



Aflasafe® technology transfer and commercialisation in Africa

Country status: The Gambia

September 2020

The Gambia's aflatoxin challenge

The Gambia's tropical climate favours the proliferation of fungi such as *Aspergillus flavus* which produce the carcinogenic aflatoxin, particularly in staples such as groundnuts, maize, rice, and millet. Safety levels for aflatoxin worldwide generally range between 4 and 15 parts per billion (ppb), with an even more stringent standard for aflatoxin B1 in particular, at 2 ppb in Nigeria and the European Union (EU) for example. A 2015 study by the African Union's Partnership for Aflatoxin Control in Africa (PACA) showed aflatoxin contamination to be as high as 1,189 ppb in some cases.

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.



Aflatoxin greatly handicaps Gambia's food and economic security, and undermines poverty eradication. The Gambia faces severe difficulties in meeting export-quality requirements for food-grade groundnuts. In the EU – its main export market – The Gambia's groundnuts have been downgraded from the more lucrative confectionary sector to the bird-feed market segment due to aflatoxin. Groundnut exports with aflatoxin exceeding EU limits (4ppb for confectionery and 10ppb for bird feed) are rejected and summarily returned, with the exporter bearing the charges, further compounding the losses.

Domestically, groundnuts and cereals are generally processed at home, with little regard for quality and no food-safety checks, including for aflatoxin. Most Gambians are unaware of aflatoxin in their food and how it affects their health. Consequently, liver cancer is common.

The total aflatoxin-related overall loss in monetary terms is estimated at USD 7.86–29.87 million. Yet, the economic losses of health comprise 99.8%, compared to 0.24% for international trade. Aflatoxin therefore poses a crippling and unquestionable health challenge.

Aflatoxin has plagued The Gambia since the 1960s, affecting exports of both raw groundnuts and their processed products. Although the National Agricultural Research Institute (NARI) has conducted several research initiatives including on aflatoxin-resistant or -tolerant varieties and promoted good agricultural practices, aflatoxin contamination in groundnuts and related cereals, nuts and oilseeds continues to pose a serious challenge. Aflatoxin reduces agricultural productivity and trade, and endangers human and animal health – sometimes with fatal results.

Geography	Area: 11,300 km ² Agroecology: Sahelian. 20% wetland Neighbours: The Gambia is an enclave, totally surrounded by Senegal for all its land borders, with an Atlantic seafront
Population	≈ 2.3 million (2020); rural – 74%
Agriculture and Economy	
GDP	USD 938.8 million (2015), with agriculture accounting for 23% of GDP, employing 75% of the labour force, and accounting for about 90% of export earnings.
Main crops	Subsistence: millet, maize, sorghum, rice Semi-intensive cash crops: groundnuts, cotton, sesame, horticulture
Crop production and utilisation	Total arable land available for agriculture is estimated at 430,000 hectares (ha, 38%), with ≈ 200,000 ha on average cultivated annually. Agriculture is mainly rainfed, with only 2.0% under irrigation. Average percentage of cultivated area per crop Groundnuts 40–50% Early millet 25% Rice 8% Maize 7% Sorghum 7% Sesame and roots and tubers (cassava and sweet potatoes) occupy the smallest area
Sources:	CILSS (2008), FAO (2010), UNECA (2016)

Solutions from IITA and partners

Aflasafe SN01 is a natural IITA product that is applied preharvest and successfully counters aflatoxin, including postharvest protection. It was developed in collaboration with the United States Department of Agriculture – Agricultural Research Service.

Maize and groundnut samples collected across The Gambia's seven regions in March 2014 confirmed that the same four Senegalese friendly fungi used to manufacture Aflasafe SN01 for Senegal were not only present but also well-distributed in The Gambia as well. This made it safe to deploy Senegal's Aflasafe SN01 in the country. Therefore, IITA and Senegal's *Direction de la Protection des Végétaux* (DPV) collaborated with NARI, the Gambia Groundnut Corporation (GGC, now the National Food Processing, Security and Marketing Corporation, NFSPMC) and the Department of Agriculture to initiate the application of Aflasafe SN01 in selected fields in The Gambia. Tests showed Aflasafe SN01 reduced aflatoxin contamination by more than 90%, with 86% of the samples from Aflasafe-treated fields having less than 4 ppb compared to 61% in the untreated fields.

Aflasafe



In 2016, the intergovernmental *Comité permanent inter-État de lutte contre la sécheresse au Sahel* (CILSS) approved the registration of Aflasafe SN01 to counter aflatoxin in maize and groundnuts in Senegal and The Gambia. 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.





Aflasafe SN01 was registered in 2016 by the *Comité permanent inter-État de lutte contre la sécheresse au Sahel* (CILSS). Following the registration, IITA's Aflasafe Technology Transfer and Commercialisation (ATTC) facilitated the dissemination of the technology. The starting point was a commercialisation strategy to guide our intervention in the country, based on the potential market, the feasibility of local manufacturing and distribution, the policy environment and the investor landscape. The strategy defined the key partners and interventions necessary. ATTC then vigorously engaged with private-sector actors, leading to the selection of BAMTAARE Services as the licensed partner to undertake Aflasafe production, marketing and distribution on a commercial basis across the country. IITA granted a five-year exclusive licence to BAMTAARE for the manufacturing and distribution of Aflasafe SN01 in both Senegal and The Gambia.

Currently, NFSPMC purchases Aflasafe SN01 from BAMTAARE in Senegal, for distribution to farmers in the three regions above where aflatoxin was highest during product research. To enhance the knowledge about the product, BAMTAARE and ATTC conducted sensitisation campaigns on aflatoxin and how to use Aflasafe, as well as training of trainers. ATTC supported the production of multi-lingual audio-visual tools for these events.

Consecutive results from 2018 and 2019 Aflasafe application showed total aflatoxin at 4 ppb and less, well within the EU standard. This has enabled NFSPMC to regain export sectors

in foreign markets that it had lost due to aflatoxin. For instance, independent external testing at the point of entry to export markets in 2019/2020 showed aflatoxin at 1.8–2 ppb for Aflasafe-protected groundnuts. After more than 20 years of being locked out by aflatoxin, The Gambia is back on the UK market for confectionary groundnuts, commanding a price of USD 1,000 per tonne, compared to USD 600 on the Chinese market.

ATTC provided initial technical support and capacity-building for aflatoxin testing which has now enabled NFSPMC to generate their own independent data on product performance. These independent data have been crucial in convincing corporate and institutional clients.

On the policy and advocacy front, the 2015 PACA study on the impact of aflatoxin on trade, health, agriculture and livestock was adopted by The Gambia, forming the basis of the National Aflatoxin Control Plan for which recommended the use of Aflasafe SN01, among other solutions to combat aflatoxin. To implement the plan, an Aflatoxin Technical Working Group (ATWG) was formed comprising the Ministries of Agriculture, Health and Trade. ATTC is working with the ATWG and BAMTAARE to engage the government through the PACA initiative in The Gambia. The ATWG is chaired by the Food Safety and Quality Authority (FSQA). FSQA has been very active on aflatoxin, working with other government bodies on subsidising Aflasafe and disseminating it widely. Jointly with the Medical Research Council, the ATWG is implementing a nationwide awareness campaign on aflatoxin and its harmful effects.



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



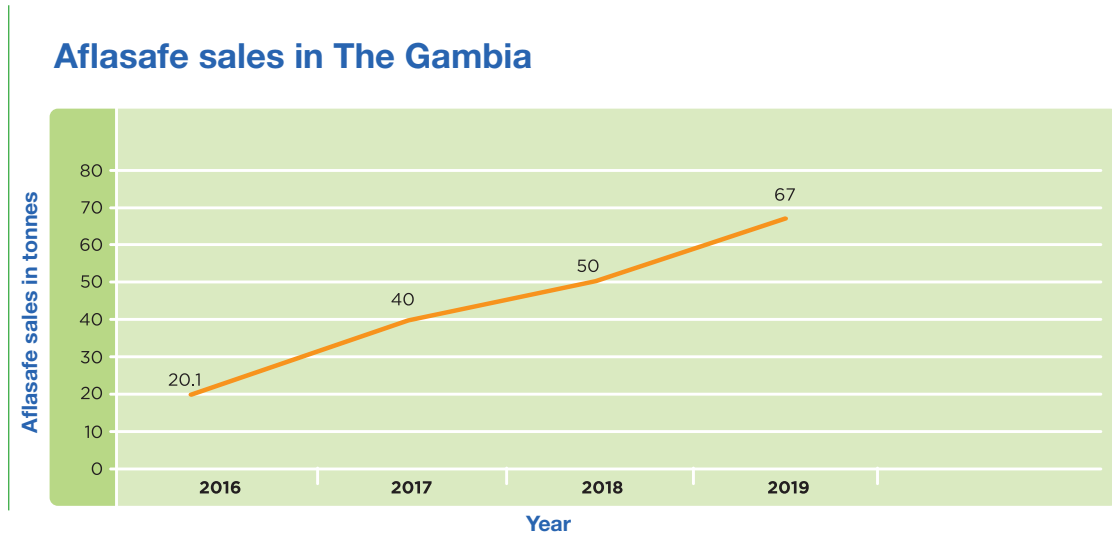

BAMTAARE Service (*Base d'Appui aux Méthodes et Techniques pour l'Agriculture, les autres Activités Rurales et l'Environnement*), is a full-service agribusiness firm involved in the aggregation and export of various agricultural commodities.

A 100% subsidiary of SODEFITEX as its special purpose vehicle for rural development, BAMTAARE Services is a public limited company with a Board of Directors.

Established on 15th March 1974 as a mixed public-private ownership company with a public ownership majority, besides cotton agri-business, SODEFITEX also supports rural development.

Main partners in Aflasafe commercialisation

- Aflatoxin Technical Working Group (ATWG)
- Ministries of Agriculture, Health, Trade and Industry
- The African Union's Partnership for Aflatoxin Control in Africa (PACA)
- National Food Processing, Security and Marketing Corporation (NFSPMC)
- Food Safety and Quality Authority (FSQA)
- UN Food and Agriculture Organization (FAO)
- West and Central African Council for Agricultural Research and Development (CORAF/WECARD)





Locations where Aflasafe has been applied: 2017–2019



Well-situated: BAMTAARE's Aflasafe factory in Kaolack, Senegal, is strategically located to serve The Gambia. In The Gambia, Aflasafe is being distributed by the National Food Security, Processing and Manufacturing Corporation (NFSPMC).





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 sector to sensitise value-chain actors and consumers would increase the demand for safe food, and thus, for Aflasafe.

The Gambian government should complement and expand NFSPMC’s effort in using Aflasafe SN01 and good agricultural practices, among other important solutions to taming aflatoxin.

Some of the other concrete steps the government should consider include:

- **Continued public awareness on aflatoxin** through the nationwide awareness campaign, spearheaded by FSQA, the ATWG and other stakeholders.
- **Policy and its enforcement:** The Gambia has no aflatoxin safety standard. This greatly undermines

FSQA’s food-safety effort to protect Gambians from aflatoxin.

- **Nationwide Aflasafe use:** Over the past three years, NFSPMC has demonstrated that using Aflasafe SN01 lowers aflatoxin contamination in groundnuts from as high as 1,000 ppb to less than 3 ppb, thus unlocking the doors to these lucrative market sectors. Aflasafe and good agricultural practices should therefore be used nationwide for aflatoxin-safety assurance for the country’s groundnuts and maize. There would be a multiplier effect, given that about 80% of farm households grow groundnuts which generate 60–80% of their income. Groundnuts and their derivative products account for about 70% of exports.
- **Continued IITA-facilitated collaboration and commercialisation:** Given the heavy and constant flow of people and goods between the two countries, collaboration with Senegal is imperative. As a neutral non-State actor, IITA continues to play a pivotal role in simultaneously commercialising Aflasafe in both countries, and in identifying gaps in effective transnational aflatoxin control.



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