Aflasafe® technology transfer and commercialisation in Africa

Country status: Tanzania

September 2020

Tanzania's aflatoxin challenge

Aflatoxin is a serious problem with adverse effects on human and animal health, and on maize and groundnut trade. A 2016 aflatoxicosis outbreak in Dodoma and Manyara Regions affected 65 people, resulting in 19 deaths. Aflatoxin contamination was as high as 300 parts per billion. Tanzania's aflatoxin-safety standard is 10 parts per billion (ppb) for total aflatoxin, and 5 pbb for Aflatoxin B1 – the most toxic type.

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.

Few children escape aflatoxin. A 2013 study by Shirima *et al* on dietary exposure to aflatoxin and fumonisin in young children in Tanzania found that 84% of Tanzania's babies had been exposed to aflatoxin at six months old, reaching 99% by their first birthday. In a subsequent 2014 study of breastmilk samples from Tanzanian mothers, more than 90% of the samples had aflatoxin levels beyond the safe limit for infant foods. And yet, a country situational assessment by the African Union's Partnership for Aflatoxin Control in Africa (PACA) on aflatoxin found low levels of aflatoxin awareness. Limited access to guidelines for good agricultural practices and poor storage are amongst the factors driving the persistent prevalence of aflatoxin in Tanzania.

Tanzania is a net exporter of maize and groundnuts within East Africa where aflatoxin is now considered to be major threat to trade and health.

Geography	***Area:*** 947,300 km^2 ***Agroecology:*** Coastal, Arid, Semi-arid Plateaux, Southern and Western Highlands, Northern Highlands and Alluvial Plains ***Neighbours:*** Burundi, Kenya, Uganda, Rwanda, Democratic Republic of Congo, Malawi, Mozambique and Zambia
Population	58 million, with 67% in farming. Urban: 35%; rural: 65%
Agriculture and Economy	
GDP	USD 59 billion, with agriculture accounting for 29%
Main crops	Maize, rice/paddy, sorghum, bulrush millet, finger millet, wheat
Crop production and utilisation	Total arable land available for agriculture is estimated at 94.5m hectares (ha). Agriculture is mainly rainfed, with only 0.5 m ha under irrigation.

	Area cultivated (million ha)	**Annual production** (million metric tonnes)	**Annual** *per capita* **consumption** (kg)
Maize	6	5.5	135
Paddy/rice	1.5	1.8	37
Sorghum & millet	0.8	0.6	7 and 2
Groundnuts		0.2	1*

Utilisation (million metric tonnes)

	Food	Feed	Processed
Maize	3.7	2.7	0.5
Sorghum		0.003	0.4
Rice	2		
Millet	0.1	0.008	

Groundnuts account for more than a third (35%) of Tanzania's oilseed production. Sorghum is both food and an industrial crop for brewing.

Sources: *CIA Fact Book; MAFAP (2013);USDA–FAS GAIN Report (2018); Fewsnet (2018); Annual Agriculture Sample Survey Report 2017);World Bank – Tanzania Economic Update (2019)*

Aflasafe

Aflasafe TZ01 was registered for use in Tanzania in 2018 to counter aflatoxin in maize and groundnuts. 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 kindlier 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.

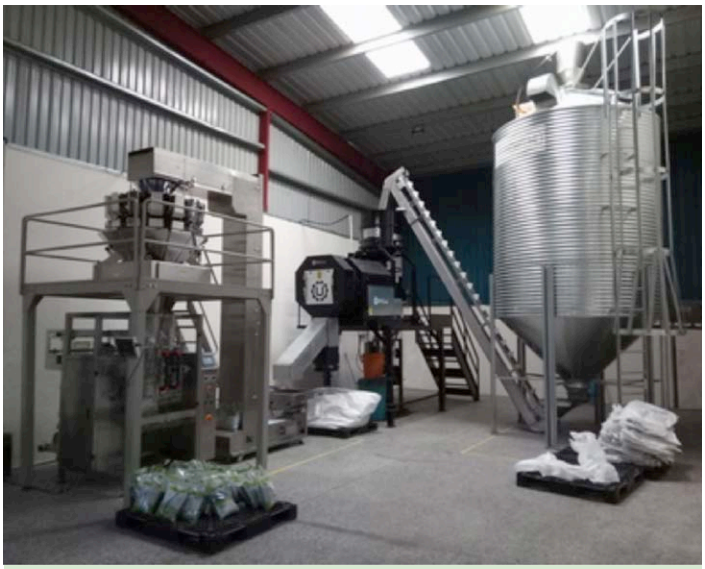
Aflasafe is dyed blue using food colour, to distinguish Aflasafe from sorghum to eat. Aflasafe has the highest World Health Organisation standard for safety.

What have IITA and partners done about it?

Aflasafe TZ01 is one way to control aflatoxin. It is the product of rigorous research and development led by the International Institute of Tropical Agriculture (IITA) in close collaboration with Tanzania's Ministry of Agriculture and the US Department of Agriculture. Aflasafe is a natural, environmentally safe solution to reduce aflatoxin contamination in maize and groundnuts at farm level. During efficacy trials in 2015–2018, Aflasafe consistently reduced aflatoxin contamination by at least 80% – and often much more. Aflasafe was registered for commercial use in October 2018. This paved way for its commercialisation in Tanzania through IITA's Aflasafe Technology Transfer and Commercialisation initiative (ATTC). Following the registration, 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.

From vigorous engagement with the private sector, followed by a competitive bidding process, in 2019, A to Z Textile Mills Ltd was selected and licensed to exclusively manufacture and distribute Aflasafe in Tanzania.

A to Z was selected due to the company's capacity and readiness to invest in the technology and human resources required for Aflasafe production and marketing, and its distribution network.



The A to Z Aflasafe factory at the company's headquarters in Arusha, Tanzania. (*Photo: A to Z*)

To aid market development, ATTC also works with A to Z in mapping distributors, consumer profiles, developing distribution channels and in crafting communication materials for marketing Aflasafe and creating awareness of aflatoxin. Thus far,173 government extension officers have been reached, as well as nearly 1,500 farmers and 112 agribusiness entities.

For its part, A to Z has formulated a five-year plan for a total investment of USD 1.5 million.

As part of implementing an aflatoxin-fighting strategy whose formulation began in 2013, Tanzania recently initiated a nation-wide programme, the Tanzania Initiative for Preventing Aflatoxin Contamination (TANIPAC). A to Z is a key TANIPAC partner and player. TANIPAC coordinates aflatoxin control efforts by researchers, traders, regulatory authorities, traders, aggregators and buyers, and development partners. The Tanzania Agriculture Research Institute and Tanzania Bureau of Standards work closely with TANIPAC to respectively promote good agronomic practices, and aflatoxin awareness and management.

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

SUSTAINABLE DEVELOPMENT GOALS

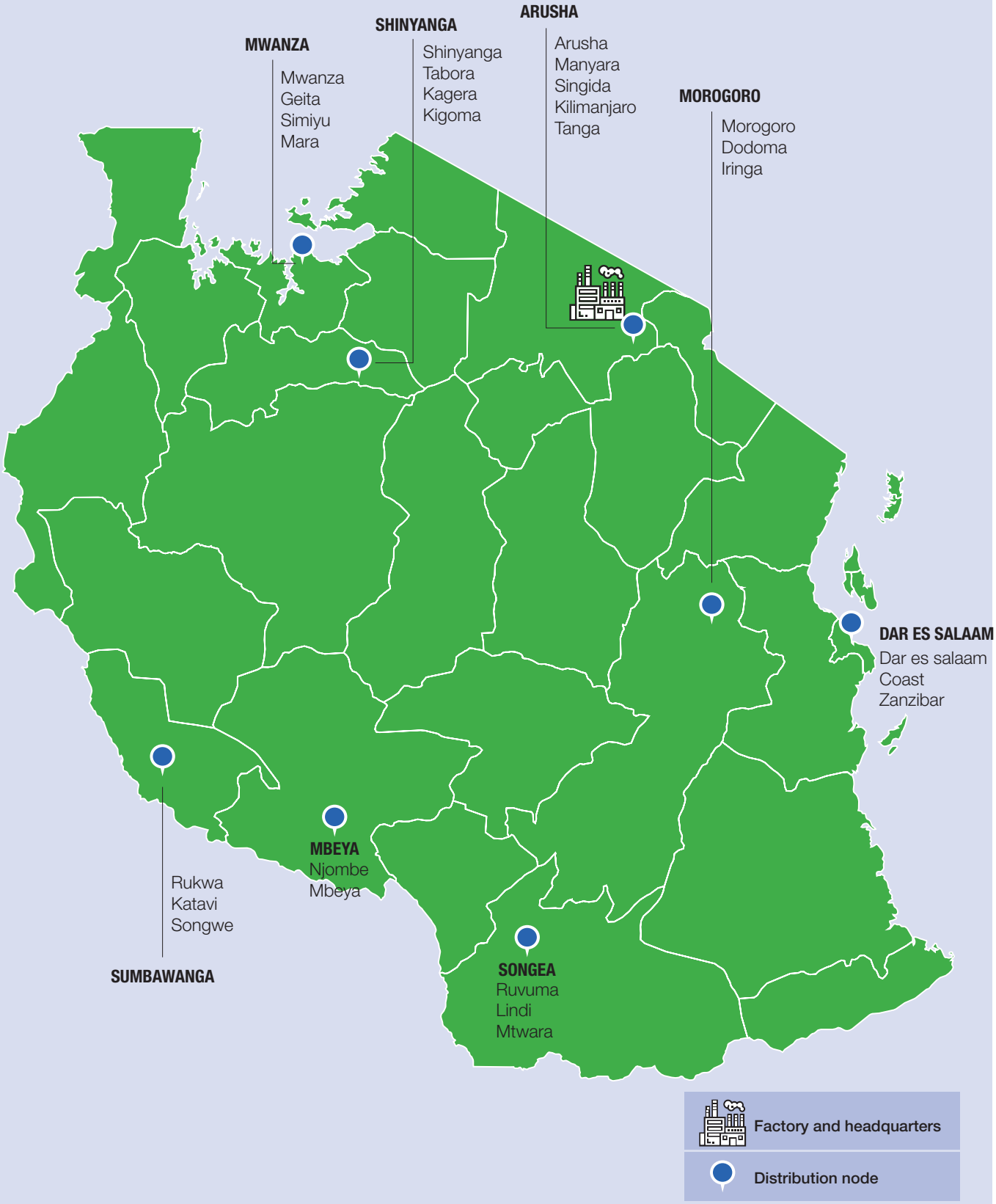
A to Z is a successful family-owned business established in the 1960s. Following a series of diversification drives, A to Z now specialises in vector-control products (primarily long-lasting insecticide-treated mosquito nets); garments and other textiles; packaging materials, including bags for agricultural commodities and cement; and household plastic items and products for use in agriculture, such as on-farm hermetic storage solutions that include AgroZ® Bag, AgroZ® Bag Plus and maize-drying mats (AgroZ® tarpaulins).

Aflasafe TZ01 joins the already well-established AgroZ line of crop-protection products.

Key commercialisation partners

- Ministry of Agriculture
- Tanzania Bureau of Standards
- Tropical Pesticides Research Institute
- Tanzania Initiative for Preventing Aflatoxin Contamination Project (TANIPAC)
- National Food Reserve Agency
- Eastern Africa Grain Council
- World Food Programme
- Serengeti Breweries Limited
- Tanzania Breweries Limited

A to Z's distribution network in Tanzania



ATTC is providing technical support to A to Z in setting up the Aflasafe factory, and in technical training and quality control. The factory is now producing and distributing Aflasafe TZ01 in Tanzania.

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 level of awareness on the impact of aflatoxins in Tanzania is lamentably low not only among the farmers but also for consumers, processors and even policymakers. Low technology adoption and weak purchasing power coupled with lack of market incentives are among critical limitations hindering Aflasafe's broad adoption. This lack of monetary incentive for producing aflatoxin-safe crops and lack of a grading system that incorporates aflatoxin standards leaves little or no motivation to adopt Aflasafe.

Factors that would redress this situation include, among others:

- ***Strong enforcement of food-safety standards***, with regulatory entities adequately equipped with the necessary knowledge, tools and infrastructure to facilitate effective aflatoxin management. Intra- and inter-agency collaboration at national and regional levels is key, as is enhancing public–private partnerships.

- This will lead to ***coordinated efforts on creating aflatoxin awareness and mitigation measures***. Aflatoxin contamination affects every stage of the commodity value chain, thereby requiring a holistic approach targeting on-farm production, harvest, storage, processing and logistics. Both the public and private sectors must be involved. TANIPAC provides a mechanism for this coordination.

- ***Aflasafe TZ01 extension to other crops*** such as sorghum. For this, resources would be needed for research, registration and business development.

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Safer food in Africa

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IITA Transforming African Agriculture
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For more on Aflasafe in Tanzania, please visit:
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