



Aflasafe® technology transfer and commercialisation in Africa

Country status: Ghana

September 2020

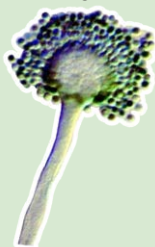
Ghana's aflatoxin challenge

Despite knowledge of aflatoxin being in Ghana's food since the mid-1960s, aflatoxin is still a public-health challenge, and awareness of its negative effects on people and livestock remains low.

Aflatoxin

is a natural **cancer-causing poison** from toxin-producing types of the *Aspergillus* fungus. Because aflatoxin **contaminates food**, the effects of aflatoxin build up in our bodies and damage our health. As well as **causing liver cancer**, aflatoxin makes us weaker against other diseases and stunts children's growth. In some cases, aflatoxin in food can be fatal.

In large amounts, aflatoxin can make us ill or kill straight away (acute aflatoxicosis). But most of the time, we eat it without noticing. It can therefore gradually **infiltrate our bodies**, with its effects building up within us (chronic aflatoxicosis). For this reason, aflatoxin can be present undercover for many years doing us long-term harm, **yet very difficult to detect**. As with all ills, the best cure is prevention.



Children under five are particularly vulnerable due to contamination of typical weaning foods. The main ingredients in weaning blends are maize, millet, wheat and groundnuts. In 2018, the University of Development Studies conducted a study of 48 branded, locally prepared cereal and cereal-legume blends, with samples taken from shops in 10 regional capital towns in Ghana. Sixty percent of the samples and 35% of the companies had aflatoxin above 20 parts per billion (ppb). Ghana's safety standard for maize and groundnuts was then 15 and 20 ppb, respectively (since revised). Tests by the International Institute of Tropical Agriculture (IITA) on maize, sorghum and groundnut harvests in 2019 from different locations across Ghana showed the at-harvest samples exceeded safety standards, averaging 25.1 ppb (maize), 28.9 ppb (sorghum); and 29.7 ppb (groundnuts).

Aflatoxin contamination causes liver cancer and child stunting. A 2014 joint malnutrition study by the United Nations Children Fund, the World Health Organization and the World Bank found 19% of Ghana's children suffered stunting.

Over the last decade, aflatoxin has slashed Ghana's maize and groundnut exports 60%.

Testing for aflatoxin is limited, only carried out on request, and largely by commercial entities supplying high-end markets, or exporters who must comply with international standards.

Aflatoxin has low prioritisation or no mention in national health and agriculture policies and programmes, including in the government's ongoing flagship initiatives *Planting for Food and Jobs* and *Rearing for Food and Jobs*. Although there are several food-safety policies, aflatoxin management requires a specific cross-sectoral approach currently lacking. And although various institutions are addressing aflatoxin, activities are fragmented and poorly coordinated.

Investments in research linking aflatoxin contamination directly to disease and fatalities have been inadequate. Without empirical evidence, the effects of aflatoxin remain undetected.

Geography	Area: 23,884,245 hectares (ha) Agroecology: Rain Forest, Deciduous Forest, Transitional Zone, Coastal Savannah and Northern Savannah (Guinea and Sudan Savannah) Neighbours: Cote d'Ivoire, Togo, Burkina Faso			
Population	25.5 million (2019 est); 44–52% engaged in farming 2010 census: rural, 49.1%; urban, 50.9%			
Agriculture and Economy				
GDP	USD 66 billion (2018), of which agriculture, forestry and fishing account for 18%			
Main crops	Maize, cassava, groundnuts, sorghum, cocoyam, yam, plantains, rice, millet, cowpeas			
Crop production and utilisation	Total arable land available for agriculture: 6.8m hectares. Agriculture is mainly rainfed, with only 3.2% under irrigation.			
		Area cultivated (million ha)	Annual production (million metric tonnes)	Annual per capita consumption (kg)
	Cassava	0.98	20.8	153
	Yams	0.47	7.8	125
	Plantains	0.39	4.7	85
	Maize	1	2.3	45
	Cocoyams	0.20	1.5	40
	Rice	0.26	0.8 (paddy) 0.5 (milled)	32
	Groundnuts	0.32	0.52	12
	Sorghum	0.23	0.32	5
	Millet	0.14	0.18	5
	Cowpeas	0.16	0.24	5
Sources: Agriculture Facts and Figures published by Statistical, Research, Information Department of the Ministry of Food and Agriculture (2018)				

Aflasafe



Aflasafe GH02 was registered for use in Ghana in 2018 to counter aflatoxin in maize, groundnuts and sorghum. Aflasafe is a **safe natural solution** to the problem of aflatoxin, **homegrown in Africa** through national and international collaboration. It works from the plot to your plate to **stop contamination from reaching dangerous levels** and keep foods like maize, groundnuts and sorghum **safe to eat**.

Aflasafe tackles toxic tragedy using harmless types of *Aspergillus flavus*. Surprisingly, this is the same kind of fungus that produces aflatoxin, but in this case they are kinder cousins that **do not and cannot ever produce the toxin**.

Each country has its own version of Aflasafe using a mixture of four fungal strains, all found growing naturally in local soils. The friendly fungi are coated onto ordinary sorghum grain, which acts as a vehicle to help them get established, and can easily be broadcast onto fields.

Aflasafe is dyed blue using food colour, to distinguish Aflasafe from sorghum to eat. Aflasafe has the highest World Health Organisation standard for safety.



What have IITA and partners done about it?

Aflasafe GH02 was specially developed for Ghana by IITA, in collaboration with the Kwame Nkrumah University of Science and Technology and the US Department of Agriculture, to fight aflatoxin. Following successful testing in farmers' fields in 2015–2016, Aflasafe was registered in April 2018 by Ghana's Environmental Protection Agency for application on maize, groundnuts and sorghum. Aflasafe reduces aflatoxin contamination by between 80 and 100%.

In 2018, IITA's Aflasafe Technology Transfer and Commercialisation initiative (ATTC) facilitated the import into Ghana of 20 tonnes of Aflasafe GH02 from IITA headquarters in Nigeria. To grow the market, ATTC worked with input suppliers, aggregators, processors and extension officers to convincingly and participatively demonstrate eye-witness product performance and economic value. Product promotion was further amplified by building alliances with other food-safety development-partner programmes. This greatly expanded the scope, depth and geographical reach: 800 value-chain actors were trained as trainers in collaboration with partner programmes. These programmes focus on

enhancing farm productivity and integrating farmers in lucrative value chains. The partners purchased half-a-tonne of Aflasafe for farmer demonstrations. To date, 7 tonnes of Aflasafe have been used for demonstration by both smallholder and large-scale maize, groundnut and sorghum farmers to protect 700 hectares from aflatoxin. Mean aflatoxin in Aflasafe-treated maize was 2.1 ppb, 3.6 for sorghum, and 11.4 for groundnuts. Compared to untreated fields (whose aflatoxin levels are indicated in the 2019 tests in the challenge above), Aflasafe reduced aflatoxin contamination by 60–94%.

To demonstrate that factory-processed packaged foods are not necessarily aflatoxin-safe, eye-witness tests were conducted on packaged peanut butter that trainees bought from shops. All were dangerously contaminated with aflatoxin. The worst had 130.6 ppb.

ATTC is partnering with the Ghana Standards Authority (GSA) and the Alliance for a Green Revolution in Africa in the GSA-implemented National Aflatoxin Sensitisation and Management (NASAM) project. ATTC provides technical advice, training, demonstrations, and communication tools. NASAM targets the general public and policy-makers.

These nascent efforts with partners to increase awareness are receiving attention from the market, consumers and the public sector. The media now frequently reports on aflatoxin. The recent raising of the aflatoxin standards for maize and groundnuts to 10 ppb in total aflatoxin – and 5 ppb for aflatoxin B1, the most toxic type – attests to the increasing seriousness the government is now paying to aflatoxin.

To assure nationwide reach and effect, 250 Agricultural Extension Agents from the Ministry of Food and Agriculture (MOFA) in the highest food-basket regions were trained as trainers on the proper use of Aflasafe. Similarly, 35 businesses and more than 5,000 farmers have been trained.

For more efficient Aflasafe dissemination and marketing, ATTC has invested in publicly accessible communication tools such as marketing posters and instructional leaflets, factsheets, multilingual instructional training and testing videos, documentaries and slides. For market development, ATTC works with large processors and their suppliers to routinely use Aflasafe as part of standard operating procedure for aflatoxin control.

ATTC closely collaborates with the recently established National Aflatoxin Steering Committee, which has initiated efforts for a policy on aflatoxin management: a draft will be tabled before Parliament.

All these developments bode well for Aflasafe's successful commercialisation in Ghana.

Main partners in Aflasafe commercialisation

- Ministry of Food and Agriculture (MOFA)
- GIZ's Market-Oriented Agriculture Programme
- GIZ's Green Innovation Centre
- DFID's Market Development Programme
- USAID ADVANCE project
- Ghana Standards Authority
- Ghana Commodity Exchange
- Alliance for a Green Revolution in Africa
- National Aflatoxin Steering Committee
- Adventist Development and Relief Agency/Amplifies Ghana
- Peasant Farmers Association of Ghana

1 NO POVERTY



2 ZERO HUNGER

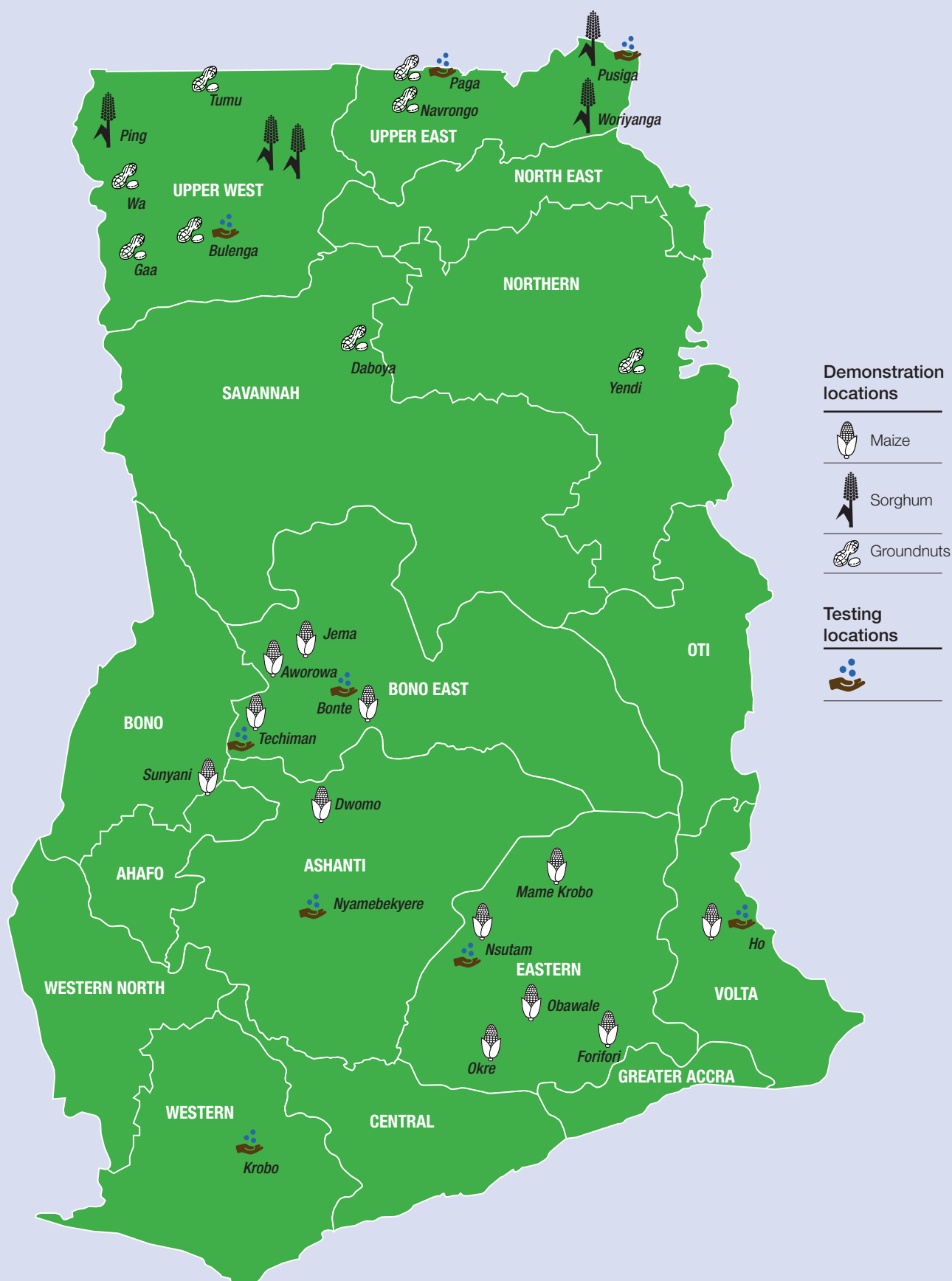


Aflasafe contributes to two of the United Nations Sustainable Development Goals.



SUSTAINABLE DEVELOPMENT GOALS

Locations of Aflasafe demonstration and aflatoxin testing in Ghana: 2019 cropping season





What remains to be done?

Effective aflatoxin control is a 'shared responsibility', calling for concerted collective action by all. The government is indispensable.

Food safety is not as rigorously regulated as it should be. Therefore, the private sector should send a strong signal to farmers and intermediaries by rewarding quality. The government should not only formulate but also enforce appropriate food-safety policies and regulations. Effective collaborative action by the public and private sectors to sensitise value-chain actors and consumers would increase the demand for safe food, and thus, for Aflasafe.

ATTC has been working with partners to address some of these barriers in order to ensure market-driven Aflasafe sales and sustainability. More remains to be done in areas such as the ones below.

- **Engaging policy- and decision-makers and the media:**

The key to catalysing effective and sustained Aflasafe demand is to strengthen relevant institutions to enforce standards and monitor aflatoxin. This would prioritise aflatoxin in national programmes. The media is an indispensable key partner in awareness-raising. Strategic media engagement will ensure accurate information and responsible reporting.

- **Capacity building and delivery:** It is crucial that aflatoxin management be mainstreamed in national policies and national agricultural investment plans and budgets. To enable this, IITA would work with the Ministries of Agriculture, Trade, Health, and other development partners to train a critical mass of trainers on aflatoxin management along the entire agricultural value chains. The resultant ever-expanding pool of awareness and expertise would greatly improve the delivery of much-needed advisory support to value-chain actors, where, when and how the actors need it. It would require refreshing the existing curricula to incorporate modules on aflatoxin management and solutions, among them Aflasafe.

- **Grading, market incentives and socioeconomic progress:** Consumer demand and market push will be the strongest drivers for Aflasafe's broad uptake and market success. Currently, farmers investing in Aflasafe lose on the market because there is no monetary reward for aflatoxin-safe produce. Even where market incentives exist, these do not reach farmers. It is imperative that a grading system based on aflatoxin standards to which all commodity value-chain actors must conform be established. Maize, groundnuts and sorghum are all of strategic importance to Ghana. Maize is a staple food and Ghana's key calorie source, while groundnuts are a favourite national snack. Sorghum is a crucial food-security lifeline in Ghana's northernmost regions and has a bright industrial future. Over the last decade, sorghum has progressively replaced barley in the brewing industry. Guinness Ghana Breweries Limited procured about 18,000 tonnes in 2018/2019 exclusively from local farmers.

- **Enhancing access and capacity for aflatoxin testing:** Aflatoxin-testing facilities are limited and expensive, with a single test by GSA costing GHC 250 (USD 47). IITA is in a strong position to provide advice and training on rapid and cost-effective mobile testing for relevant agencies. The government can stimulate investments in affordable testing.

- **Exports, subsidies and public health:** To avoid aflatoxin penalties from lucrative external markets, IITA would work with trade-facilitating agencies to empower actors in the maize and groundnut value chain to meet the required export quality. The Peasant Farmers Association of Ghana has appealed to MOFA for support in combating aflatoxin, and for government subsidies for Aflasafe since aflatoxin endangers public health.

For IITA, the search for a suitable Aflasafe commercialisation partner in Ghana continues alongside demonstrating the economic value and public-health benefits of taming aflatoxin. To facilitate this, IITA has a capable and experienced research and business development team.

atTC
aflasafe
Safer food in Africa

Implemented by:



Dalberg

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BILL & MELINDA
GATES foundation



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For more on Aflasafe in Ghana, please visit:
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