and a cadre of technically qualified personnel to monitor and test for aflatoxin contamination of human and animal food stuffs should be created within each partner state.
6. Other measures should be taken regionally and nationally to ensure that industry and the private sector share the burden of compliance with appropriate aflatoxin standards for animal and fish feed and products.
7. Programs and interventions to adequately address aflatoxin in feed and animal products consumed on-farm and/or sold through informal trade should be designed and implemented.

MODULE IV: GOOD AGRICULTURAL PRACTICES

**Biocontrol for Aflatoxin: Knowledge Base and Situational Analysis**

1. Biocontrol for aflatoxin abatement activities should be adopted by the EAC and partner states as a key component of the agriculture plan within the 5-year strategy to achieve an aflatoxin-safe East Africa region.
2. The EAC’s Five-Year Communications Strategy should include a comprehensive biocontrol component that will reach all stakeholders along the value chain: consumers, government, and regional trade and regulatory bodies, and legislators. This communications initiative will be both a prerequisite for country-specific pilots and an expanding network for the scale-up of biocontrol technologies.
3. The EAC, COMESA, and partner state ministries of agriculture, trade and industry, and other relevant regulatory agencies, should work together to fast track and facilitate the regionally harmonized registration of biocontrol products for the East Africa region.
4. Business models for the distribution of biocontrol products—to farmers at all income levels, especially those living below the poverty line—should be designed, implemented, and evaluated within each of the EAC partner states. The models should be country specific and include a scale-up strategy.
5. International donor agencies, such as the World Food Program (WFP) and United States Agency for International Development’s (USAID) Food for Peace (FFP), working consistently in agriculture-linked emergency relief and development, school feeding, contract farming, and/or local commodity purchases, should be encouraged and supported to include biocontrol products and extension support services for their use.
6. The FEWSNET and Food and Agricultural Organization (FAO) Early Warning Systems should be adapted to include variables that signal the need for biocontrol application in specific and/or new areas in response to drought, insect infestation, and for the longer term, global climate change.
7. As a necessary element of a comprehensive aflatoxin control initiative, and especially for successful biocontrol programs, an inventory and analysis of test kits to be used along critical points of the production cycle and the value chain should be conducted.
8. Regional and national manufacturing capabilities for biocontrol products should be incorporated into the biocontrol strategic framework.
9. Centers of Excellence should be established throughout the East Africa region to ensure the highest quality of research, development, product assurance, scale-up, and sustainability for biocontrol.

**Aflatoxin and Post-Harvest Losses (PHL): Knowledge Base and Situational Analysis**

1. In the interest of regional food security and the public health, give immediate attention and prioritized resource allocation to addressing PHL for the aflatoxin-prone staple food crops.
2. Give the greatest urgency to maize, groundnuts, and milk, but also devote adequate attention to sorghum, sweet potato, and pulses wherever they are widely grown, consumed, and/or traded.
3. Within the priority commodity systems, take a comprehensive approach that begins with GAPs, extends through good handling practices (GHPs), and continues along the value chain through GMPs.
4. For post-harvest management, broadly defined, focus interventions on locally adapted and validated best practices for harvesting, drying, sorting, and storing to reduce PHL.
5. To guide policy and program development for post-harvest interventions at the household, farm, marketing, and processing levels, undertake further qualitative and quantitative analyses on key crops and best practices for aflatoxin abatement.
6. Ensure the EAC plays a leadership role in a region-wide initiative to inform farmers, aggregators, and traders of the breadth of issues related to aflatoxin and PHL, while also providing them with affordable options for improvement.
7. Establish monitoring, reporting, and information systems, beginning with the known aflatoxin “hotspots,” and using existing tools, such as the African Post-Harvest Losses Information System (APHLIS) and FEWSNET, to create baseline information and assess progress. Expand the breadth and depth of these systems as resources allow.
8. For prevention purposes, support and expand the use of proven biological control methods, such as AflaSafe™, but also explore others like *Trichoderma viridae* and compost-enriched with *Pseudomonas aeruginosa.*
9. Take steps to identify, describe, and address aflatoxin issues related to gender, climate change, HIV/AIDS, and other cross-cutting issues.
10. Reduce EAC and COMESA tariff schedules to increase economic access to modernized post-harvest handling, storage, and testing equipment, and encourage the rapid inflow of other aflatoxin control tools and technologies.
11. Invest in behavioral change and communications (BCC) programs that are customized by gender, language, and literacy levels to:

* Raise the level of awareness among small farmers, rural households, vulnerable groups, actors within affected value chains, and providers of technology generation and transfer services.
* Launch a national campaign to reduce aflatoxin contamination that would involve all major stakeholders in the public and private sector, civil society, and the academic community.

1. Actively support the Partnership for Aflatoxin Control in Africa (PACA) to serve as the lead knowledge platform for aflatoxin control across the region.

MODULE V: TRADE AND THE ENVIRONMENT

**Economic Impacts on Trade: Situational Analysis**

1. The full benefits of harmonized aflatoxin standards for agricultural commodities, as well as food and feed within the East Africa region, can only be realized with adequate enforcement of these standards, both at the borders and within domestic markets. Therefore, adequate human and financial resources should be focused on establishing and enforcing aflatoxin standards and other food and feed safety regulations within EAC partner states.
2. A secondary and parallel approach to regulation and enforcement is needed for the informal trade, processing, and marketing sectors. Without this, over half of domestic and cross-border trade will continue to flow unregulated. This will undermine efforts to address the detrimental public health impacts of aflatoxin for consumers and recuperate economic losses.
3. Emphasis should be placed on the design of a multi-tiered testing protocol in tandem with making affordable and reliable testing technologies logistically and economically accessible for farmers, traders, artisanal food and feed processors, customs and borders officials, government regulators, and consumers.
4. Safe and rapid disposal systems for contaminated commodities and products need to be established within the domestic value chains and at international trading points.
5. Development of a credible “aflatoxin-safe” certification will be a necessary condition to support the development of such products and as enforcement becomes efficient. This can also play a role in expediting the movement of intra-regionally traded aflatoxin-prone commodities and products by reducing times spent transiting borders.
6. Harmonization of standards across Africa will bring impetus to the overall efforts to generate awareness about aflatoxins, strengthen the legal and regulatory environment, and increase Africa’s trade shares in the global marketplace. The EAC and COMESA should play a leadership role with SADC, MENA, and ECOWAS to establish such standards. The PACA can also be used as a vehicle for this initiative.
7. Until agricultural production, processing, and markets become fully responsive to new demand for aflatoxin-safe crops and products, and aflatoxin-contaminated commodities are transparently and swiftly removed from markets, there will be an interim period of transition where there are dual markets—one for higher premium aflatoxin-safe commodities, foods and feed, and another for unsafe contaminated products. For the short- to medium-term spans during this transition period, attention should be focused on protecting poorer households and other vulnerable groups that are more likely to consume contaminated products.
8. Similarly, special programs that address the region’s high levels of on-farm consumption must be integrated into the larger trade and regulatory initiatives to ensure consumer protection.

**Alternative Uses and Disposal Systems for Aflatoxin-Contaminated Commodities: Knowledge Base and Situational Analysis**

1. Develop and adopt a harmonized policy framework for alternative uses and disposal systems for the EAC, with this framework further reflected at the national level with individual partner states.
2. Consider a “cascading utilization” policy that would legally permit use of material unfit for one category of consumers to be used in another category of agricultural activity.
3. Promote modern decontamination processes, such as the use of alkalis.
4. Revise the permissible aflatoxin limits for livestock based on recent science regarding animal health and productivity outcomes, and transmission rates into other products.
5. Establish regulatory harmonization guidelines and standards for alternative uses and disposal systems for key commodities of economic and food security importance.
6. Address differences between the formal and informal trade and agriculture sectors, which influence the effectiveness, socio-cultural, and economic viability of proposed alternative use and disposal systems.
7. Consider to the fullest extent possible the regional, national, community, and household food security needs of the EAC in the context of alternative use and disposal systems.

# APPENDIX B: BRIEF DESCRIPTION OF KEY ISSUES & RECOMMENDATIONS OF EACH TECHNICAL PAPER

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