

EVALUATION OF SANITARY AND PHYTOSANITARY (SPS) TRADE POLICY CONSTRAINTS WITHIN THE MAIZE, SOYA AND GROUNDNUT VALUE CHAINS IN SOUTHERN AFRICA

BRIEF 2: AFLATOXIN, SPOTLIGHT ON MOZAMBIQUE

USAID's Bureau for Food Security commissioned the study *Evaluation of Sanitary and Phytosanitary (SPS) Trade Policy Constraints within the Maize, Soya, and Groundnut Value Chains in Southern Africa* through the [Leveraging Economic Opportunities](#) (LEO) project¹. The study is one of three regional assessments carried out in East, Southern, and West Africa regions to identify key SPS-related constraints to trade within priority Feed the Future value chains, in order to gauge opportunities for potential SPS-related investments. The Southern Africa study targeted four countries: Malawi, Mozambique, South Africa, and Zambia. The study identified aflatoxin as one of the most important SPS issues; this brief spotlights the causes and consequences of aflatoxin in Mozambique, which has one of the highest contamination levels in the region.

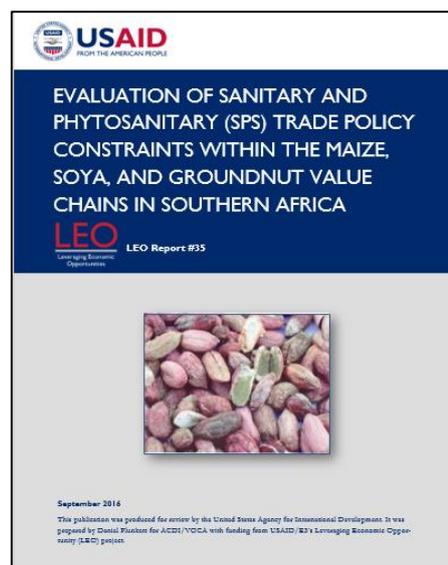
SITUATIONAL OVERVIEW

With a humid climate and widespread, deep poverty among rural populations, Mozambique's aflatoxin problems in the maize and groundnut value chains may be the worst in Southern Africa. Lack of storage facilities, low levels of educational achievement, poor knowledge of good agricultural practices, and limited marketing infrastructure also rank as contributing factors to the prevalence of aflatoxin in these key staple foods, with devastating human health impacts. This study surveyed the food safety and public health systems of Mozambique, making recommendations to improve storage conditions and to raise awareness about how to reduce aflatoxin contamination in maize and groundnuts.

In Mozambique, high-level public sector officials and private sector operators in the agriculture and food industries were aware of the magnitude of the country's aflatoxin problems, but few knew what to do about it. The general public, whether in urban or rural areas, was largely unaware about aflatoxin. A commonly heard phrase during stakeholder interviews was that "only farmers producing for the export markets are concerned about aflatoxin."

It is difficult to trace a direct cause-effect relationship between high levels of aflatoxin and negative aspects of Mozambique's public health profile. In 2011, 43 percent of children under the age of 5 were affected by stunting, with 20 percent suffering from severe chronic malnutrition.² Of these, almost half live in the two most populous and leading agricultural production provinces of the country, Nampula and Zambézia.

In the late 1970s, intake of aflatoxin-contaminated food, particularly groundnuts, was linked to high prevalence of liver cancer in Inhambane Province. In the late 1990s, groundnuts from Nampula Province



¹ For more information on LEO, and to access the full studies for East, West, and Southern Africa, visit www.microlinks.org/leo.

² CARE (2014). "Mozambique Agricultural Strategy 2014-2020."

bound for the UK export market were rejected on account of high aflatoxin content exceeding that country's import standards.

IS IT NATURE?....

In a 2013 survey, the average level of aflatoxin in groundnuts at harvest in Central and Northern Mozambique was 73.6 percent parts per billion (ppb), many times greater than is considered safe. For maize, the average level of aflatoxin at harvest was 9.3 percent, meaning nearly half of all maize produced was at or above the national standard of 10 ppb. For both groundnuts and maize, aflatoxin often increases during post-harvest handling and storage, worsening the levels in the consumer end-product.

Mozambique's tropical humid climate, which is beyond the control of both the government and farmers, is a foundational piece in understanding the high incidence of aflatoxin. Temperatures in excess of 30° C and humidity of over 85 percent, both typical of Mozambique, are reported to be the most favourable conditions for *Aspergillus flavus* development.³ Further aggravating the situation is that in Mozambique the harvest seasons coincide with the wet months of reduced sunshine, since most of the farmers rely on sun-drying to reduce the moisture content of the recently harvested crops.

Mozambique has also historically lacked the needed transformational investments in agricultural structures and inputs that are part of the enabling environment for each farmer. Mozambique records the lowest agricultural productivity in Southern Africa, with smallholder farmers making only infrequent use of modern technologies, fertilizer, animal traction, irrigation schemes, extension services or improved seeds. Credit to agriculture is another challenge that further curtails the adoption of new technologies.

...OR NURTURE?

Beyond climate and natural conditions, Mozambique's lack of investment in human capacity also contributes to high levels of aflatoxin in maize and groundnuts. Rural smallholders in Mozambique fall into the lowest ranking of formal education, with limited functional literacy. Raising awareness about the risks of aflatoxin, and how to combat it, is therefore much more complex than in an educated community.

The Ministry of Agriculture and the Ministry of Health lack sufficient personnel to help rural populations understand the challenges. In 2011, less than 9 percent of the smallholder farmers had access to extension services, with as few as 708 public extension agents across the country of over 800,000 km². The LEO project has proposed finding new ways for the government to communicate with rural populations, including the broadcasting of radio spots and TV announcements in local languages and development of purely visual tools for illiterate stakeholders.

In Mozambique, farmers report post-harvest crop loss can be 30 percent to 40 percent for maize due in part to a lack of storage facilities of any kind, never mind modern storage facilities adapted to reduce the spread of aflatoxin. To fill this gap, the report proposed using 'challenge funds' to promote investment in innovative storage solutions by Mozambique's private sector.

Poor transport links from the field to market also result in food rotting in the hot and damp conditions. New rural storage facilities, once built, can be linked with aggregation markets, but investment in tertiary or feeder roads is a necessity, although not necessarily one to be undertaken by USAID.

Mozambique's traditional trading practices may also come into play. Sales are usually made on the basis of weight or volume, both positively influenced by moisture content. Hence, as much as possible, farmers will prevent excessive loss of moisture to maximize their returns from the crop sales. High levels of moisture are subject to toxigenic fungi. Encouraging widespread use of grades and standards could

³ Paul E. Sumner and Dewey Lee (2012). "Reducing Aflatoxin in Corn during Harvest and Storage." University of Georgia.

provide the proper incentive for farmers to boost the quality of their marketed crops and to prevent or reduce aflatoxin accumulation.

RECOMMENDATIONS TO REDUCE AFLATOXIN THROUGHOUT THE VALUE CHAINS

Techniques exist for reducing aflatoxin in maize and groundnuts (see box for a summary of techniques in groundnuts, for example), but in Mozambique, actors throughout the maize and groundnut value chains are not aware of the risks to human and animal health and plant productivity. The ‘ambulant doctors’ deployed by Mozambique’s Ministry of Health, who go house to house discussing nutrition and human health, suggest a ready supply of ‘trainers’ to communicate with the general public.

HOW TO REDUCE AFLATOXIN IN GROUNDNUTS

In the field	<i>Treat with Aflasafe</i>
Upon harvesting	<i>Dry in shell 3 to 4 weeks</i>
When de-shelling	<i>Don't soak with water, Use mechanical sheller</i>
During selection	<i>Destroy discolored and shriveled nuts</i>
For peanut butter	<i>Target sampling to high-risk lots</i>
For table nuts	<i>Blanch the nuts</i>

A value chain-wide approach to combating aflatoxin contamination will require cooperation through the national SPS committee, bringing together the ministries of agriculture and health, the national standards bureau, farmers groups, animal feed manufacturers, maize millers and processors, peanut butter producers, and organizations representing consumer interests, for example mothers’ groups.

The Southern Africa SPS study recommended several of the following additional activities to address critical weaknesses in the present food systems and to raise awareness:

- Broader dissemination of Aflasafe, a package of soil treatments and seeds with greater resistance to aflatoxin;
- Adoption of more modern storage facilities through the use of innovation challenge funds, specialized warehouses providing hermetic storage, and promotion of PICS bags⁴;
- Increased public knowledge of techniques for reducing aflatoxin during production, harvest, post-harvest handling, storage, and processing;
- Public communications and outreach campaign, that targets multiple communication channels such as radio spots, community theater, and visual tools such as laminated posters in Portuguese and local Mozambican languages.

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⁴ Purdue Improved Cowpea (PICs) bags have two layers of synthetic bags inside the traditional jute bags.