Mycotoxin in Sorghum Project
Lessons from a multi-country; multi-institutional project

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BACKGROUND: Why Project?

- **Codex Discussions** in 2005
  - lacking reliable data from a sufficient number of countries on 5th most important crop in the world,
  - lack of data from countries with high levels of sorghum in human consumption

- **Request for data collection in 2009** – on mycotoxin in sorghum - yielded only response from Japan

- A **discussion paper** on ‘mycotoxin on sorghum’ was prepared and presented in the 5th Session of the CCCF (March 2011) by Sudan

- Agreed that the **paper should be further updated** Nigeria took the lead on this. ftp://ftp.fao.org/codex/meetings/cccf/cccf6/cf06_14e.pdf

- Countries are **encouraged to continue to collect data** on the occurrence of mycotoxins in sorghum and sorghum-based food products at the pre-and post-harvest levels as well as data on dietary intake especially from major producing countries.
The main objective of the project is:
- collection of data for Codex to make a decision on the need to continue work on this topic, either
  - by developing a code of practice
  - request JECFA to evaluate/perform a risk assessment, informing the possible development by Codex of a Maximum Limit

Support from Codex Trust Fund funded by the European Union (see http://www.who.int/foodsafety/areas_work/food-standard/codextrustfund/en/ for more info)

Project managed by a TEAM, at different levels (in countries: Burkina Faso, Ethiopia, Mali, Sudan; at international level: FAO and WHO, and project manager)

In each 4 countries
- Sorghum value chain study
- Sorghum sample collection and sample analysis for mycotoxins
- Data analysis & reporting
Achievements – common approach

- Technical guidance on sampling plan adapted to local conditions, sampling activities, sample preparation and labeling, shipping.
- Value chain study with common methodology – covering production, post-harvest, trade and consumption to facilitate decision making about appropriate prevention and control measures.
- Cross-cutting partnerships
  - FAO/WHO
  - Min. of health/Min. of Agriculture
  - State institutions/research
Achievements – sample collection

- Total of 1533 samples analysed for 25 mycotoxins
  - at point of production (immediately after harvest)
  - after 5-7 months of storage (at market/and at producers);
  - at the end of storage (at consumers and market level).
- Analytical challenge; worked with University Ghent using LC–MS/MS Method for Quantification of 25 Mycotoxins
Analytical results – preliminary trends

● Mycotoxins
  – **Frequent**: Aflatoxin B₁, B₂, G₁,G₂, Fumonisin B₁, B₂, B₃; Sterigmatocystin; Diacetoxyiscirpenol
  – **Rare**: Zearalenone, Ochratoxin A, Alternariol, AlternariolMonomethylether, HT-2 toxin

● Frequently multiple toxins on one sample (up to 9)

● Currently undergoing further data analysis to connect levels observed to other parameters

● Importance of value chain analysis to place analytical results into an agro-ecological context
Value chain analysis

- Literature review on status in country (desk study)
- Key Informant Interviews
- Focus Group with chain actors

<table>
<thead>
<tr>
<th>Amount of sorghum available</th>
<th>Production</th>
<th>Opening stock</th>
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<tbody>
<tr>
<td>4680 (100%)</td>
<td>4606 (98.4%)</td>
<td>74 (1.6%)</td>
</tr>
<tr>
<td>Utilization</td>
<td>4680 (100%)</td>
<td></td>
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</tbody>
</table>

- Food: 2461 (52.5%)
- Feed: 500 (10.6%)
- Seed: 46 (0.98%)
- Losses: 350 (7.3%)
- Export: 650 (13.8%)
- Closing stock: 673 (14.4%)
- Import: 0

Literature review on status in country (desk study)
- Key Informant Interviews
- Focus Group with chain actors

Value chain analysis

Food and Agriculture Organization of the United Nations
Next steps at national level

- Project has helped to gather robust data and evidence to support decision makers: practical example at national level of the interrelationships between scientific processes and food safety decision making.

- Need for an improved dialogue between food safety authorities (particularly Min. of Agriculture & Health) and research/scientific community.

- Importance of a national mechanism to decide upon necessary follow up:
  - technical constraints /issues by producers/storage that could limit the effectiveness of proposed control measures?
  - national code of practice?
  - strategies for future monitoring?
Next steps at regional level

- Evaluate the possibility of having **regional standards**
- Need for improved awareness raising, leading to action, especially a regional **theory of change** to achieve this would be useful
- **Capacity building** of Regulatory Systems and enforcement mechanisms is essential - focus capacity building efforts where they provide the greatest public good
- harness novel market mechanism that can **create a pull for quality food** partnerships with the private sector
- Regulatory efforts need to reach out not only to the **formal markets** but also the **informal** (testing and spot testing)
Research needs for the future

- Better understanding of **novel very prevalent toxins** - Diacetoxyscirpenol (DAS) and Sterigmatocystin (SC)
- Need for **multitoxin studies** and their effect on health eg. interactions
- Better **consumption/food basket data** to improve exposure/risk assessment
- Need for **second year/multiyear data collection** and continued effort in countries – so that trends are confirmed