PROGRAMMES AND ACTIVITIES FOR AFLATOXIN CONTROL IN AFRICA

THE IMPACT OF AFLATOXIN – KENYAN EXAMPLE

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Estimated 25% of world food crops affected by aflatoxin contamination (FAO) include maize, peanuts, cassava.

These crops constitute the staple food for majority of African countries.

Undermines overall development goals of Governments, for instance:

- Attainment of Vision 2030 for Kenya
- Attainment of MDGs (No. 1- Eradication of extreme poverty and hunger; No. 4- Reduction of child mortality; No. 5- Maternal health; No. 6- Combating HIV/AIDS and other diseases)
AFLATOXIN INCIDENCES IN KENYA

To illustrate the impact of Aflatoxin in Kenya, the following brief history is necessary:

- 265 people died between 2000 and 2008 out of which 123 died in 2004
- No deaths recorded between 2009 and 2011
- Presence of aflatoxin detected in huge quantities of maize in the Eastern Province of the country.
ADDRESSING THE PROBLEM

Aflatoxin is a multi-faceted transboundary problem that requires:

- Stakeholder involvement and participation, from both public and private sectors
- Sector-wide approach
- Regional, inter-Governmental and international collaboration
Mainstreaming in National policies and programs, for instance:

- Agricultural Sector Development Strategy (ASDS)
- CAADP in Kenya (Pillar 2, 3)

Mobilization of resources and investment in projects with direct impact on food quality and access to markets.
ACTIVITIES FOR AFLATOXIN CONTAINMENT

- To effectively manage the levels of aflatoxin in food and livestock products, the following activities are necessary:
  - Policy formulation, development of standards and regulations
  - Awareness creation and training
  - Health impact analysis
  - Economic impact and analysis, research
  - Use of appropriate bio-control technologies
  - Pre and post harvest handling
  - Testing Development
Policy

- Policy formulation, development of standards and regulations
- A policy framework forms the basis for subsidiary legislation to enforce regulations
- Sets the standards and trading regulations
  - 10 ppb for Kenya; 10 ppb EAS-2:2005
  - Harmonisation for EAC, COMESA, Africa in line with International standards
- Registration of traders and all grain dealers for ease of monitoring the movements of the produce in the country.
- Standards are needed to create markets for crops unsafe for human consumption. For instance, standards for: detoxification; blending; beef feedlot; feed producer; feed markets; human food/feed; corn flour mill; corn processor.
Awareness Creation and Training

- Farmers and the general public informed of the dangers associated with aflatoxin poisoning both in food and feed
  - On site training is the key with leaders identified at all levels.
  - Developing robust awareness and public education programs that involve all stakeholders.
  - Notifications on Aflatoxin in affected countries to inform and warn consumers
  - Strengthening the capacity of non-state actors to understand, advocate and push for safe foods and consumer health.
- Early detection of illness symptoms of such poisoning for immediate medical attention.
- A holistic approach to training of all stakeholders.
Health Impact Analysis

- Health impacts include:
  - Death due to acute poisoning
  - Chronic phase leads to loss of productivity (labour) and increased health expenses
  - Reduced immunity leading to increased attack from opportunistic diseases.
  - Stunted growth mainly of children leading to sickly and unproductive population.

- Need to understand effective interventions to minimize health impacts
Economic Impact Analysis

- Economic impacts include:
  - Loss to farmers, traders through contaminated produce, for instance 32000 bags of maize condemned in Kenya in 2009
  - Decreased production of animals
  - High cost of decontamination
  - Loss of trade, local regional and International
    - 135000 MT of maize cross border trade within EAC in 2010 (~43m USD)
    - 1.5 million MT maize, 781717 MT wheat imports to Kenya in 2009 (~84m USD)
    - 117 MT of maize rejected by the WFP in 2009 in Bura (~37k USD)
- How to evaluate losses due to, for instance:
  - Market failures – no testing, no premium, home consumption
  - Lack of alternatives in food insecure areas
Deaths could result in orphaned children creating a burden to society

Reduced availability of both quantity and quality of food to the population

Dilemma:

- **Market loss occurs when:**
  - Food IS monitored for aflatoxin: Buyers pay lower prices or reject contaminated food (developed nations, local or international trade)
  - Animals become sick from aflatoxin consumption

- **Health loss occurs when:**
  - Food IS NOT monitored for aflatoxin: Dangerous levels enter food supply
Use of Biocontrol Technologies

- Use of beneficial fungi successful in other parts of the world, for instance USA

- Trials on-going in Kenya involving the following collaborating institutions:
  - Kenya Agricultural Research Institute (KARI)
  - Kenya Plant Health Inspectorate Service (KEPHIS)
  - Maize and Wheat Improvement Centre (CIMMYT)
  - Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance (ACDI/VOCA)

- Great potential to offer solutions to the Aflatoxin menace in Kenya and the rest of Africa
Resistant Cultivars

- Innovative breeding may be explored to produce cereal crops more tolerant to fungal infection.
- Challenge of tolerance versus high yields
- Different varieties of grain require different drying regimes.
Factors influencing fungal growth and toxin development:

- Growth cracks, mechanical injury and damage by pests to grains lead to infestation by fungi
- Toxins are produced under high temperatures, drought, high insect activity prior to harvest
- Wet conditions at harvest leading to longer duration for drying in the field after grain maturity
Value chain approach to pre- and post harvest handling including:

- Proper drying as quickly as possible
- Proper storage: control of humidity, temperature, ventilation
- Manual or mechanical sorting/segregation by risk
- Appropriate transport for food items including grains. (Closed or well covered vehicles to avoid rain or contact with external sources of moisture.)
Grains suspected to be contaminated should be impounded for analyses and confirmed cases of contamination should be destroyed or converted to non-food uses.

Routine surveillance of all food and feed stores should be instituted.

- Use of simple moisture meters.
- Salt and bottle method
Testing Development

- Sampling protocols and procedures
- Sample preparation
- Analysis using rapid field-based test kits
- Reporting of results
- Quality assurance
- Laboratory capacity for elaborate confirmatory tests
CONCLUSION

- **Integrated approach, from farm to fork**
  - Limit the risks of aflatoxin contamination at each step along the food chain

- **Concerted effort of all actors along the food production chain**
  - Government authorities, Private sector (farmers, industries...), Research institutes, NGOs, ...

- **Multidisciplinary approach**
  - Integrate technical and socio-economical aspects to develop a sustainable aflatoxin management system

- **Coordinate other projects/activities, create a platform for complementary actions**