food trade coalition for africa

Economic Impact of Sanitary and Phytosanitary Measures on Regional Food Trade

A Case Study of AGRA Focus Countries

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January 2023

This report was done under the Food Trade Coalition for Africa, through AGRA's Regional Food Trade & Resilience Unit with support from the United States Agency for International Development (USAID).

The Food Trade Coalition for Africa acknowledges the members of the Food Safety and Nutrition Thematic Working Group for their feedback on this report

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Acronyms

AFA	Kenya Agriculture and Food Authority
AGRA	Alliance for a Green Revolution in Africa
ARSO	African Organization for Standardization
CAC	Codex Alimentarius Commission
DALY	Disability Adjusted Life Year
EAC	East African Community
EAGC	East Africa Grain Council
FBD	Foodborne Disease
GM	Genetically Modified
IPPC	International Plant Protection Convention
ISSB	International Standard Setting Bodies
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Service
NTB	Non-Tariff Barrier
WOAH	World Organization for Animal Health
PACA	Partnership for Aflatoxin Control in Africa
REC	Regional Economic Community
SADC	Southern African Development Community
SPS	Sanitary and Phytosanitary
WFP	United Nations World Food Programme
WHO	World Health Organization
WHO-FERG	World Health Organization Foodborne Disease Burden Epidemiology Reference Group

Executive Summary

Introduction

Food safety is often not prioritized as a significant contributor to food security, particularly in developing nations where the burden of food inadequacy is greatest. Food safety is a precursor of food security which is defined as the state when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Therefore, consuming unsafe food is tantamount to being food insecure. African governments are losing millions of dollars annually due to aflatoxin and avian flu effects on the economy and health of their populations. The direct economic cost of unsafe food is felt by producers and traders who fail to access high value export markets due to non-compliance with food safety requirements, or the prohibitive costs of compliance with food safety requirements particularly by smallholder farmers. The indirect costs of unsafe food include the increased public health burden as a result of preventable non-communicable diseases due to exposure to food-borne hazards. The less developed a country is the higher the economic burden of food safety. Therefore, it is imperative for African governments to prioritize investments in food safety. Due to limitations such as limited and poor-quality data, it is difficult to explicitly quantify the economic burden of unsafe food and food borne diseases in Africa. Further, apart from gastrointestinal infections, there is limited epidemiological evidence of direct causal relationships between unsafe food and food borne diseases.

Key Messages

- There is inadequate data to explicitly quantify the economic costs associated with SPS measures, and countries need to invest in data generation in order to fill this crucial data gap.
- Exporters mostly affected by SPS measures were Uganda, Tanzania, and South Africa, while the affected importers were Kenya, Rwanda and Tanzania. The effect of decreased exports and induced commodity shortages in the importing countries had the negative impact of decreased revenues for producers as well as tax revenue and increased retail prices, to consumers respectively. When combined, SPS measures (mycotoxins, GM, FMD, and Avian flu alone) cost the affected countries in excess of US$1.2 billion in the five years between 2016 and 2021.
- Blanket bans on non-compliant commodities resulted in a decrease in formal imports, yet informal imports increased significantly, and in so doing negated the intended purpose of protecting public health. This was the case when Kenya banned aflatoxin contaminated maize from Uganda and \ Tanzania.
- Domestic food prices were negatively impacted by commodity bans across all the key value chains.
- Mitigation costs for aflatoxin contamination in maize, foot and mouth disease in cattle and avian flu in poultry were found to be high, further pushing up domestic commodity prices.

Sanitary and phytosanitary (SPS) measures and their economic impacts

Sanitary and Phytosanitary (SPS) measures (including food safety measures) and their implementation remain a major impediment to food trade in r African countries. Further, the fragmented nature of food safety regulations poses challenges in implementing food safety measures, more so for traders who face difficulties trying to comply with these measures. The absence of harmonized food safety measures in most instances gives rise to the presence of non-tariff barriers. The specific objective of this assessment is to estimate the economic cost of SPS measures (including food safety and animal health measures) to regional food trade in Africa, and in particular the focus countries.

Regarding international trade, there has been a notable decrease in food safety related export rejections and bans. However, the landscape shifts when it comes to intra-regional trade, with a number of food safety related export rejections and bans having affected trade in some of the focus countries. The two value chains that are prone to food safety and animal health concerns were found to be maize and livestock. With respect to maize, the key SPS issues that affected intra-regional trade were aflatoxin contamination and genetically modified content in maize. Regarding livestock, the key SPS issues that affected intra-regional trade were foot and mouth disease in cattle and avian flu viruses in poultry. In all instances, affected exporting countries were slapped with import bans from their trading partners, resulting in significant costs across the entire value chain and for the various value chain players. However, due to unavailability of data, time and methodological constraints, it was not possible to quantify the public health costs associated with these key SPS issues. Estimates from gray literature sources indicate that African governments are losing millions of dollars annually due to aflatoxin and avian flu effects on the economy and health of their populations. For example, avian flu outbreaks that occurred in South Africa, Tanzania, Uganda and Zimbabwe in 2017 cost these countries and their trading partners over US$800 million in revenue. The aflatoxin problem in East African Community (EAC) countries has cost the region over US$235 million between 2018 and 2021. The associated public health effects of aflatoxins have been estimated to be at least US$580 million annually.

Introduction

The role of food safety in agricultural transformation through enhanced food systems is key to unlocking both economic and health potential of populations. Food safety is a precursor of food security which is defined as the state when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Several factors contribute to the decline in the food security status of populations, and chief among them is the limited food supply due to decrease in agricultural production resulting from adverse production conditions. In addition to adverse agricultural production conditions (droughts and famine, tropical cyclones, pests and diseases), ill-advised policies (bans on food imports, lack of incentives and price distortions), and impacts of poor supply chains, SPS issues (food safety and animal health measures inclusive) contribute significantly to food insecurity and increased commodity prices. Recently, the COVID-19 pandemic resulted in disruptions in supply chains, leaving consumers at risk of becoming food insecure.

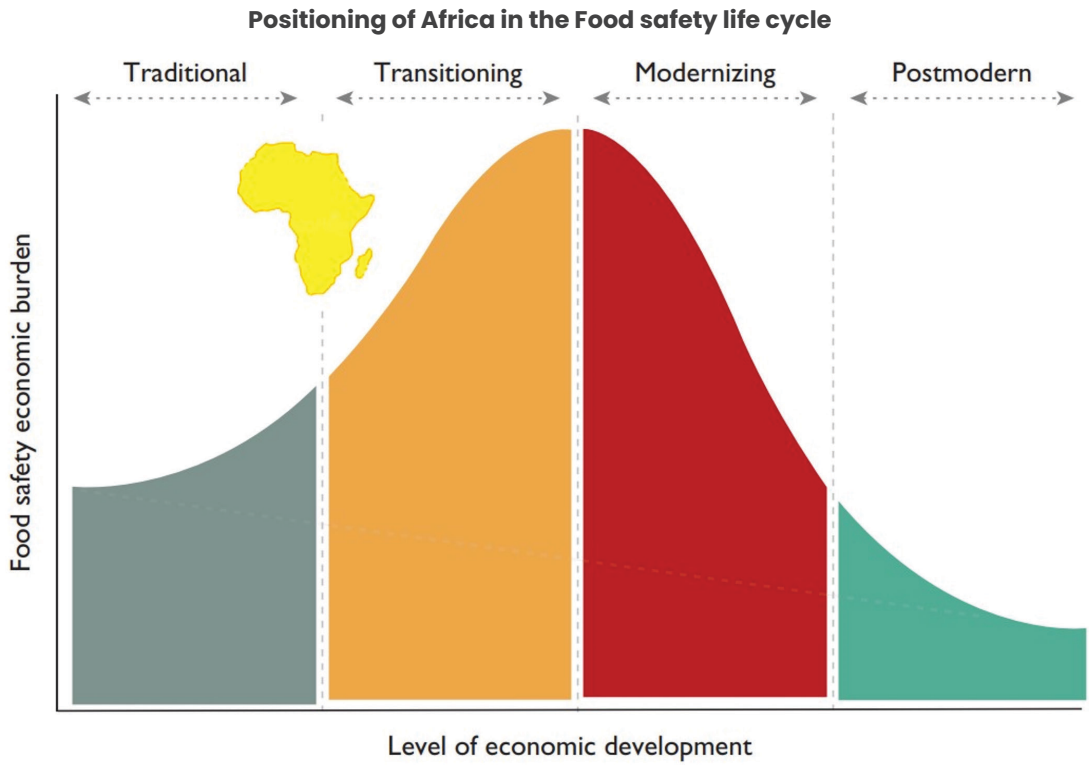
Food safety is often not prioritized as a significant contributor to food security, particularly in developing nations where the burden of food inadequacy is greatest. However, according to the World Health Organization's (WHO) definition of food security, consuming unsafe food is tantamount to being food insecure. Further, exposure to unsafe food has economic ramifications. As was articulated by Jaffee et. al., food safety can affect the livelihoods of poor people within agrifood value chains, whether as small-scale producers; marketplace, street, or cross-border food vendors; or operators (or employees) of micro and small food enterprises (Jaffee et al., 2020).

The direct economic cost of unsafe food is felt by producers and traders who fail to access high value export markets due to non-compliance to food safety requirements, or the prohibitive costs of compliance to food safety requirements particularly by smallholder farmers. Export rejections are costly and may result in decreased market access, and reduced commodity prices which also has a negative impact on food producers and traders. The indirect costs of unsafe food include the increased public health burden as a result of preventable diseases due to exposure to food-borne hazards. This is often the case when domestic markets are not monitored to ensure that only safe food is supplied to the public, or when non-complaint food exports are rejected and redirected to domestic food or feed markets.

The food safety life cycle (Figure 1) across countries and over time, reflects evolving food safety challenges, as well as the degree of mismatch of food safety management capacity in and between the public and private sectors (Jaffee et al., 2020). The less developed a country is, the higher the economic burden of food safety. Many African countries are considered to be reliant on traditional food systems with others transitioning towards modernized food systems. With increasing modernization of food systems, diversified diets and increased processing of foods, there are also increased food safety hazards and challenges. For example, microbiological hazards (*Salmonella typhi, Listeria monocytogenes, Staphylococcus aureus*) may be amplified due to increased handling during food processing. Other processing methods such as high temperature treatment may result in the formation of toxic compounds such as acrylamide. Having said this, there is minimum to no capacity to manage the growing plethora of emerging food safety concerns in most African countries.

According to the World Health Organization Foodborne Disease Burden Epidemiology Reference Group (WHO-FERG) food borne diseases (FBDs) are estimated to cost approximately 15 billion disability adjusted life years (DALYs)[1] (World Health Organization, 2015). Given that the sum of DALYs across a population is a measure of the burden of disease and can be thought of as a measurement of the gap between current health status and an ideal health situation, wherein the entire population lives to an advanced age, free of disease and disability, it is imperative that African governments consider investments in food safety. Currently, it is difficult to estimate the economic costs related to FBD in Africa. Apart from gastrointestinal infections, there is limited epidemiological evidence of direct causal relationships between unsafe food and chronic FBD such as cancer. These challenges are exacerbated by data and methodological limitations.

[1] The disability-adjusted life year is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.



Adapted from: Jaffee et al (2019)

Data seems to suggest that when compared to trade-related economic costs, public health related economic costs, though indirect, far outweigh the trade-related economic costs of food safety. This is because the domestic costs associated with exposure to unsafe food are not necessarily monitored and prioritized, and that safer food is directed to international markets to ensure compliance with market requirements and standards. Therefore, a data gap exists particularly with regard to domestic food safety and the associated public health burden of unsafe food. There has been a decreasing number of food safety related export rejections for international exports. However, regarding intra-regional trade, a few incidences have been reported, notably disruption in trade due to aflatoxin contamination in maize and groundnuts, and the ban on livestock exports due to foot and mouth disease in the recent years.

SPS measures remain a major impediment to trade for African countries, who face challenges including limited technical support to drive harmonization, and convergence of sanitary and phytosanitary (SPS) standards based on science and aligned with those of International Standard Setting Bodies (ISSB), namely Codex Alimentarius, WOAH and IPPC. Findings indicate that at the continental level, there are structures and policies to promote the implementation of food safety principles and measures for the protection of human, animal, and plant health. Typically, the food safety regulatory landscape in member states is fragmented, with food safety regulations falling under the responsibility of different institutions, agencies, and departments that carry out mandates independently, with minimal or no linkages and with some evidence of overlap. Moreover, lack of harmonization in food safety legislation and regulation also poses a huge challenge in addressing issues to deal with non-conformity to prescribed standards and regulations. Although, considerable work has been done through the African Organization for Standardization (ARSO) and Regional Economic Communities (RECs) towards harmonization of standards at the continental level, more work still needs to be done at national level. Coupled with SPS capacity constraints being faced by African countries, this poses numerous challenges for implementing SPS measures and consequently for trade, as the absence of common ground gives rise to the emergence of non-tariff barriers to trade.

This assessment is part of a bigger project whose overall objective is **to document pathways that the Food Trade Coalition for Africa's Thematic Working Group on Food Safety and Nutrition could influence and/or advocate policy/regulatory reforms that are targeted at resolving food safety and nutrition constraints to increasing regional food trade**. The specific objectives of this assessment were to estimate the economic cost of SPS measures to regional food trade in Africa in a select number of focus countries in sub-Saharan Africa[2].

[2] Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Nigeria, Rwanda, South Africa, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

Focus countries

1. Burkina Faso
2. Mali
3. Ghana
4. Nigeria
5. Ethiopia
6. Kenya
7. Uganda
8. Rwanda
9. Unted Republic of Tanzania
10. Zambia
11. Malawi
12. Mozambique
13. Zimbabwe
14. South Africa

The key value chains identified to be prone to food safety issues, and are important to increasing intra-regional trade due to high production, export potential, and national prioritization in the various national agricultural policies were: maize, sugar cane, rice, livestock, bananas, fresh vegetables, palm oil, coffee, black tea, fish/sea food, cashew nuts, groundnuts, soya beans, potatoes, wheat, cocoa, and sesame seed. Notably, there have been a decreasing number of food safety related export rejections for international exports. However, regarding intra-regional trade, a few incidences have been reported, notably disruption of trade due to aflatoxin contamination in maize and groundnuts, and the ban on livestock exports due to foot and mouth disease. This report will focus on the economic costs associated with SPS measures in the maize and livestock value chains respectively.

Approach

In order to quantify the economic costs associated with food SPS measures, it is necessary to perform in-depth analyses of the following;

- Resources expended on public health and loss of productivity when FBD outbreaks occur including disruptions to food markets;
- Demographic distribution of affected populations;
- Impediments to agrifood exports due to real or expected food safety problems including self-bans and export rejections, loss of markets and decreased market access;
- Costs of complying with food safety regulations and standards in foreign markets;
- Costs associated with FBD prevention (inspections, conformity assessments); and,
- Costs associated with shifting food consumption patterns, as a result of concerns about food safety.

Unfortunately, there is limited data available on the magnitude of these variables with respect to these commodities, to be able to draw definitive conclusions on the economic costs of these measures. This assessment therefore focused on maize and livestock, as they are the largely traded commodities with historical SPS issues particularly between in the selected focus countries. This study could not cover all the food safety hazards, nor was it able to explicitly quantify the magnitude of the economic burden of SPS measures due to limitations of time and data.

- Cognizant of the aforementioned limitations, the approach that was used to estimate the economic costs of SPS measures on the maize and livestock value chains was as follows;
- Production statistics over a five-year period (2016-2020) for the key value chains were extracted from FAOSTAT database. Commodity losses were computed relative to production volumes, and used as a measure to estimate economic losses due to non-compliant food circulating in the domestic market. The assumption is that commodities that are not traded on the regional or international market end up in the domestic market, and any loss reflects non-compliance to domestic market requirements. These could be due to product perishability, poor storage, and public health concerns such as contamination.
- Trade statistics (quantity and value) for the selected key value chains were extracted from the FAOSTAT database, and computed as a percentage of the produced volumes per commodity. These statistics covered a five-year period (2016-2020). The statistics were further disaggregated to determine trends in trade between focus

countries, and to identify time points where traded volumes were affected. Trade data for livestock were specifically extracted from the COMTRADE database.

- Domestic food prices were used to estimate the market value of commodities. These prices were obtained from the United Nations World Food Programme (WFP) food prices database. All currencies were converted to USD for ease of comparison.
- All statistics were corroborated, where possible, with data and information obtained from key informants per respective value chain, notably the Eastern Africa Grain Council (EAGC).

SPS measures and associated economic costs

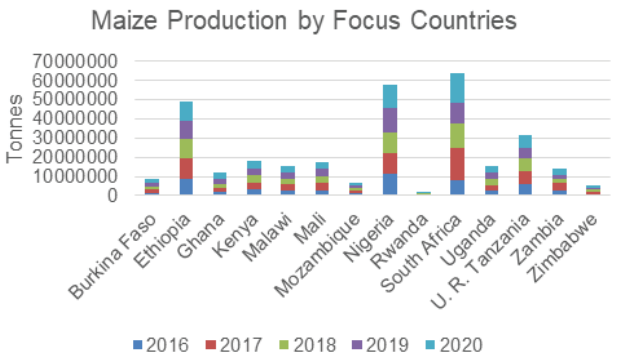
Regional trade amongst focus countries in 2021

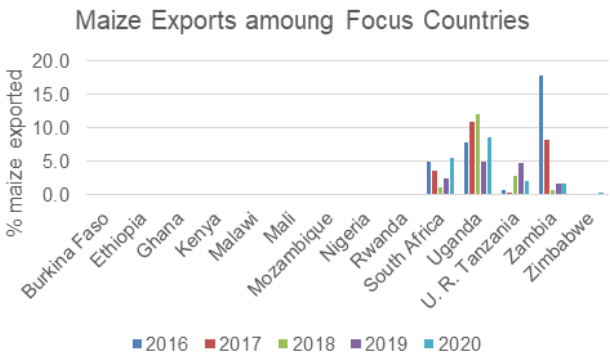
Focus Country	Commodity	Commodity (HS code)	Export value 1000 USD	Importing countries
Burkina Faso		Rice (1006XX)	9	Ghana
		Livestock (0102XX, 0103XX)	720	Ghana, Mali
Ethiopia		Coffee (090111)	2,941	South Africa, Kenya, Nigeria
Kenya		Maize (100590)	2,668	U.R. Tanzania, Ethiopia, Rwanda
		Bananas (080390)	1	Uganda
		Fresh vegetables/ fruit (0706XX)	5,532	Uganda, Ethiopia, U.R. Tanzania
		Black tea (090240)	10,267	Nigeria, South Africa, Ghana, U.R. Tanzania, Zambia, Ethiopia, Uganda, Burkina Faso, Rwanda
Malawi		Rice (1006XX)	25	Zimbabwe, South Africa, Zambia, U.R. Tanzania
		Black tea (090240)	18,790	South Africa, Kenya, Zambia

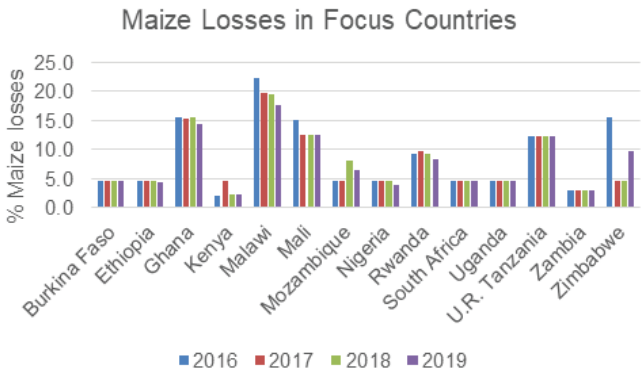
Focus Country	Commodity	Commodity (HS code)	Export value 1000 USD	Importing countries
Mozambique		Maize (100590)	1,141	South Africa, Zimbabwe
		Rice (1006XX)	1,003	Zimbabwe
		Bananas (080390)	39,944	South Africa, Malawi
Rwanda		Rice (1006XX)	3	Uganda
South Africa		Fresh vegetables/ fruit (0706XX)	1,540	Mozambique, Zambia, Malawi, Ghana, Zimbabwe, Uganda, Burkina Faso
		Maize (100590)	97,378	Zimbabwe, Mozambique, Ghana, Kenya, Nigeria, Malawi, Zambia, Uganda, Ethiopia, U.R. Tanzania.
Uganda		Maize (100590)	18,927	Kenya, U.R. Tanzania
United Republic of Tanzania		Maize (100590)	54,019	Kenya, Rwanda, Uganda
		Rice (1006XX)	286,726	Uganda, Kenya, Rwanda, Zambia, Malawi, Zimbabwe South Africa
		Livestock (0102XX, 0103XX)	10,453	Kenya
		Bananas (080390)	340	Zambia, Malawi, Kenya

Focus Country	Commodity	Commodity (HS code)	Export value 1000 USD	Importing countries
		Black tea (090240)	15,517	Kenya, South Africa, Rwanda
Zambia		Rice (1006XX)	7	Zimbabwe
Zimbabwe		Bananas (080390)	1,582	South Africa, Zambia
		Black tea (090240)	15,985	South Africa, Mozambique, Zambia

Maize



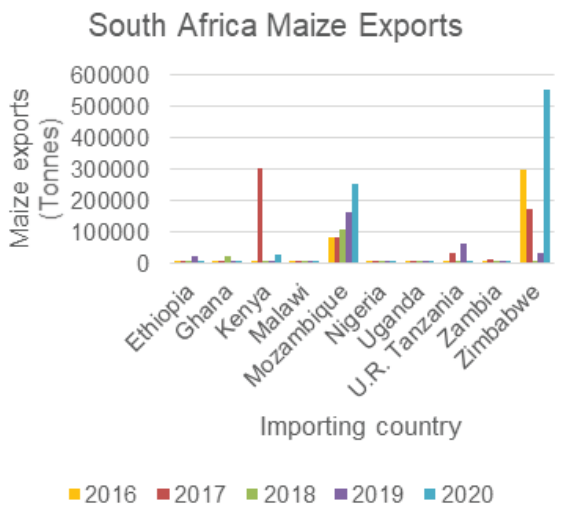


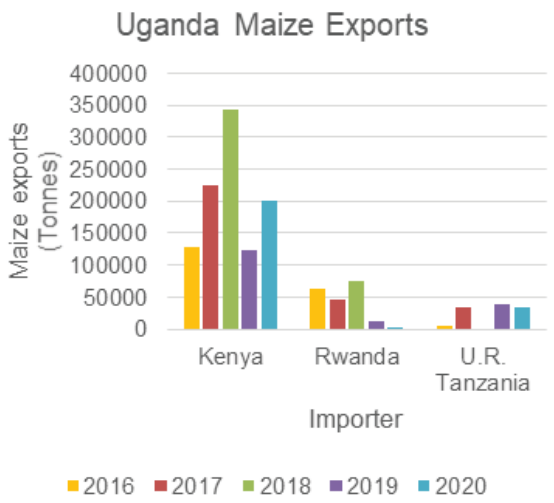


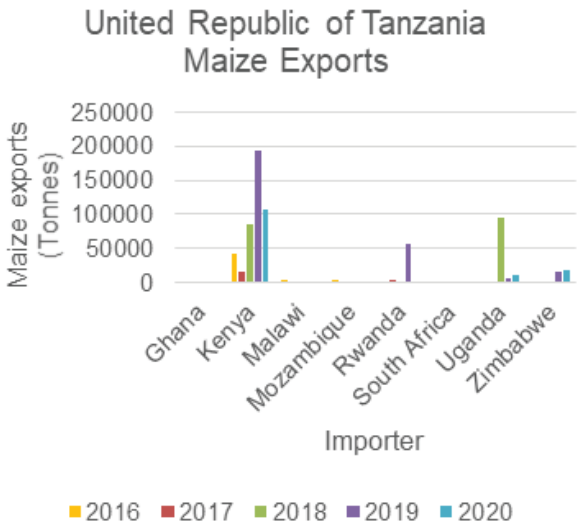
Data source: FAOSTAT (2022)

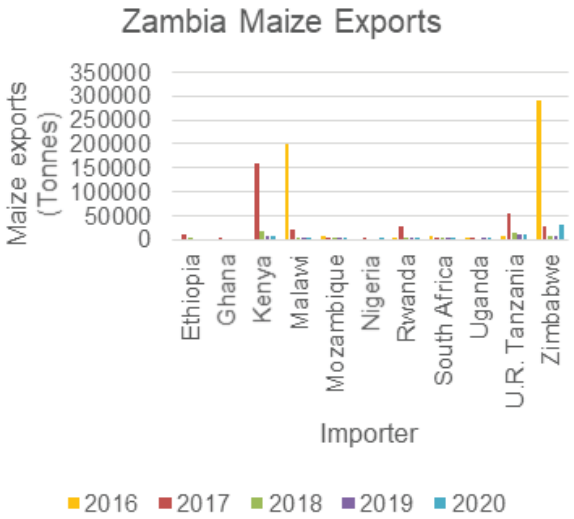
Between 2016 and 2020, approximately 317 million tonnes of maize were produced by the focus countries, with the cumulative average production levels in excess of 4.5 million tonnes per year. Maize losses between 2016 and 2019 were estimated to be approximately $4.1 million, and these can be attributed to a variety of factors including post-harvest losses such as some export market rejections due to failure to meet food safety standards. There is however no data to enable the disaggregation of product losses, nor to determine the specific causal factors. It is estimated that up to 36% of maize losses that occur in Africa, are due to post-harvest losses (Tefera, 2012). Therefore, we can extrapolate the remainder as food safety and quality losses, and subsequently derive an estimation of $2.6 million. The main exporters of maize to the focus countries were South Africa, Uganda, Tanzania, and Zambia. Despite high production levels in most countries, export bans imposed in most countries, chiefly to ensure food security, negatively affected maize trade (Diao et al., 2016; Sitko et al., 2014).

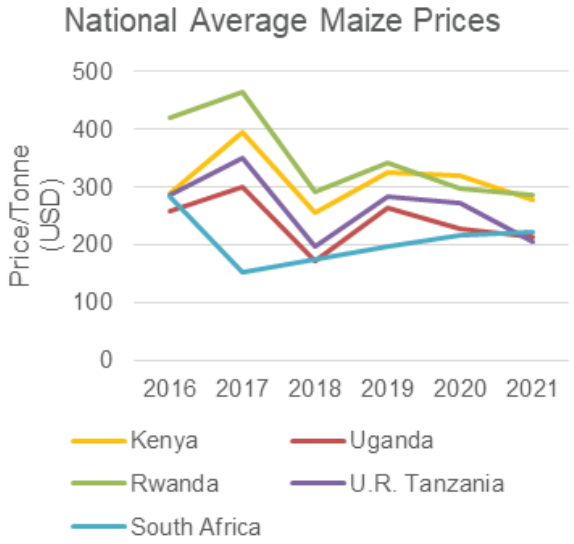
Maize trade by country











Data source: FAOSTAT (2022)

The trend in the trade of maize suggests that generally there were fluctuations in exported quantities over the years from 2016 to 2020. With the exception of Zambia, which imposed an export ban on maize from 2017 to 2020, various SPS issues affected trade in maize by key trading countries, and these include mycotoxin contamination and genetically modified (GM) content in maize grain. Exporting countries affected by SPS measures were Uganda, Tanzania, and South Africa, while the affected importing countries were Kenya, Rwandan and Tanzania. The effect of decreased exports and induced commodity shortages in the importing countries had the negative impact of decreased revenues for producers and increased retail prices respectively.

Maize SPS Issue 1 – Mycotoxins

Maize is a staple crop in many sub-Saharan countries, particularly in East and Southern Africa. In the past five years, there have been food safety concerns in the maize value chain specifically due to aflatoxin B1, a potent mycotoxin associated with both acute and chronic toxicity in humans. In the EAC region, up to 13 million tonnes of maize are traded annually, with 99% of the maize being imported by Kenya. Uganda and Tanzania are the net exporters of maize in the region, and Kenya and Rwanda are net importers. Uganda used to be the largest exporter of maize to Kenya, but the aflatoxin contamination concerns and subsequent import bans by Kenya have resulted in loss of export markets for Ugandan maize exporters.

In **2018**, 600 metric tonnes of Ugandan maize, worth about 180 billion Ugandan shillings (over US$80 million), were returned by Kenya claiming the maize had traces of aflatoxin among other standards issues.

In **2018**, there was a significant decrease (over 90%) in the percentage of maize exports from Uganda to Kenya, Tanzania and Rwanda, and this was attributed to the ban on maize imports from Uganda by Kenya due to aflatoxin contamination above the regulated limit of 10 ppb. Maize imports by Rwanda from Uganda also decreased significantly, and this could be attributed to the ripple effects of Kenya's ban on Ugandan maize.

In **March 2020**, Kenya enforced a blanket ban on all imports of maize, particularly from Uganda and the Tanzania due to aflatoxin contamination exceeding the legislated level of 10ppb. According to the Agriculture and Food Authority (AFA) in Kenya, Ugandan maize was found to contain mycotoxins, particularly aflatoxins and fumonisins exceeding 10ppb and 2000ppb respectively. In addition to maize import bans from Uganda and Tanzania, the Kenya Bureau of Standards (KEBS) also banned and directed market recall of 17 maize flour brands in the same year, citing high aflatoxin levels that could negatively impact human health.

In **May 2021**, Kenya's Agricultural Food Authority (AFA) confiscated and destroyed more than 150 tonnes of Tanzanian Maize with an approximated value of TZS75 million (US$32 000) due to non-compliance to aflatoxin maximum limits . In **August 2021** the Kenya Bureau of Standards (KEBS) issued a ban on several maize meal and composite flours from being sold to the public in Kenya due to non-compliance with the requirements of the Standards Act Cap 496, Laws of Kenya.

Costs of Importing maize into Kenya

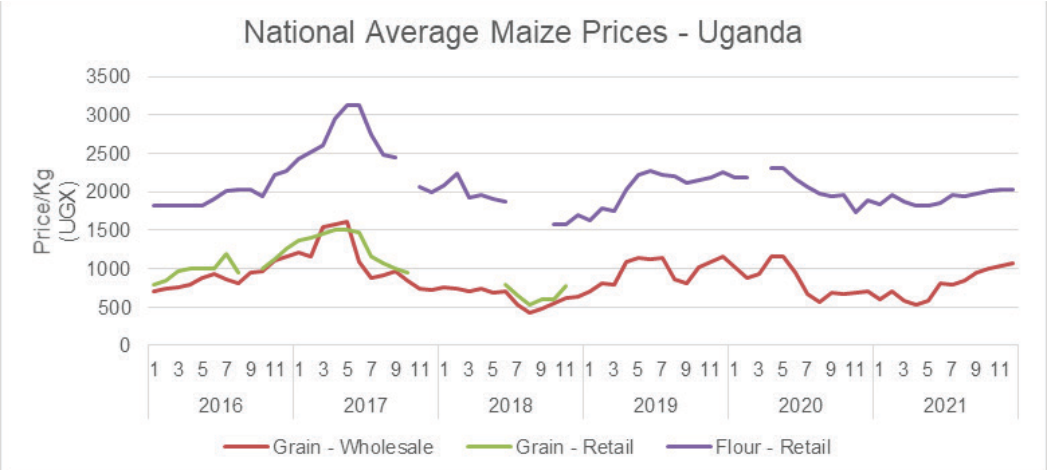
- **Clearing agent fees** - 1% of value of consignment.
- **Registration fees** - 2% Cost, Insurance & Freight (CIF) or customs value (Railway development levy) for non-EAC countries + 3.5 % Cost, Insurance & Freight (CIF) or customs value for non-EAC/ non-COMESA countries for import duty.
- **Kenya Plant Health Inspectorate Service (KEPHIS) Inspection fees** - minimum KES10,000.00.
- **National Biosafety Authority release fee** – KES1,000.00
- **Port Health Certificate** – KES1,000.00
- Kenya Bureau of Standards (KEBS) inspection fees (optional)
- **20% customs value** for non-EAC countries.
- $265.00 or 0.6% of the customs value with a maximum fee payable of $2,700 for destination inspection fees for EAC countries.
- **Certificate of origin** - Free

Effect of Ugandan and Tanzanian maize ban by Kenya on maize exporters

- 90% of Ugandan maize exports are to Kenya. The annual exports of maize to Kenya are estimated to be from US$720 to US$900 million, according to figures from the Bank of Uganda. The total revenue from potential exports of maize was estimated at an average of US$121 million (Ush447 billion) in annual revenue, according to data obtained from the Bank of Uganda and US$34.85 million (TZS81 billion) by Tanzania. The ban impacted traders, transporters, and farmers resulting in an increase in the cost of doing business. Even though the ban was lifted in 2021, stringent conditions were enforced for the importation of maize, mainly;
- All importers had to be registered;
- All maize imports had to be accompanied by a certificate of conformity to the aflatoxin maximum limits;
- Each consignment must be accompanied by a certificate of origin; and,
- Each exporter must provide traceability documentation.

In Uganda, farm gate revenues were not affected as the ban went into effect when farmers had already disposed of their maize to aggregators, wholesalers and traders. However, the market price of maize decreased, with the average price of maize reportedly dropping from between 580 – 600 Ugandan shillings to 530 Ugandan shillings per kilogram in Kampala soon after the ban was effected[3]. The ban had a dampening effect on domestic prices as supplies had increased in the domestic market. Traders also suffered up to 10% revenue losses from the drop in market prizes of the commodity.

[3] https://www.newvision.co.ug/category/news/kenyas-ban-on-ugandan-maize-starts-biting-93672



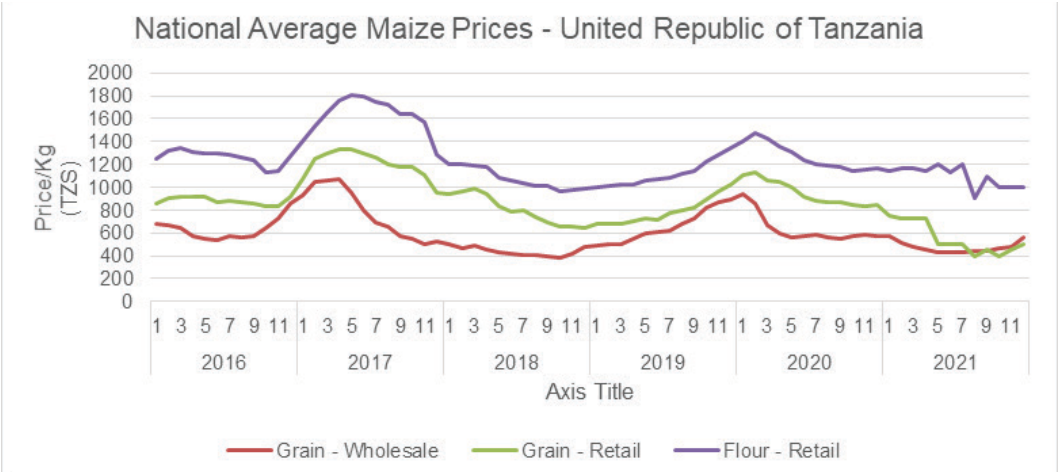
Data source: WFP Food Prices Data (2022)

According to a draft report by the East Africa Grain Council (EAGC) and AGRA, over 90% of exporters were directly affected by the maize ban (Masila et al., 2022) and the following effects were experienced across the maize value chain in Uganda;

- Inability of exporters to access the Kenyan market, leading to loss of markets to Tanzanian exporters. There was 80% and 69% decrease in maize exports to Kenya between February and March 2021, and March and April 2021 respectively, when compared to the same period in 2020.
- Decreased imports by Kenyan maize aggregators as they were now wary of the safety of Ugandan maize, preferring Tanzanian maize due to a perceived lower risk.
- Inability to service credit lines due to disrupted cash flows as a result of failure to export the commodity. This also cascaded to decreased credit lines to maize traders by farmers, as the former failed to service previously advanced credit.
- Decreased foreign currency revenues.
- Prohibitory costs of compliance owing to more stringent requirements for the import of maize into Kenya.
- Additional costs due to border delays including demurrage and additional transport costs of up to US$100 per day per truck.
- Oversupply of maize in the domestic market in Uganda due to export diversions of maize rejected by the Kenyan market. As such, compared to March 2020, there was a decrease in the market price of maize by over 40% in March 2021.

In Tanzania, farmgate prices were not affected as maize farmers had already sold off their maize. However, as in Uganda market prices of maize were negatively impacted, with a decrease in formal maize exports shortly after the ban. On average, 150 trucks each loaded with more than nine tonnes of maize cross the border to Kenya daily, and the ban disrupted the supply chain. According to a survey by the EAGC, formal Tanzanian exports of maize to Kenya decreased by 66% and 60% between February and March 2021, and March and April 2021 respectively, as compared to the same period in 2020 (Masila et al., 2022). However, there was an increase in informal maize exports from Tanzania into Kenya by 260% and 286% between February and March 2021 and March and April 2021 respectively, as compared to the same period in 2020. Further, the ban affected maize grain imports to Kenya but was silent on maize flour imports therefore creating a lucrative market for Tanzanian millers.

There was a decrease in the average maize prices on the local market.



Data source: WFP Food Prices Data (2022)

Effect on the maize import ban on the Kenyan market

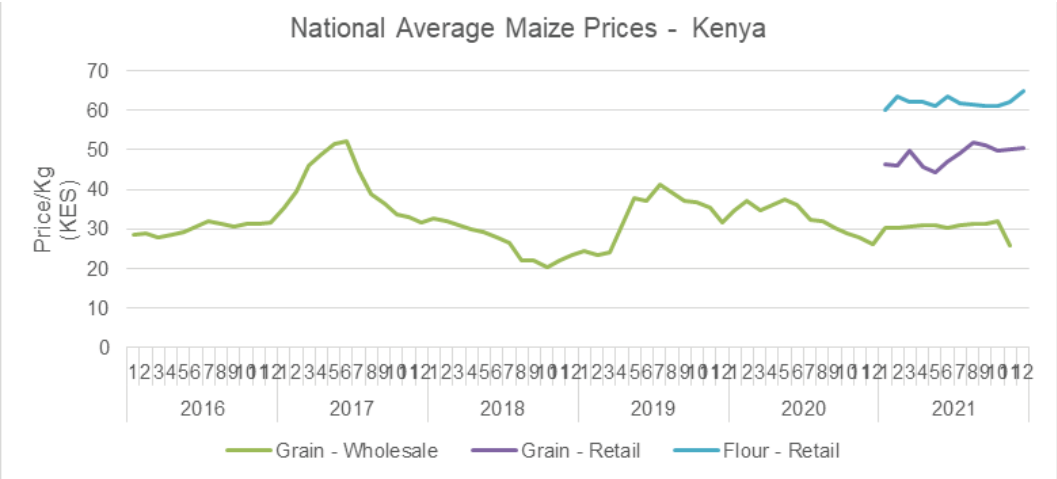
According to the draft report by the EAGC and AGRA (Masila et al., 2022), the following effects of the maize ban were experienced in the Kenyan domestic market;

- There was a 2-fold increase in maize grain prices for millers due to shortages induced by the maize ban.
- The increased imports (both formal and informal) of cheaper Tanzanian maize flour into Kenya, coupled with failure to satisfy the required market volumes led to a reduced market share occupied by Kenyan millers leading to loss of business.
- Decreased capacity utilization by millers of up to 40% due to the shortage of maize resulted in an inability by millers to supply the market.
- Disrupted cash flows and inability to service lines of credit by millers.
- Increased direct costs (at least US$300 per consignment) for maize importers who were expected to comply to more stringent import requirements by the AFA, and indirect costs due to delays in obtaining the necessary AFA approvals. Based on an estimated average of 150 consignments per day, the estimated cost of additional costs amounts to US$45,000.00 per day.

Effect of maize import bans by Kenya on domestic maize prices in the EAC region

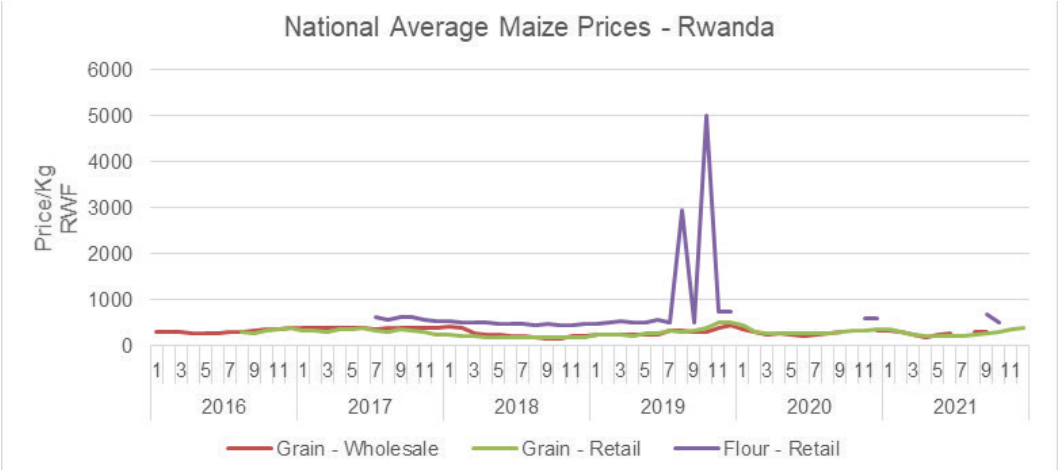
The direct economic impact of aflatoxin contamination in crops results mainly from a reduction in marketable volume, loss in value in the national markets, inadmissibility, or rejection of products by the international market, and losses incurred from livestock disease, consequential diseases, and mortality. Trade restrictions push products from the formal markets into informal markets using porous borders, where there is little to no traceability regarding volumes, destinations, and prices (Sitko et al., 2014). Import bans push exporters/traders to store maize, causing prices in both origin and destination countries to rise higher than they otherwise would (Diao et al., 2016). This price instability creates a high-risk environment for farmers, who are exposed to lower domestic prices as compared to higher prices in export markets where the demand for commodities is high (Diao et al., 2016). This also affects their investment decisions come next season and affect the national output. In addition, export competitiveness is decreased particularly due to the high cost of exporting due to increased requirement for export market compliance. Small-holder farmers are particularly affected as food safety compliance costs are typically prohibitive to their access to export markets.

Kenya market price data shows that there was a significant increase in the price of maize for the first half of 2017, 2018 and 2019 when maize import bans were in effect. According to the EAGC, there was a 15% increase in maize prices in March 2021 as compared to March 2020 and a 19% increase when comparing the 3-year average price of maize during the same period (Masila et al., 2022).



Data source: WFP Food Prices Data (2022)

The maize import ban imposed by Kenya on Ugandan and Tanzanian maize also had a negative ripple effect on the Rwandese market. Rwanda is a net importer of maize from Uganda and Tanzania. Following the maize import ban from Uganda and Tanzania by Kenya in 2019, data on maize process indicates that there was a sharp increase in prices of imported maize on the Rwandese market. In 2020, there was a shortage of imported maize on the Rwandese market in response to the aflatoxin concern in Ugandan and Tanzanian maize.



Data source: WFP Food Prices Data (2022)

Public health cost of aflatoxin contamination in maize

Though estimated to account for a very small proportion of foodborne illnesses or deaths in Africa, aflatoxins are the food safety hazard that has attracted the most public attention, policy focus, and development assistance in recent times (Jaffee et al., 2020). Aflatoxin is the toxin associated with the greatest number of DALYs and they are mainly attributed to years of life lost (YLL) (World Health Organization, 2015). The median rate of illnesses, deaths and DALYs per 100 000 people in Africa attributed to aflatoxin was estimated to be 0.4, 0.4 and 15 respectively (World Health Organization, 2015).

76 cases of acute aflatoxicosis and 24 associated deaths were reported in the **United Republic of Tanzania** between 2016 and 2017 (Massomo, 2020). Of these cases, a total of 68 cases occurred between 14 May and 14 November 2016, with 20 mortalities within the same period (Kamala et al., 2018). Further, it was estimated that in 2016 there were about 1,480 (2.95 per 100,000 persons) new cases of aflatoxin-induced liver cancer in Tanzania and an associated total loss of about 56,247.63 DALYs (Kimanya et al., 2021). Based on findings of a country-led situation analysis and action planning (C-SAAP) on aflatoxin led by the Partnership for Aflatoxin Control in Africa (PACA), the aflatoxin public health burden in Tanzania is estimated to cost the country in excess of US$10 million annually (PACA, 2017). Further, approximately 4,825 aflatoxin induced liver cancer cases are reported annually (PACA, 2017).

It is estimated that **Uganda** loses US$ 577 million (Shs 200 billion) annually as a result of 3,700 aflatoxin-induced liver cancer cases (Lukwago et al., 2019). In addition, the aflatoxin-related illnesses cost the government of Uganda an extra US$ 910,000 on health services (Lukwago et al., 2019).

In **Kenya**, the most severe aflatoxin outbreak documented to date occurred 2004 in the former Makueni District, which resulted in 317 cases and 125 deaths (Lewis et al., 2005). Aflatoxin contamination in maize has been linked to increased risk of hepatocellular cancer in the Kenyan population (Kibugu et al., 2022).

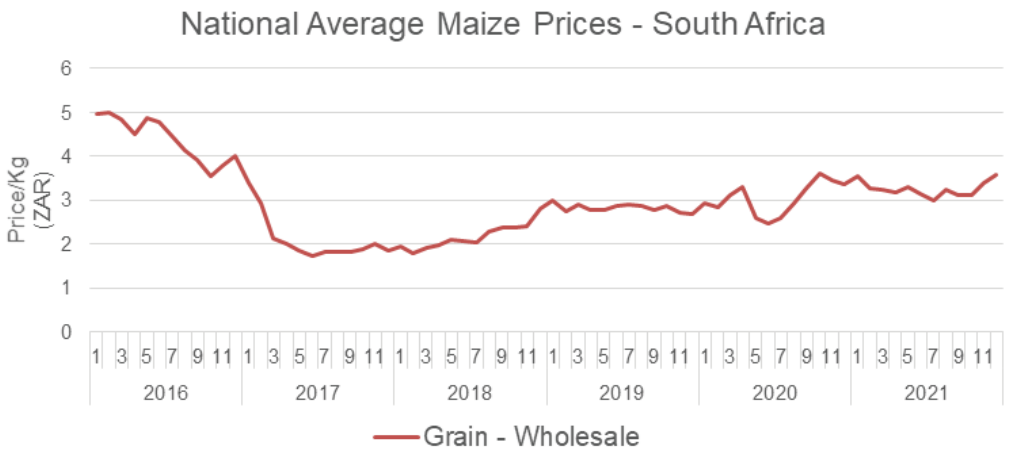
Maize SPS Issue 2 – Genetically modified (GM) content safety concerns

The Government of Kenya on 8th November 2012 through a Cabinet decision instituted a ban on importation of all GM food into the country. There was a significant decrease in maize imports by Kenya from South Africa due to Kenya's ban on genetically engineered food crops. This limited the amount of maize that can be imported from South Africa as over 80% contains GM content[4]. The ban on imports from South Africa resulted in an increase in maize prices in Kenya in 2017 but had no significant effect on maize prices in South Africa.

There was also a significant decline in imports of maize from South Africa by Zimbabwe due to Zimbabwe's ban on GM maize. However, in 2020, Zimbabwe permitted the importation of GM maize from South Africa on condition that it would be directly processed (milled) upon importation.

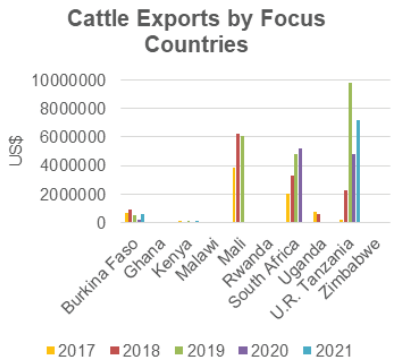
Based on 2016 export volumes to Kenya and Zimbabwe, South Africa lost potential revenue of US$105.52 million (ZAR1.734 billion) in potential maize exports to the two trading partners in 2017.

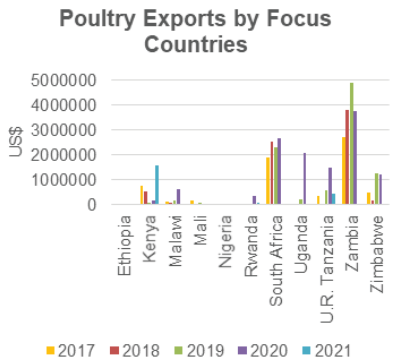
[4] https://www.cnbcafrica.com/2022/changes-in-sub-saharan-maize-trade-spell-potential-trouble-for-kenya/

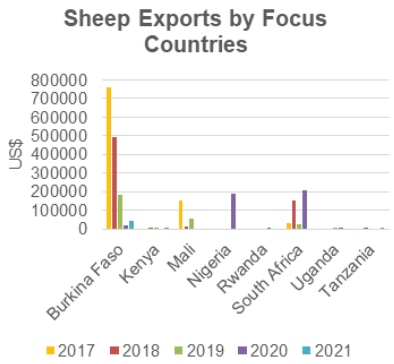


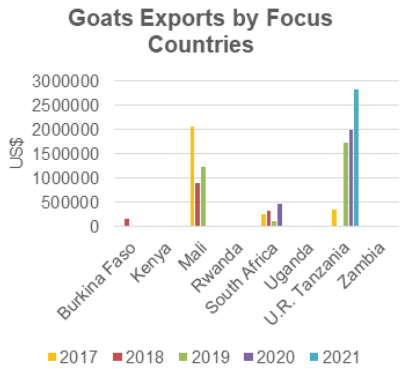
Data source: WFP Food Prices Data (2022)

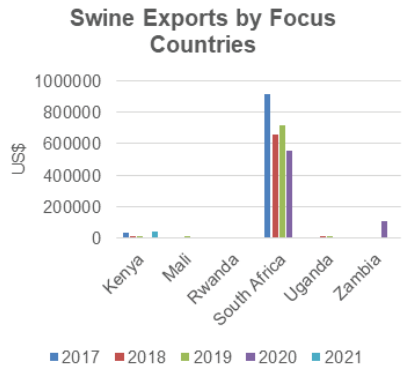
Livestock







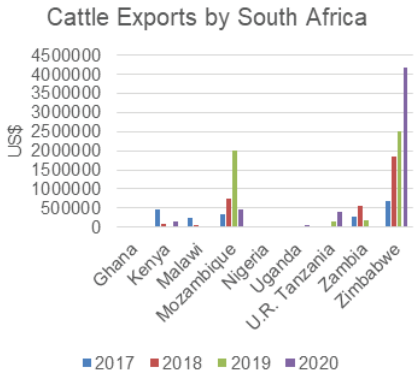


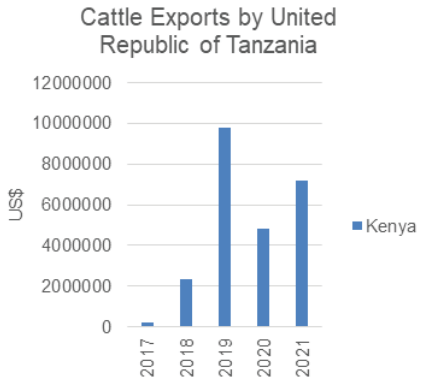


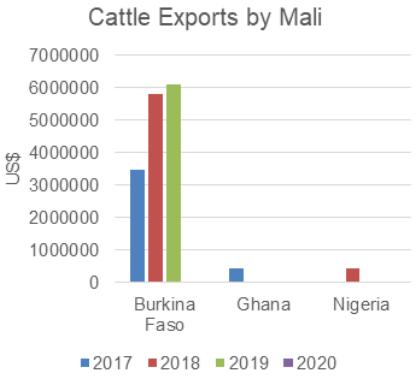
Source: COMTRADE Data (2022)

Cattle and poutlry are the main livestock traded. The biggest exporters of cattle by value are U. R. Tanzania, South Africa and Mali, with total revenue from cattle exports between 2017 and 2021 being US$24.3 million, US$16.2 million and US$15.5 million, respectivley. The biggest exporters of poultry by value are Zambia, South Africa and Zimbabwe with total revenue from poultry exports between 2017 and 2021 being US$15.1 million, US$9.4 million and US$3.1 million respectively. The U.R. of Tanzania and Mali are the biggest exporters of goats by value with total revenue from exports between 2017 and 2021 being US$1.4 million, respectively. South Africa is the biggest exporter of swine by value with total revenue from swine exports between 2017 and 2021 of US$2.8 million.

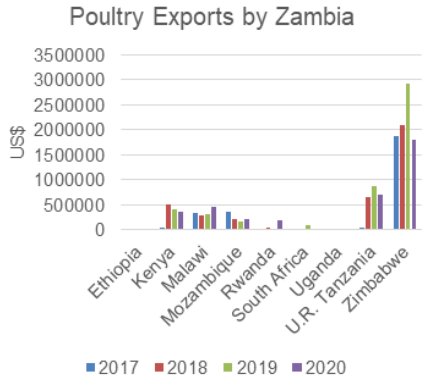
Cattle trade by country

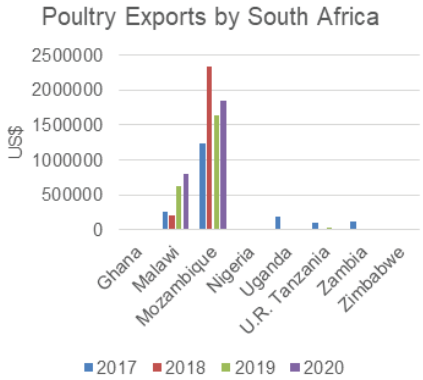


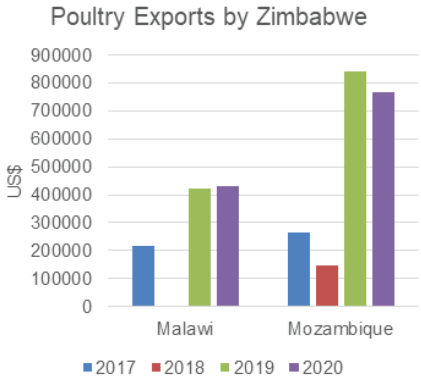




Poultry trade by country







Livestock SPS Issue 1 – Foot and Mouth Disease in Cattle

Foot and mouth disease (FMD) is endemic to Africa. From 2014 – 2019 Foot and Mouth Diseases outbreaks have been reported in many SADC countries, some of which occurring in previously designated FMD free zones, affecting trade of livestock (SADC, 2019) . Regarding the focus countries and based on data from between 1996 and 2018, the countries with the most reported cases of FMD are Burkina Faso, Tanzania, Zambia, and Ethiopia (Calkins & Scasta, 2020).

In **November 2019**, Zimbabwe reactivated a ban on livestock imports from South Africa as a precautionary measure designed to prevent the spread of FMD into Zimbabwe.

In **March 2022** the Mozambique National Directorate for Livestock Development banned the importing from South Africa of cattle, goats, sheep, pigs, their meat and by-products, plus wild cloven-hoofed ruminants and fodder for feeding cattle, following an outbreak of foot-and-mouth disease in three South African provinces (Limpopo, North-west and KwaZulu Natal) (Makgopa, 2022). South Africa responded to the FMD outbreak by imposing restriction on the movement of livestock from affected areas and this has resulted in increased beef prices on the domestic market. In addition, culling was used as a control measure on a case-by-case basis.

Impact of FMD on livestock production

The FMD negatively affected producer prices, with a significant increase in producer prices in South Africa in the years following the 2017 FMD outbreak (DALRRD, 2020).

Average beef producer prices in South Africa

Source: DAIRRD, 2020

FMD inflicts huge losses chiefly direct losses due to reduced production changes in herd structure and indirect losses caused by costs of FMD control, poor access to markets and limited use of improved production technologies (Knight-Jones & Rushton, 2013). Further, FMD outbreaks also affect secondary value chains. For example, in the dairy value chain there are additional processing costs for dairy products, reduced daily yields in affected regions and potential supply chain disruptions.

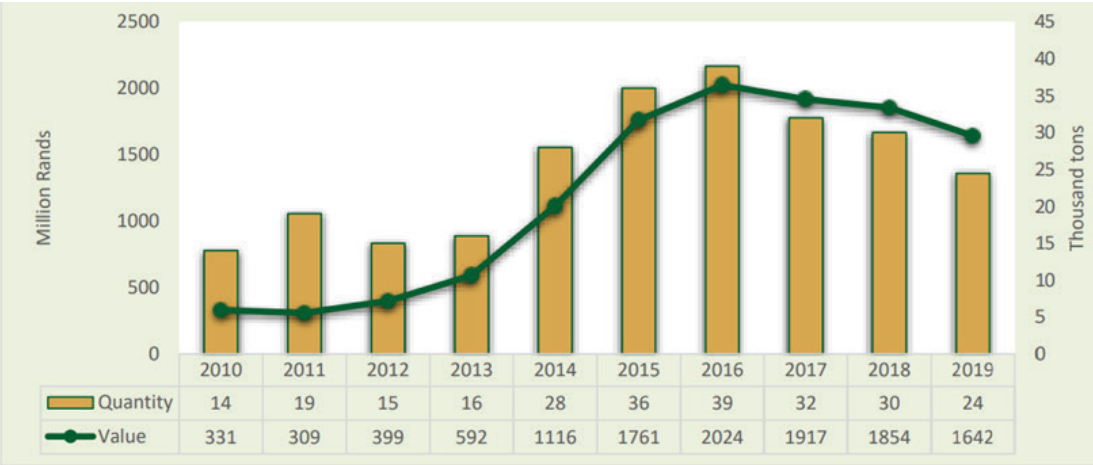
Costs of control to achieve maintaining disease free status are very high and these include;

- Vaccination per dose approximated at between us$0.40 To us$9.00 (Knight-jones & rushton, 2013).
- Surveillance
- Culling
- Restriction of movement of animals
- Investments in veterinary services, education, research, and general infrastructure to develop the animal health system

Impact of FMD on prices of livestock food products

Over 80% of South African beef exports goes to Southern African Development Community (SADC) countries, with Mozambique being the largest importer. Following the FMD outbreak, there were lower exports of beef in 2017 to 2019, resulting from the decline in beef production and the export ban.

Beef exports by South Africa

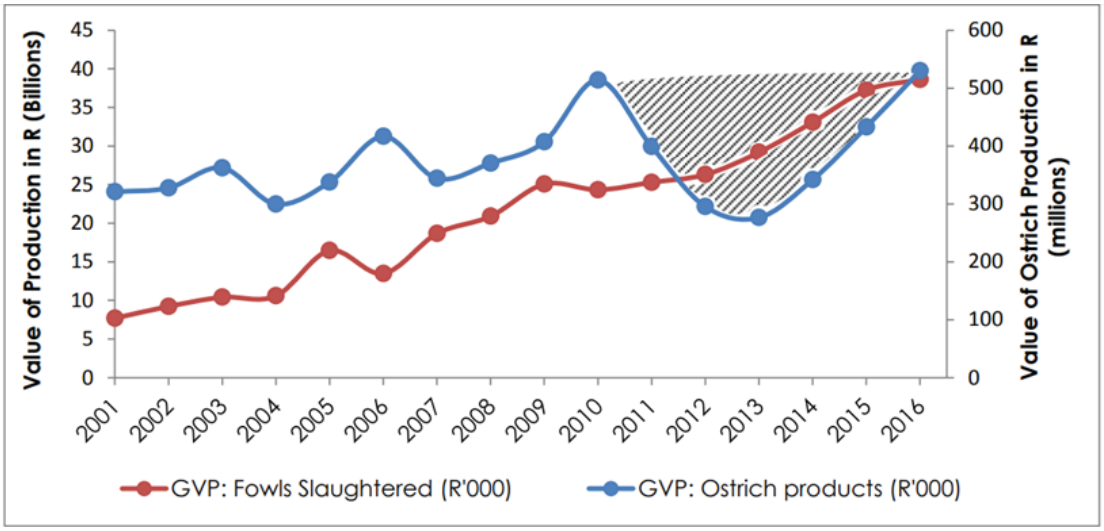


Source: DALRRD, 2020

Livestock SPS Issue 2 – Avian Flu in Poultry

In **2011**, Zimbabwe banned the importation of poultry and poultry products from South Africa due to an outbreak of avian influenza (H5N2) at ostrich farms over fears that the virus would potentially mutate to the H5N1 variant which affects chickens and humans[5]. Exports of ostrich meat was immediately halted, and an avian influenza control area (AICA) was set up using geopolitical boundaries after confirmation of the outbreak (van Helden et al., 2016). The direct costs of this outbreak were a monthly loss of R108 million from foreign export earnings from ostrich exports and approximately R72.62 million replacement costs after the culling of 27000 ostrich birds (Pienaar, 2017). Following the outbreak, there was a decline in production in the following 5 years and this was estimated to be valued at R864.3 million from 2010 to 2016 (Pienaar, 2017).

Decline in ostrich production due to H5N8 avian flu in South Africa



Source: Pienaar, 2017

In **January 2017**, Kenya and Rwanda banned the importation of poultry and poultry products from Uganda due to an avian flu outbreak caused by Highly Pathogenic Avian Influenza (HPAI). It is estimated that Kenya imports poultry worth KSh1.5 billion (US$12.4 million) annually through both formal and informal channels. The ban affected poultry traders who were profiting from cheaper poultry imports from Uganda.

In early **June 2017**, an avian influenza outbreak caused by the H5N8 virus at one of the largest poultry farms in Zimbabwe resulted in the culling of over 2 million birds[6] with an estimated worth of over US$7 million. This was followed by a ban by South Africa of poultry imports from Zimbabwe. Later in the same month, Zimbabwe banned the importation of poultry products from South Africa due to an outbreak of the highly contagious H5N8 bird flu in the country. Similar bans were also effected against South Africa by Namibia and Botswana. The affected poultry farms instituted several costly control measures, including the culling of a significant proportion of their breeding stock in order to contain the outbreak[7]. Around 20% of laying hens — 4.7 million birds — were culled leading to a nationwide shortage of 20-50% in South Africa. Further, the affected farms were placed under quarantine and movement of chickens and chicken products onto and off the farms stopped. In Zimbabwe, prevention measures included the increase monitoring and surveillance at ports of entry and increased bio-security measures at poultry farms. The estimated direct cost of this outbreak in the SADC region was over US$800 million, and was attributed to losses in egg production, breeding stock, and job losses (SADC, 2018). Over 800,000 breeding stock were affected and this induced shortages of eggs, breeding stock and day-old chicks in Zimbabwe and Mozambique. In Mozambique, the shortages of poultry breeding stock and day-old chicks caused an increase in prices of up to 25%[8].

In **November 2017**, Tanzania government destroyed 6,400day-old chicks imported from Kenya, citing health issues.[9] According to Tanzanian media, the consignment of chicks worth Sh12.5 million (US$5 517) was destroyed in the wake of illegal imports and fear of the spread of bird flu.

In **November 2021** Zimbabwe effected yet another poultry import ban against South Africa due to an avian flu outbreak caused by the H5N1 virus, and another outbreak caused by the highly pathogenic avian influenza (HPAI) virus[10]. Again, increased monitoring and bio-security measures were put in place to protect local poultry industry. Mozambique also banned the importation of poultry and poultry products from South Africa. Mozambique has turned back "truck-loads" of South African eggs at the shared border. Given that 70% of South African egg exports are to Mozambique, the ban had a significant impact on both the Mozambican and South African markets. Similarly, chicken meat

[5] https://www.thepoultrysite.com/news/2011/04/zimbabwe-bans-poultry-imports-from-south-africa
[6] https://www.voazimbabwe.com/a/zimbabwe-south-africa-botswana-avian-flu-bird-flu-influenza-/3899043.html
[7] https://www.reuters.com/article/us-health-birdflu-namibia-idUSKBN19I0VK
[8] https://www.thepoultrysite.com/news/2017/08/ban-on-poultry-products-driving-prices-up-in-mozambique
[9] https://www.standardmedia.co.ke/business/article/2001405551/fears-of-trade-wars-as-kenya-bans-maize-from-tanzania-ug
[10] https://www.wattagnet.com/articles/42687-avian-flu-outbreak-threatens-south-african-poultry-industry

exports to Mozambique were significantly affected by the ban. The HPAI outbreak in South Africa reportedly cost the poultry industry over 1.8 billion rands (US$118 million) (Makgopa & Caldwell, 2021).

Conclusions

SPS measures are very important in the safeguarding of human and animal health. Though intended for this purpose, their application may not achieve the desired outcomes, particularly when there are capacity constraints. In this report, the economic cost of SPS measures was found to be high, negatively impacting producers and traders as well as economic-wide impacts. Notably it was found that:

- Most exporting countries affected by SPS measures were Uganda, Tanzania, South Africa, and Zimbabwe while the affected importing countries were Kenya, Mozambique, Rwandan and Tanzania. The effect of decreased exports and induced commodity shortages in the importing countries had the negative impact of decreased revenues for producers as well as tax revenue and increased retail prices, to consumers respectively. When combined, SPS measures (mycotoxins, GM, FMD, and Avian flu alone) cost the affected countries in excess of US$1.2 billion11 in the five years between 2016 and 2021.
- Blanket bans on non-compliant commodities, chiefly maize, resulted in a decrease in formal imports, yet informal imports increased significantly and in so doing negating the intended purpose of protecting public health. This was the case when Kenya banned aflatoxin contaminated maize from Uganda and the Tanzania from being imported into the country.
- Domestic food prices were negatively impacted by commodity bans across all the key value chains, chiefly maize and poultry.
- Mitigation costs for aflatoxin contamination in maize, foot and mouth disease in cattle and avian flu in poultry were found to be high, further pushing up domestic commodity prices in the affected countries.

[11] Aflatoxin – US$235.9 million; Genetically modified content – US$ 105.52 million; Avian flu – US$937.4 million; Foot and mouth disease – not quantified.

Recommendations

It must be said that the data presented in this report does not fully describe the economic picture, only allowing a semi-quantitative analysis to be performed. Further, the data mainly speaks to formal trade, yet there is a significant volume of informal inter-regional trade that is unaccounted for. Therefore, it can be expected that the economic costs reported are a small fraction of the actual economic costs associated with SPS issues and associated SPS measures applied by the focus countries. It is imperative to close this data gap and countries need to invest in export data generation in order to fill this crucial data gap. Lack of data on volumes of export rejections, diversions and bans limits the quantification of the magnitude of direct economic costs.

The following recommendations are proposed to close the data gap and improve countries SPS capacities:

- There is need for real time documentation and monitoring of key parameters (volumes of export rejections, diversions, and bans) and the ripple effects of SPS measures along the value chains. African governments should consider creating an open access information repository to allow for governments and stakeholders to access data to inform trade policies and programmes related to food safety. Recognizing that some ICT based platforms exist to collect data related to non-tariff barriers to trade in some RECs, the level and types of information collected does not provide for detailed and disaggregated statistics on SPS issues and measures. In this regard, African governments should consider the development of an ICT based interactive SPS reporting platform for Member States, which will cater for the aforementioned documentation, monitoring, and information sharing on SPS issues and measures at the continental level.
- Scientific risk assessments should be prioritized by governments when instituting food safety measures including developing the appropriate level of protection for their citizens.
- The lack of adequate statistics to quantify the public health burden of food borne disease related to SPS concerns in most countries is an open call for African governments to consider investments in the generation of epidemiological evidence in this regard.

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