Impacts of Aflatoxins and the Need for a coordinated management approach for safer food in Africa

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All Lives Have Equal Value

To whom much has been given, much is expected.
How We Got Started

1994
Bill and Melinda read an article about rotavirus

2000
They officially create the foundation

2006
Warren Buffett decides to give Berkshire Hathaway stock
Agricultural Development

- Focus on small farms
- Meet the needs of Women
- Protect the environment
- Invest in innovation, take risks
- Develop market opportunities
- Bring success to scale
- Measure impact, adjust and share our learning
- Partner with others, listen to external voices
- Commit for the long haul
Linking the Agricultural Value Chain - Support the Range of Farmers’ Needs

1. Science and Technology
   - R&D on crop improvement - Seeds
   - Crop management – risk reduction
   - Input technologies

2. Farmer Productivity
   - Water
   - Gender
   - Fertilizer
   - Training
   - Extension

3. Market Access
   - Livestock
   - Access to markets
   - Structured demand
   - Cash crops

4. Policy and Statistics
   - Data and statistics
   - Research and analysis
   - Advocacy and policy change
   - Learning and improvement

AGRA – PASS
Nitrogen Fixation

Soil Health Program

Partnership with Coca cola World Food Program – P4P
The Challenge: Hunger and Poverty

Hunger and poverty are solvable, as we’ve seen in the past.

**BUT...**

Poverty is highly concentrated:

78% of the ~1 billion people who live on $1/day live in South Asia and Sub-Saharan Africa

This year, for the first time ever,

1 billion people will go hungry

The world population will exceed 9 billion by 2050
Aflatoxin impacts human health and presents a barrier to trade and economic growth

Today, we have an opportunity to do something about it
What is Aflatoxin?

- Highly toxic metabolite produced by the ubiquitous Aspergillus flavus fungus
- The fungus infects crops and produces the toxin in the field and in stores
- Fungus carried from field to store
- Contamination possible without visible signs of the fungus
- Some predisposing factors:
  - pre-harvest high temperature & drought stress
  - wet conditions at harvest and post-harvest periods
  - insect damage
# Aflatoxin Contamination Occurs in Two Phases

<table>
<thead>
<tr>
<th>Phase I: Before Crop Maturity</th>
<th>Phase II: After Crop Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Developing crops become infected.</td>
<td>• Aflatoxin increases in mature crop.</td>
</tr>
<tr>
<td>• Associated with crop damage (insect, bird, stress).</td>
<td>• May occur before or after harvest.</td>
</tr>
<tr>
<td>• Crop may exhibit BGYF (bright-green-yellow fluorescence).</td>
<td>• Seed is vulnerable until consumed.</td>
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<tr>
<td>• Favored by high temperature (night) and dry conditions</td>
<td>• Associated with high humidity in the field, and improper crop storage or transportation.</td>
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<tr>
<td></td>
<td>• Rain on the mature crop increases contamination.</td>
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</tbody>
</table>
World Problem
40°N and 40°S are most at risk
Economic Impacts of Aflatoxin – How?

MARKETS
- International
- Domestic
  - Feed
  - Food
  - WFP
- Lack of alternatives
Center for Disease Control has estimated that more than 5 billion people in developing countries are chronically exposed to aflatoxins in their diets.

Liver cancer incidence per 100,000 in Kenya and Mali, IARC GLOBOCAN 2008)

<table>
<thead>
<tr>
<th>Nation</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>8.5</td>
<td>4.9</td>
</tr>
<tr>
<td>Mali</td>
<td>19.4</td>
<td>8.8</td>
</tr>
<tr>
<td>North America</td>
<td>6.8</td>
<td>2.2</td>
</tr>
<tr>
<td>Europe</td>
<td>6.5</td>
<td>2.2</td>
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Health Impacts of Aflatoxin

The darker arrows identify linkages that have been well-established in agricultural and toxicological research; the white arrows denote linkages that have been relatively less well-established (Wu 2010).
Global number of DALYs associated with aflatoxin-induced liver cancer cases worldwide ranges from 328,000 TO 2 MILLION PER YEAR.

In Africa alone, the estimated burden associated with aflatoxin-induced liver cancer ranges from 130,000 TO 500,000 DALYS PER YEAR.

Wu et al., in press.
Cross Cutting Nature of Aflatoxin requires a joint effort of ALL stakeholders

Widespread impact and complex nature requires interdisciplinary approach

Coordinated, African led partnership focuses on 4 key areas:
- Agriculture, and food security;
- Health, nutrition, and food safety;
- Communications, advocacy, and political messaging;
- Commercialization;

Overarching Partnership Structure

<table>
<thead>
<tr>
<th>Activities</th>
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<tbody>
<tr>
<td>Biocontrol</td>
</tr>
<tr>
<td>Agronomic Practices, Drying, Storage, Processing</td>
</tr>
<tr>
<td>Diagnostics</td>
</tr>
<tr>
<td>Alternatives for Use of Contaminated Foodstuffs</td>
</tr>
<tr>
<td>Breeding (Screening)*</td>
</tr>
</tbody>
</table>

Cross Cutting Issues

|-----------------------------|---------------------------------|-------------------|-------------------------|--------------------------------|-----------------------------------|--------------------------------|-------------------------------|---------------------|--------------------------|

Washington DC, June 2010
WE HAVE RAISED AWARENESS

- Host Governments
- AU
- RECs
- European Commission
- Standards and Trade Development Facility
- USDA
- USAID
- IFPRI
- WHO
- World Bank
- Bill & Melinda Gates Foundation

Many people are working to help farmers address the problem, but much more needs to be done.
But, still there are gaps

Agriculture and Food Security

- Donors have not met their CAADP obligations

- More needs to be spent on agriculture and food security as a percentage of aid.

- African nations doubled agriculture spending but it’s still only 5% of National Budgets and very little is spent on aflatoxin
Gaps

Improving Diagnostics

- Challenges with aflatoxin testing
  - Aflatoxin contamination is highly heterogeneous
  - Analyses are estimates
  - Regions differ in aflatoxin incidence and severity
  - Aflatoxin levels change over time

- Testing protocols are not met:
  - Knowledge and testing tools are lacking
  - National protocols, when they exist, are not enforced
  - Wide variety of standards (Codex, EU and US, etc.)
  - Tests are expensive
  - Few labs exist
Gaps

Health, Nutrition and Food Safety

Improving Regulatory Environments

- Only 15 African countries had regulatory limits for aflatoxins as of 2003 (FAO).

- Capacity to enforce regulations is low.

- Almost all food sold in local markets is unregulated

- Millions of people living in sub-Saharan Africa are chronically exposed to aflatoxins through diet, but knowledge on their impact on human health is lacking—more is known on livestock.
Gaps

Communications, Advocacy and Political Messaging

• Lack of data
• Lack of straightforward solutions
• Cost of solutions
• High level of sensitivity related to staple foods being threatened make communications challenging
The biggest gap is in lack of a Coordination Mechanism to share accurate, relevant data.

Benefits broader community: cheaper diagnostics, practical methods of control, trade related procedures and policies – overall improvement in Food Safety & Security.
The Time to ACT
Is Now

Thank you for your attention