

Food safety issues along the maize-poultry value chain: the role of the hidden middle



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Aflatoxins along the maize value chain

About aflatoxins?

- Toxic chemicals produced by fungi (*Aspergillus flavus*, *Aspergillus parasiticus*) that grow on crops including peanuts and maize.
- Hard to detect and can have devastating effects on humans (including high risk of liver cancer)
- In animals, aflatoxin contaminated feed has health and productivity effects
- Occurrence highest in warm climates: Africa, Asia, Central America, US South



Dealing with aflatoxins ...

Most studies on mycotoxins explore their prevalence (and/or strategies to reduce them) at particular nodes (e.g. on farms or in food)

- **Biocontrol (at production level- farmers)**
- **Harvest and post harvest activities (at production level- farmers)**
- **Processing (at production level, e.g. in labs)**



Dealing with aflatoxins ...

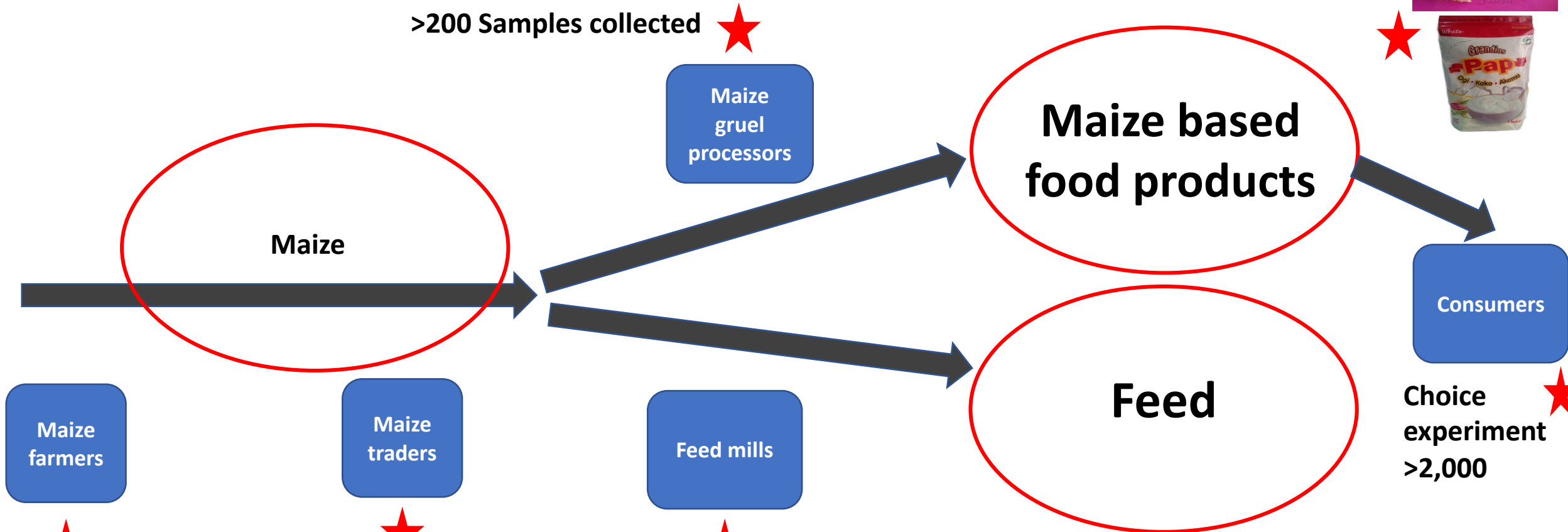
- Very few studies (and efforts to address the issue) consider how the structure of commodity supply chains and their interconnectedness to other commodity value chains could affect mycotoxin prevalence.
- This is important because the maize value chain in Nigeria (as in many parts of Africa) is often a long and fragmented supply chain with many actors
- In addition maize is often mixed with other commodities in the production of food and feed.
- These conditions create many opportunities for aflatoxin contamination during maize production, handling, processing and storage.



What we studied and how?

Aflatoxins along the maize feed–food value chain :

>200 Samples collected



Choice experiment
~315



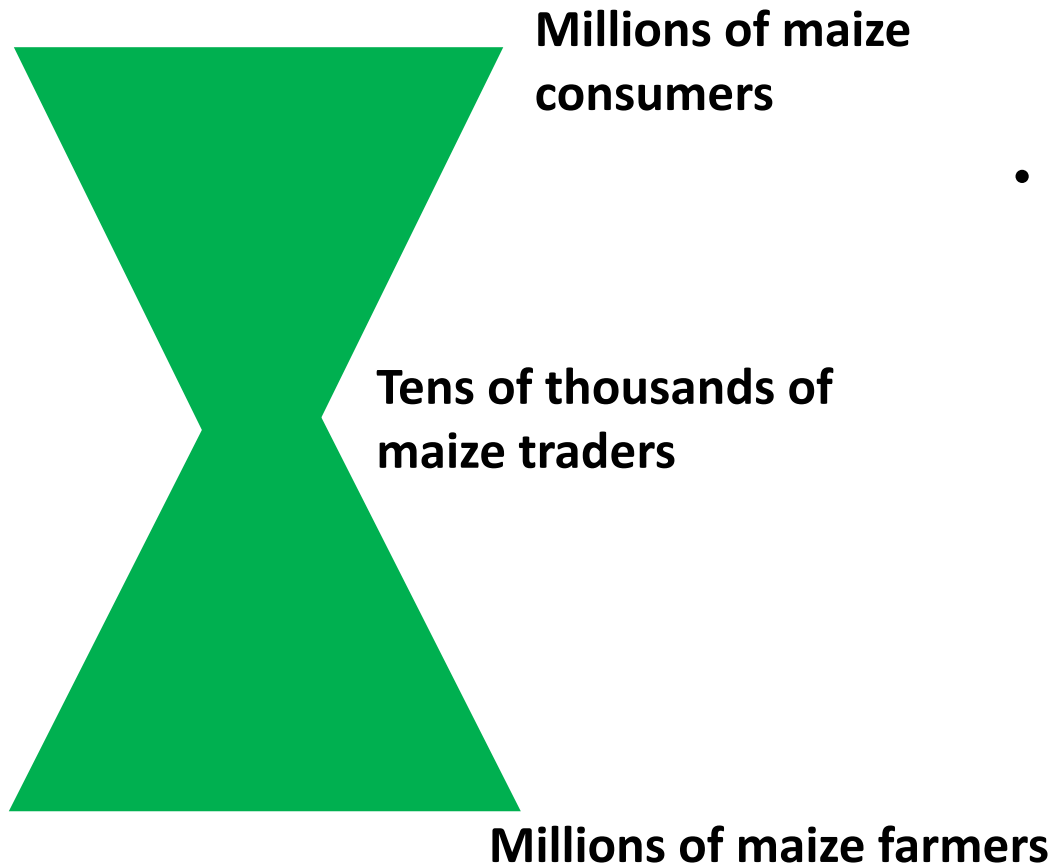
What we found documenting aflatoxin levels along the maize value chain...

1. Aflatoxin levels in farmers' and traders' stored maize increased significantly with storage length and practices
2. Very high aflatoxin levels in feed even when levels in maize used was low.
 - Due to other ingredients such as groundnut cake, which can also be contaminated with aflatoxins.
3. Aflatoxin levels were higher in non-branded maize based foods compared to branded products.

Implications?

- ❖ Adequately addressing mycotoxin risk requires consideration of the entire maize value chain and often considerations across interconnected value chains
 - ❖ Significant research activity in aflatoxins but value chain considerations are not being made and particularly in the policy debate (example in Nigeria).
- ❖ Brand reputation and traceability for **processors and traders** is an avenue for further exploration

What is the role of the hidden middle?



- **Actors in the midstream are key for addressing aflatoxin contamination in the maize value chain process but hardly considered.**
- Though aflatoxin levels increase with length of maize storage and storage practice
 - Very few traders know about aflatoxins (10% Plateau, 0 in Oyo)
 - Only about 2% of traders know the optimal moisture content for maize grain
 - Less than 5% of traders interviewed in largest grain market reported having been trained on how to handle and store maize

The role of the hidden middle...

1. Maize traders respond to the demand of their consumers
 - **They are aware of the attributes preferred by different kinds of consumers and respond accordingly**
 - Their willingness to pay for maize certified to be aflatoxin safe varies depending on their main client
 - *It is higher for those selling to the food industry and large feed mills known to be particular about the quality of their maize*
 - *It is lower for those selling primarily to consumers who are perceived not to know or care about aflatoxins (yet)*
 - However, traders do recognize that consumers use **moisture content** to proxy quality and thus exhibit preference for that attribute when their main clients are consumers

Implications?

- ❖ There might be an opportunity to minimize aflatoxin prevalence along the maize value chain through market channels
- ❖ **Since traders respond to attributes of their consumers, if all consumers begin to exhibit a preference for maize that is aflatoxin safe, then “traders and other actors along the value chain might be induced to do the same”.**
- ❖ In a survey of consumers in Nigeria, less than 10% were aware of aflatoxins
 - But providing them information about the health effects through a real choice experiment increased their willingness to pay

Key takeaways?

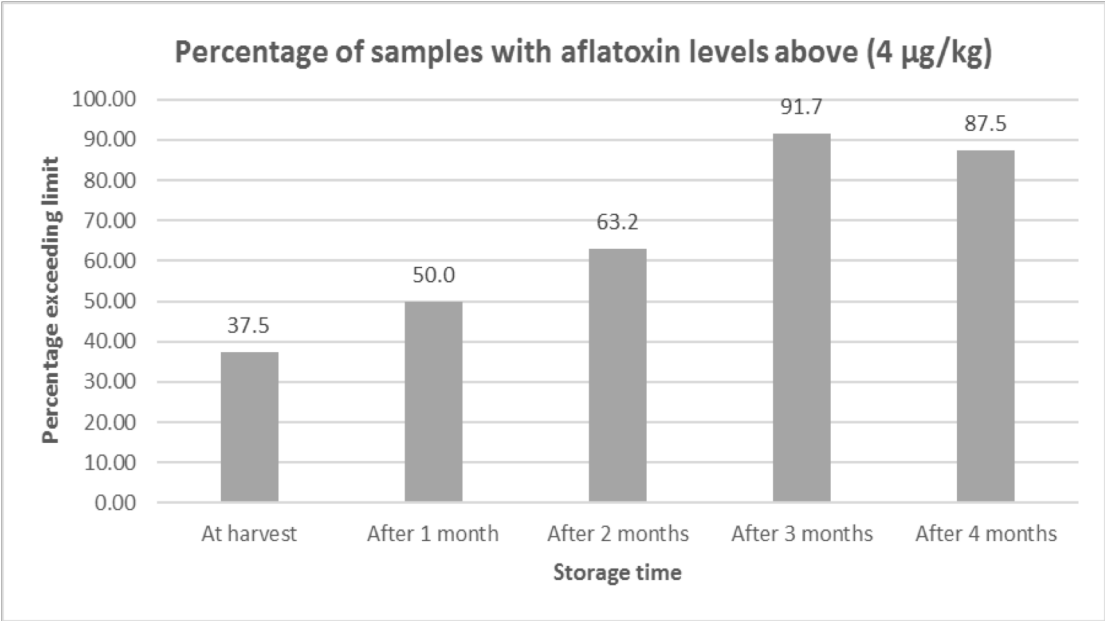
- 1. Adequately addressing aflatoxin risk requires consideration of the *entire maize value chain* and often *considerations across interconnected value chains*.**
 - This needs to be brought more into the policy debate and donor discussions and will likely increase returns on the huge investments of resources at one particular node
- 2. The role of the hidden middle (traders, processors and others involved in third party logistics should not be overlooked).**
 - Further research is needed on/with these actors to understand how best market based incentives can be used to induce the provision of safe products
 - Consumer awareness is one mechanism that can induce a change (**alongside regulation & regulation enforcement**)
 - Improving the knowledgebase (e.g. through training) of actors in the hidden middle for food safety (e.g. storage and handling)

Thank you!

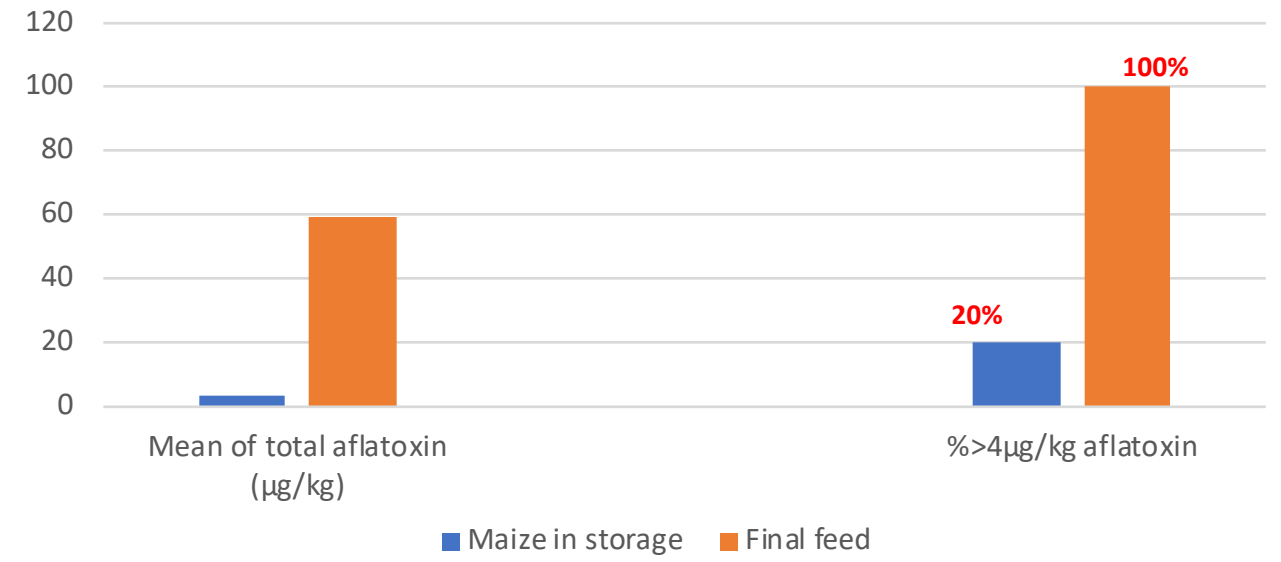
References/ Studies:

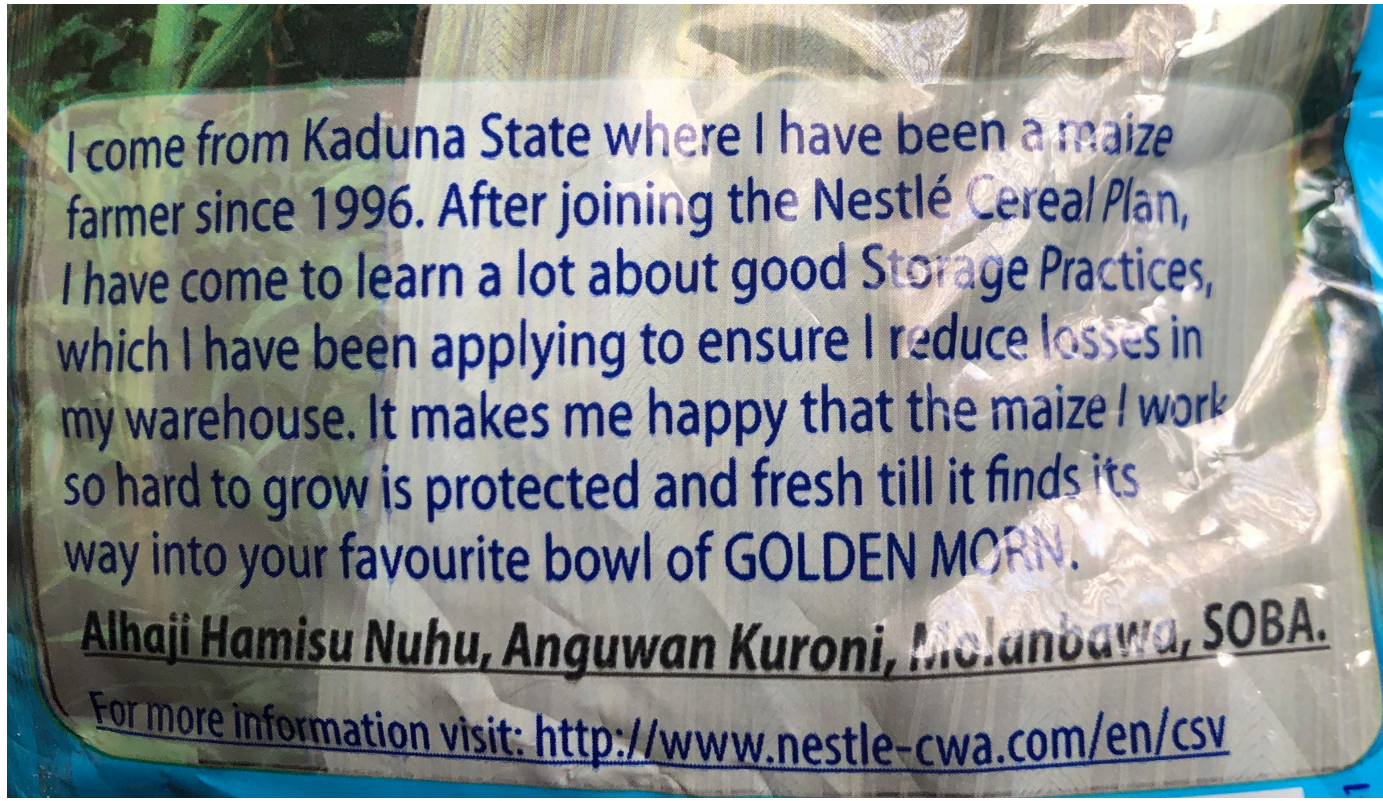
- The Occurrence and Co-Occurrence of Aflatoxin and Fumonisin Along the Maize Value Chain in Southwest Nigeria. L.S Liverpool-Tasie, N Saha Turna, O Ademola, A Obadina, F Wu. *Feed the Future Innovation Lab for Food Security Policy Research Papers*
- Food Safety in the Rapid Transformation of Food Systems in Africa: Aflatoxins along the Maize Value. O Ademola, L.S Liverpool-Tasie, A Obadina. *Feed the Future Innovation Lab for Food Security Policy Research Papers*
- The Transformation of Value Chains in Africa: Evidence from the First Large Survey of Maize Traders in Nigeria. L. S Liverpool-Tasie ,Omonona, T Reardon, A Sanou, W Ogunleye, I Ogunbayo, T Bolarin, Michigan State University, *Feed the Future Innovation Lab for Food Security Policy Research Papers*
- “Evaluating the effects of information on consumer valuation of food safety labelling: Evidence from Nigeria”. L.S Liverpool-Tasie and Vincenzina Caputo. *in progress*
- “Introducing safety labels in complex food supply chains: Evidence from a choice experiment in Nigeria. Awa Sanou, Saweda Liverpool-Tasie, Vincenzina Caputo, John Kerr and Thomas Reardon *in progress*

Extra slides...



Total Aflatoxin levels in maize and poultry feed







The role of the hidden middle...

TRADERS KNOWLEDGE ABOUT AFLATOXINS	All	Oyo ¹	Plateau
Heard of aflatoxin (0/1)	0.10	0.00	0.11
Know causes of aflatoxin build up in maize (conditional on knowing aflatoxin)	0.47		0.47
Implement steps to control for aflatoxin (0/1) (conditional on knowing aflatoxin)	0.37		0.37
Share of traders who picked the correct answer (for those who heard of aflatoxin)			
Maize infected with aflatoxin will always have high moisture content (T)	0.57		0.57
Maize with high moisture content allows infection with aflatoxigenic mold (T)	0.58		0.58
Do you think that it is likely for your maize to have aflatoxin if mechanical shelling is used? (T)	0.07		0.07
Maize infected with aflatoxin will always be discolored (F)	0.07		0.07
Number of observations	315	122	193