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The U.S. Government's Global Hunger & Food Security Initiative

AGRILINKS




Sanitary and Phytosanitary Issues to Achieving the Global Food Security Strategy: Cases on Fall Armyworm and Aflatoxin

Speakers: Kelley Cormier, USAID Bureau for Food Security, Lee Gross, USDA Foreign Agricultural Service, Chris Peterson, USDA Foreign Agricultural Service, Ken Shenge, USDA Agricultural Research Service, Elisa Loeser, USDA Foreign Agricultural Service

Moderator: Julie MacCartee, USAID Bureau for Food Security

Date: June 20, 2018

Kelley Cormier, USAID Bureau for Food Security

Kelley Cormier is Division Chief of MPI's Inclusive Market Development Division, where she leads a team that addresses access to finance, market systems strengthening, risk management and resilience, agribusiness enabling environment and trade and commercialization of technologies. Before joining USAID, Kelley worked with USDA designing, implementing and evaluating sanitary and phyto-sanitary programs and explored how policies and institutions affect agricultural markets and market actors. She has held fellowships with AAAS, Fulbright, NCEER and IREX. She was a Peace Corps volunteer in Kazakhstan, holds a PhD in Development Studies from the University of Wisconsin-Madison, and a MS in Agricultural Economics from Michigan State University.

Lee Gross, United States Department of Agriculture – Foreign Agricultural Service

Lee Gross is a Senior Program Manager with the USDA Foreign Agricultural Service. He leads the Food Safety Network, an inter-agency partnership between the USDA, USAID and FDA to help build food safety capacity worldwide. An economist and natural resource development professional by training, Mr. Gross has spent his career working to advance market and trade-based solutions to poverty reduction, environmental conservation and sustainable agricultural production. He holds an M.S. in Natural Resources and a B.S.E.S in Environmental Economics.

Chris Peterson, United States Department of Agriculture – Foreign Agricultural Service

Dr. Chris Peterson is a toxicologist and entomologist serving as a program manager and team lead for the Food Safety in Africa Team at OCBD. He also manages activities globally in pesticides and laboratory development. He received his PhD from Iowa State University before conducting pest management research for the USDA-Forest Service, then coordinating food security and agribusiness projects as a Volunteer Leader for the Peace Corps in Uganda. He joined FAS in January, 2016

Ken Shenge, United States Department of Agriculture – Agricultural Research Service

Dr. Ken Shenge is a Plant Pathologist with USDA's Agricultural Research Service with over 10 years' experience in international agriculture, plant health, food safety and public health. Dr. Shenge has a Ph.D. in Plant Pathology and a MPH in Public Health. In addition to teaching and mentoring students, he led a team in charge of plant diagnostics, and investigated the postharvest pathology of field crops, transmission mechanisms of plant pathogens, and human pathogens on Nigerian tomatoes. Dr. Shenge worked in the Food Animal Health Research Program at The Ohio State University from 2012 to 2014, with emphasis on human pathogen association with plants. In his current position, he applies advanced molecular biology techniques (such as quantitative pyrosequencing) to assist the World Bank's AgResults Initiative to assess farmer implementation of aflatoxin biocontrol in Nigeria.

Elisa Loeser, United States Department of Agriculture – Foreign Agricultural Service

Elisa Loeser is a Food Safety Program Manager with the USDA Foreign Agricultural Service. She oversees food safety and aflatoxin capacity building programs in Africa and Central America. Elisa has worked for USDA/FAS for four years and served as the FY17 President of the FAS Junior Professional Advancement Community. She has a Master's of Arts in Food Studies and speaks French.

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The Food Safety Network

Bringing the best of Food Safety Practices to the World

Online library of best practices

Rapid needs assessments for USAID Missions

Coordinated U.S. government expertise

Links to animal, plant health and food safety

Online interactive sanitary and phytosanitary training

Agrilinks.org/activities/food-safety-network

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"YOU'RE ONLY AS GOOD AS YOUR WEAKEST LINK"
SPS: A HOLISTIC PERSPECTIVE

Speakers: Lee Gross, USDA Foreign Agricultural Service

Date: June 20, 2018

SPS = Safe & Nutritious Food

Measures that are taken to protect humans, animals and plants from diseases, pests or contaminants.

Sanitary → relating to **human** or animal life or health

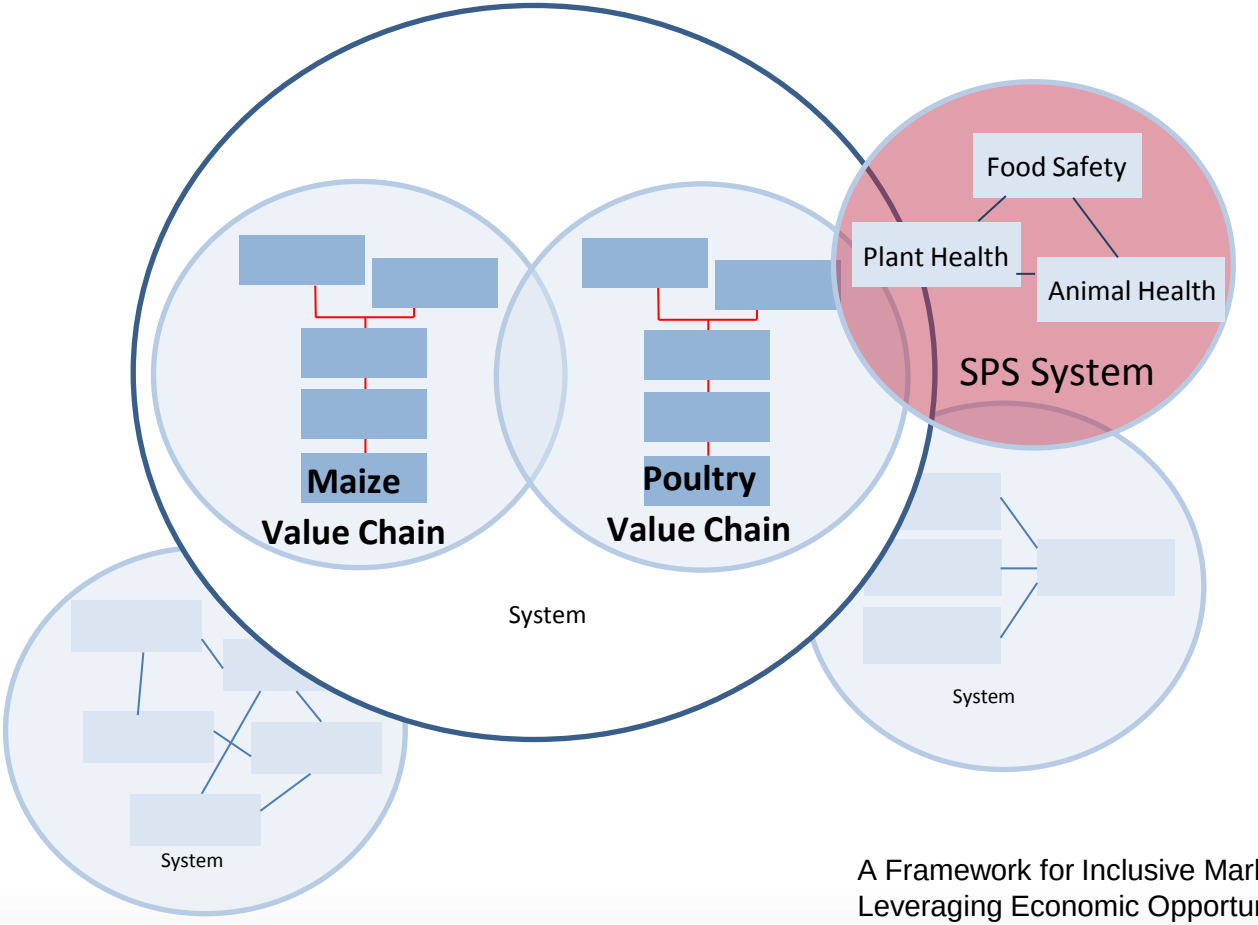
Phytosanitary → relating to plant life or health

SYSTEMS APPROACH TO FOOD SAFETY

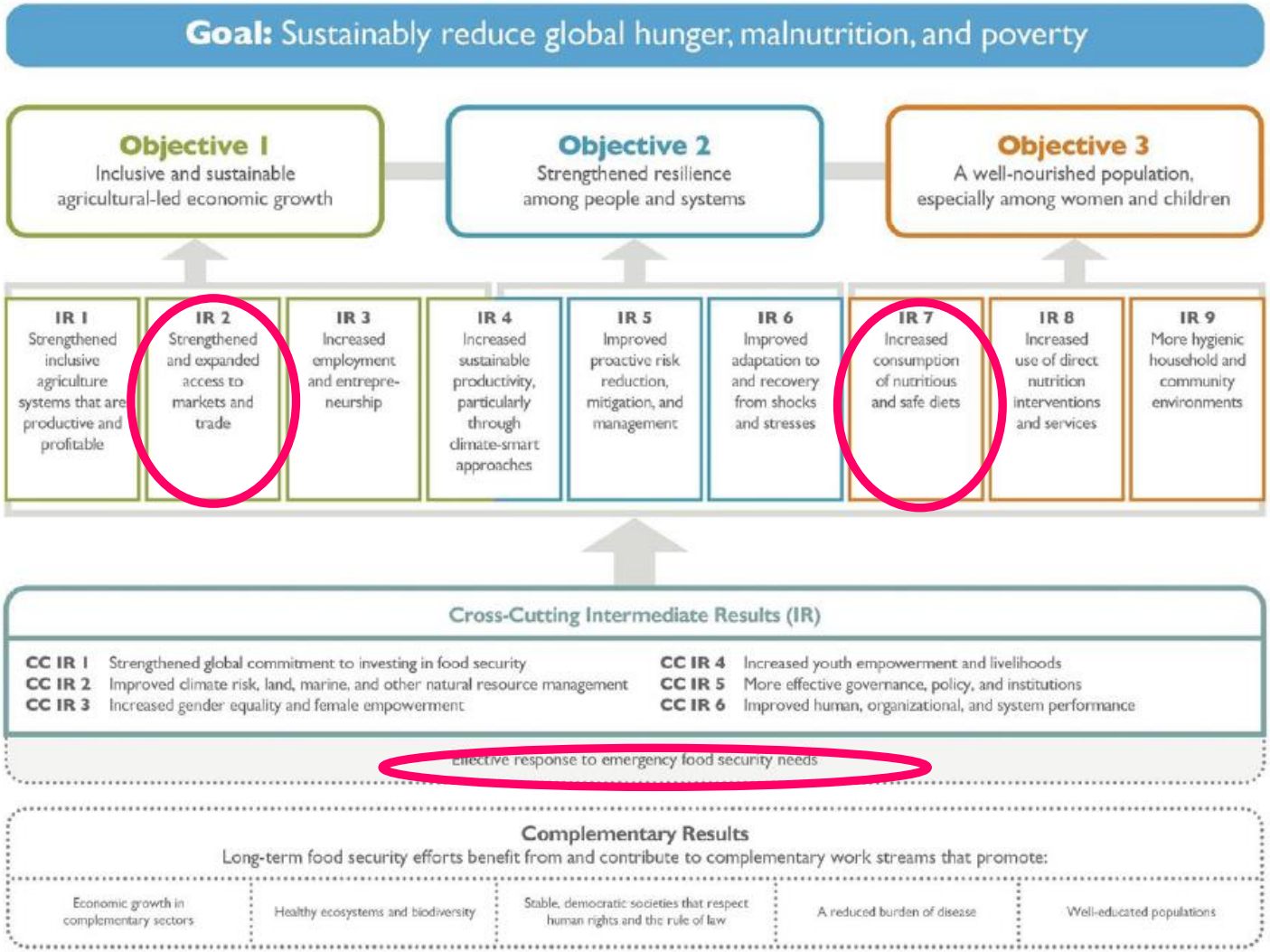
Animal Health
+ Plant Health
+ Food Monitoring

Improved Human Health

Market Systems and Value Chains



A Framework for Inclusive Market System Development, Leveraging Economic Opportunities (LEO). USAID



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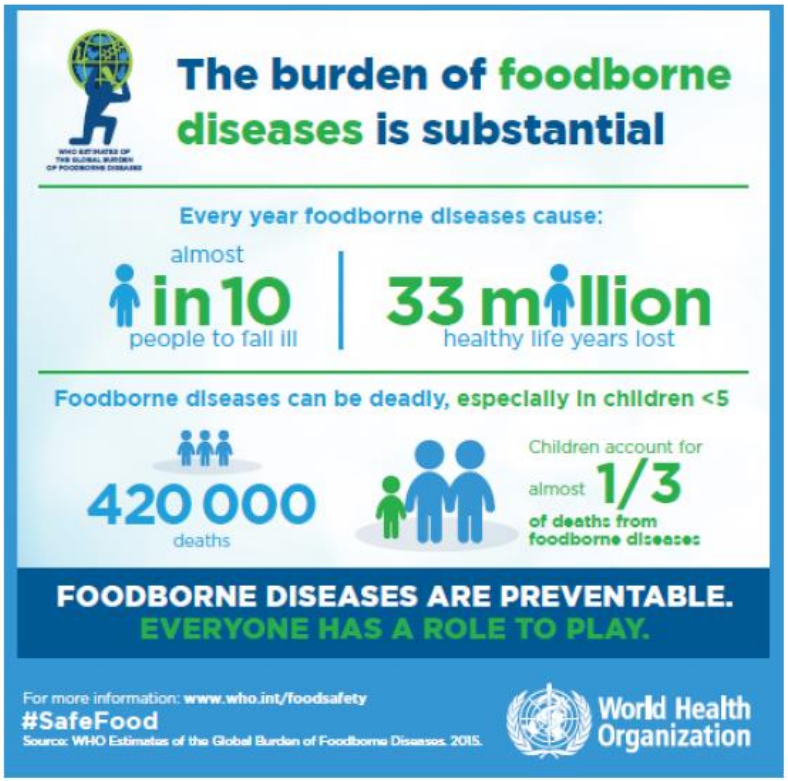
SPS & PUBLIC HEALTH

The Burden of Food Safety



An estimated 600 million – almost 1 in 10 people in the world – fall ill after eating contaminated food and 420,000 die every year, resulting in the loss of 33 million healthy life years (DALYs).

Children under 5 years of age carry 40% of the foodborne disease burden, with 125 000 deaths (or 30%) every year

In Africa, more than 91 million people are estimated to fall ill and 137 000 die each year.

Some 60 million children under the age of 5 fall ill and 50 000 die from foodborne diseases in the South-East Asia Region every year.

http://www.who.int/mediacentre/factsheets/fs399/en/

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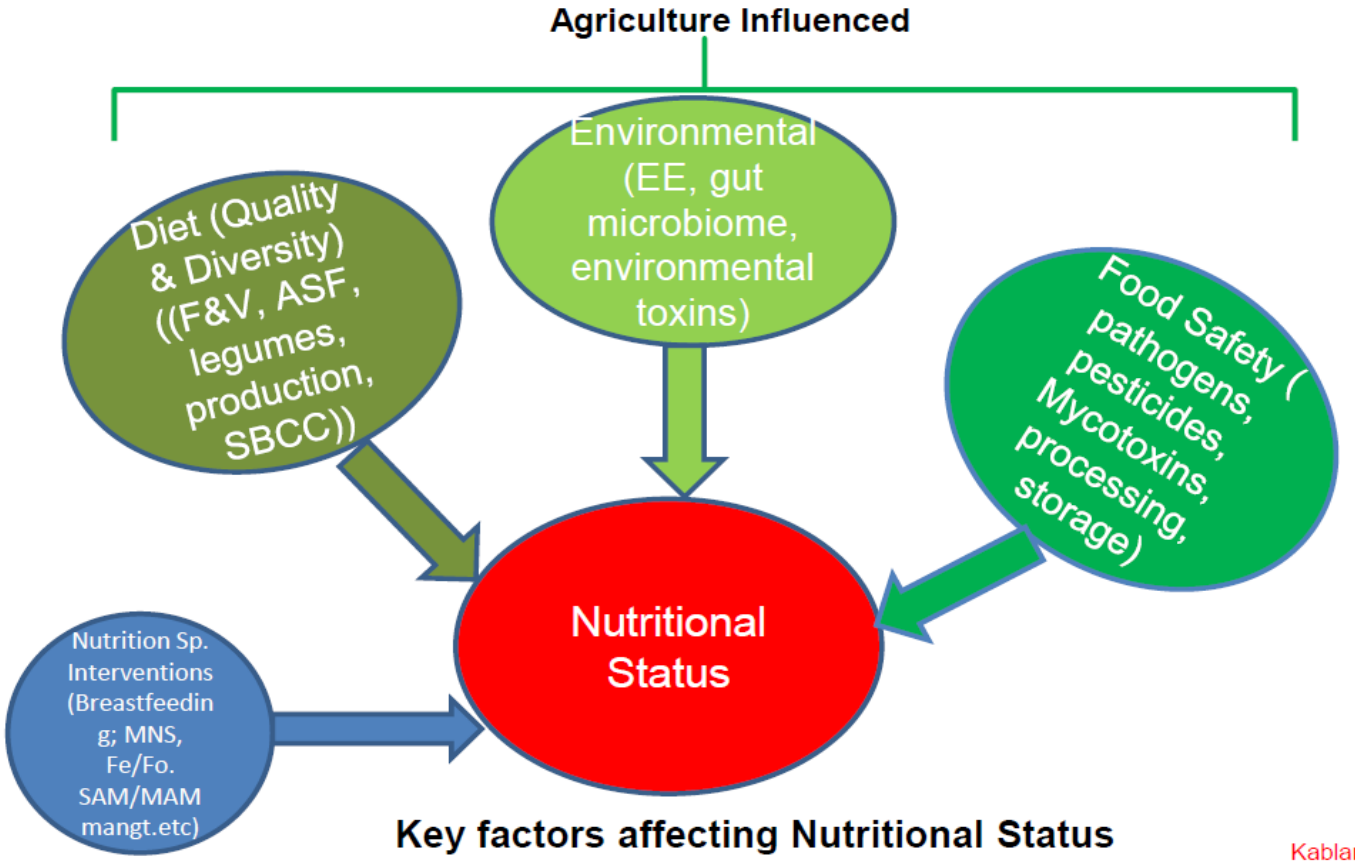
SPS & NUTRITION

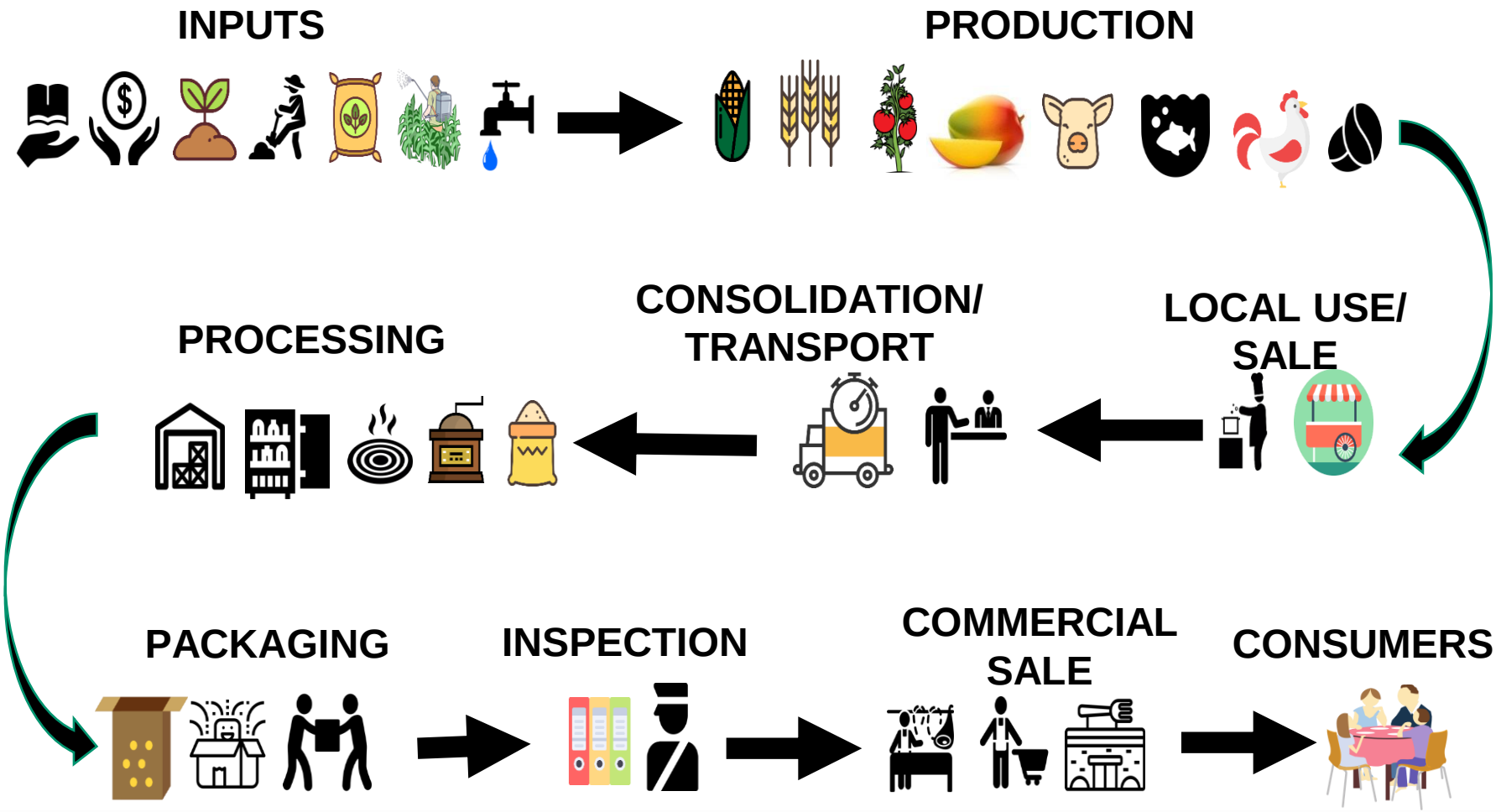


Key factors affecting Nutritional Status

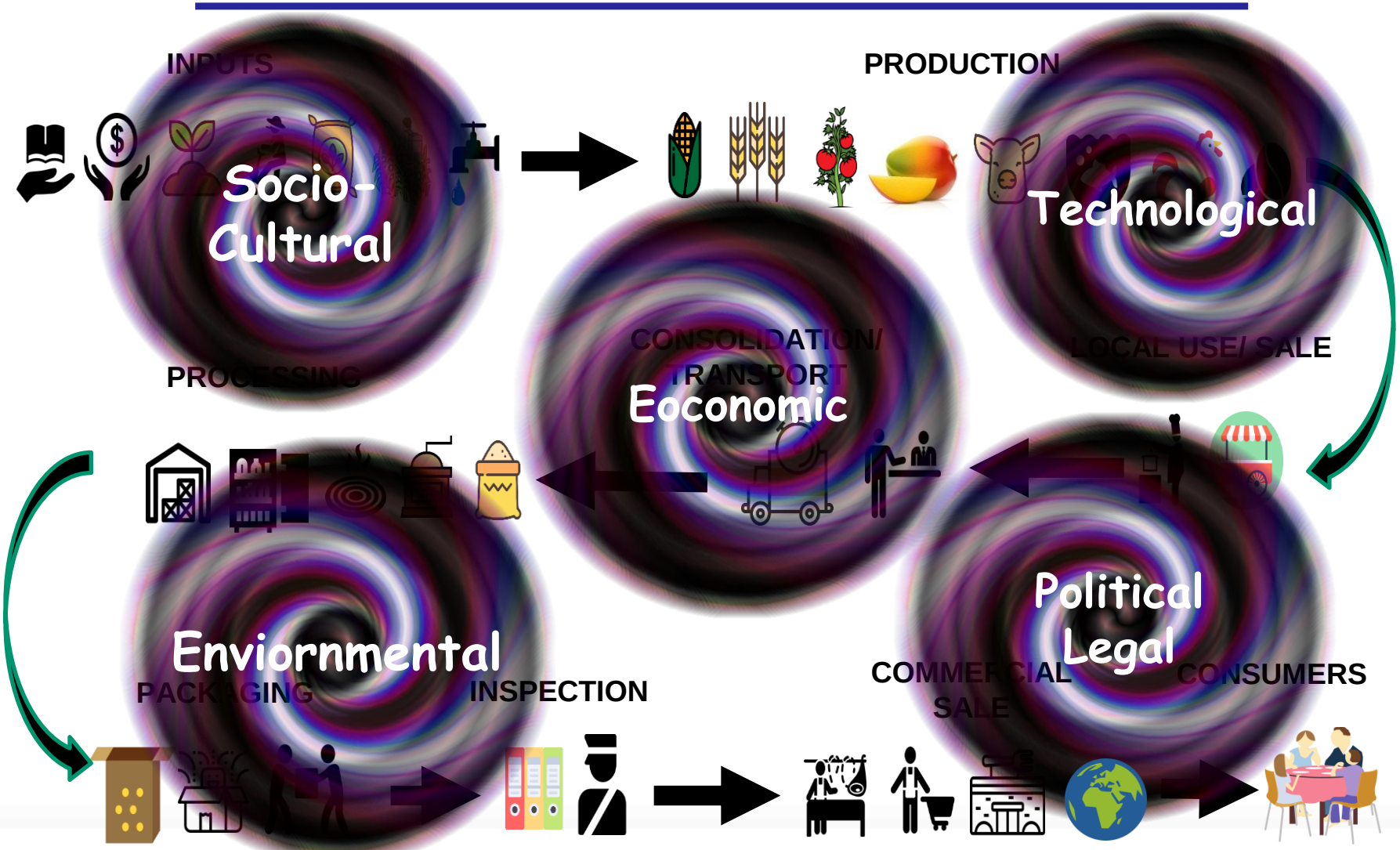
Kablan A.

SPS & TRADE

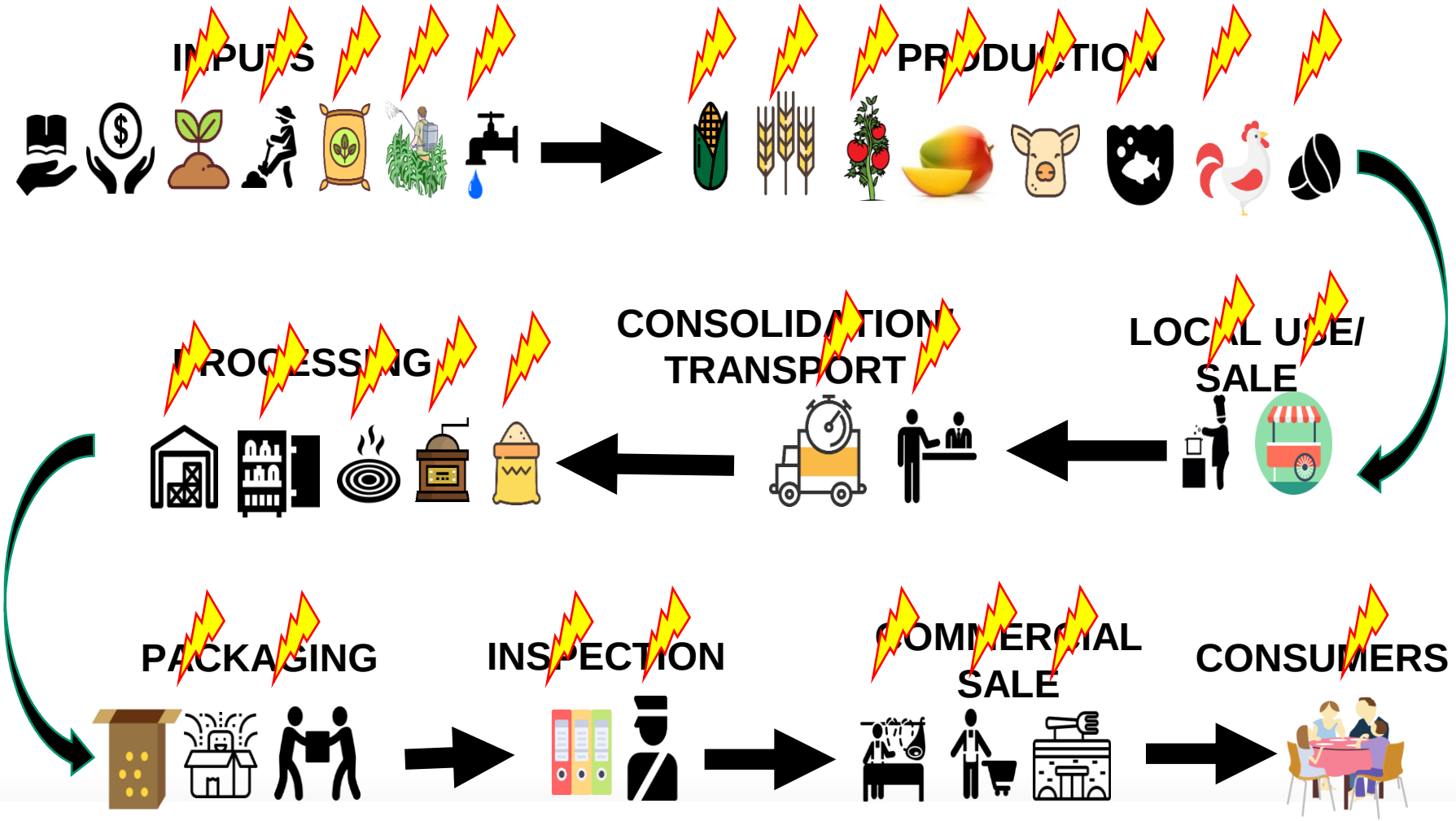
AGRICULTURAL VALUE CHAINS



EXTERNAL INFLUENCES



FOOD SAFETY HAZARDS



CONTROL POINTS

RISK MITIGATION

- **SPS Regulatory Environment**

- **Physical Infrastructure**

- **Practices: Production, Processing, and Handling**

Strengthening SPS systems and the SPS-enabling environment can:

- break down constraints in value chain programming;
- assist countries to adopt science-based regulatory systems that ensure domestic food supplies are safe and nutritious;
- harmonize domestic regulations with international standards; and
- improve a country's ability to trade regionally and globally.

To be effective, all these things need to be done collaboratively.

AGRILINKS




Fall armyworm in Africa: A case study in Zambia

Speakers: Chris Peterson, USDA Foreign Agricultural Service

Date: June 20, 2018

Fall armyworm is a devastating pest in Africa

Crop damage estimates reach into the billions

Can destroy 100% of an infested field

Climate permits continuous life cycle

Is present anywhere corn is growing

Other strains attack rice, but over 80 plants can be affected

For information on FAW control options, please consult the following publication

FEED THE FUTURE
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Fall Armyworm in Africa:

A GUIDE FOR INTEGRATED PEST MANAGEMENT

First Edition

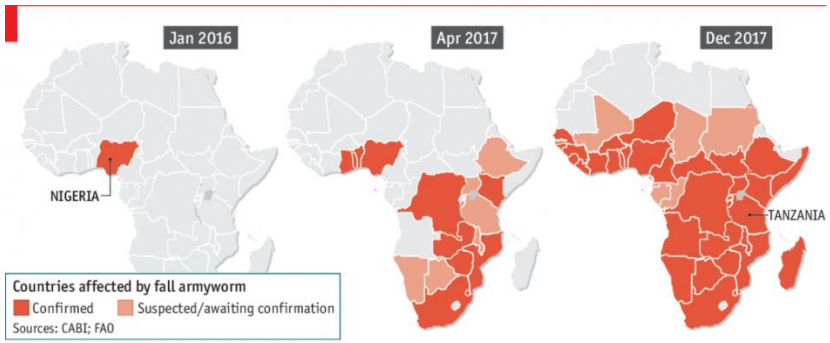
https://reliefweb.int/sites/reliefweb.int/files/resources/FallArmyworm_IPM_Guide_forAfrica.pdf

Arrived from the Americas, but not sure how

By sea or air, could not have flown on its own

Port inspections failed to intercept it

Once on the continent, had unopposed access



Fall armyworm detected in Zambia in late 2016

Affected 130K ha first year, 350K ha second year

Government resources overwhelmed

- Emergency declaration mobilized resources

Pesticide rescue treatments and seed distributed free

- But season half over and too late for most crops

Despite FAW being more widespread, second year response was better

- Rapid development and distribution of educational materials
- Mass and social media campaigns
- Pest monitoring
- Better pest management tools

However, several gaps remain in being able to respond to the issue

Extension services to monitor for the pest and to reach farmers remain understaffed and underfunded

Pesticide regulation remains weak, allowing sub-standard, counterfeit, and contaminated products to be used

- Lost efficacy = lost food
- Contaminants = food safety risk

Only a few products widely used

Coordinated multi-sectorial communication is lacking

No permanent body with mandate to address issues proactively

Cooperation with NGOs, private sector, universities, etc. spotty,

- Not covering whole country, or only reaching certain farmers

Export inspection facilities are understaffed

Could allow FAW to reach the Middle East, Europe and Asia

Vulnerable to import bans

- Quarantine pests
- Pesticide or contaminant residues

TOP TAKE-AWAYS

1. Fall armyworm continues to cause significant crop losses in Zambia
2. Zambia has no permanent, overarching body to anticipate and respond to future issues
3. Extension and public outreach efforts are underfunded and uncoordinated
4. Availability and management of pest control tools (including pesticides) a challenge
5. High awareness and engagement are working toward a solution
6. Ongoing research and lessons learned are addressing the problem

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Promoting Food Security Through Aflatoxin Biocontrol

Speakers: Ken Shenge, USDA Agricultural Research Service,
Elisa Loeser, USDA Foreign Agricultural Service

Date: June 20, 2018

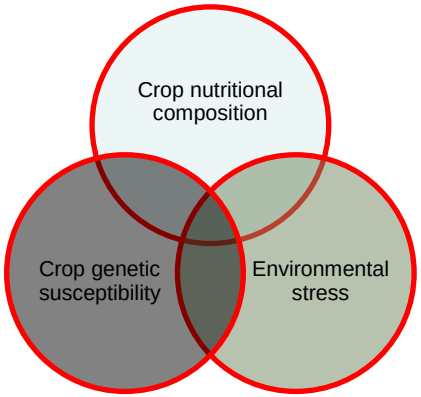
Aflatoxicosis

- The major concern with *Aspergillus flavus* is crop contamination with aflatoxins.

- Acute aflatoxicosis: vomiting, abdominal pain, pulmonary edema, and fatty infiltration and hemorrhagic necrosis of the liver, bile duct proliferation, lethargy, death.

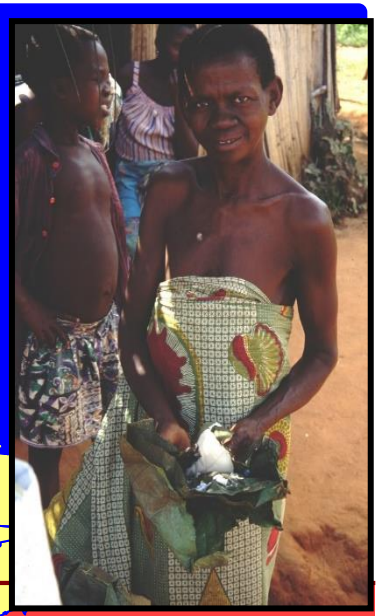
- Chronic aflatoxicosis: Growth impairment, liver cancer, lung cancer, immune suppression, synergy with HBV and HBC, nutritional interference → stunted growth.

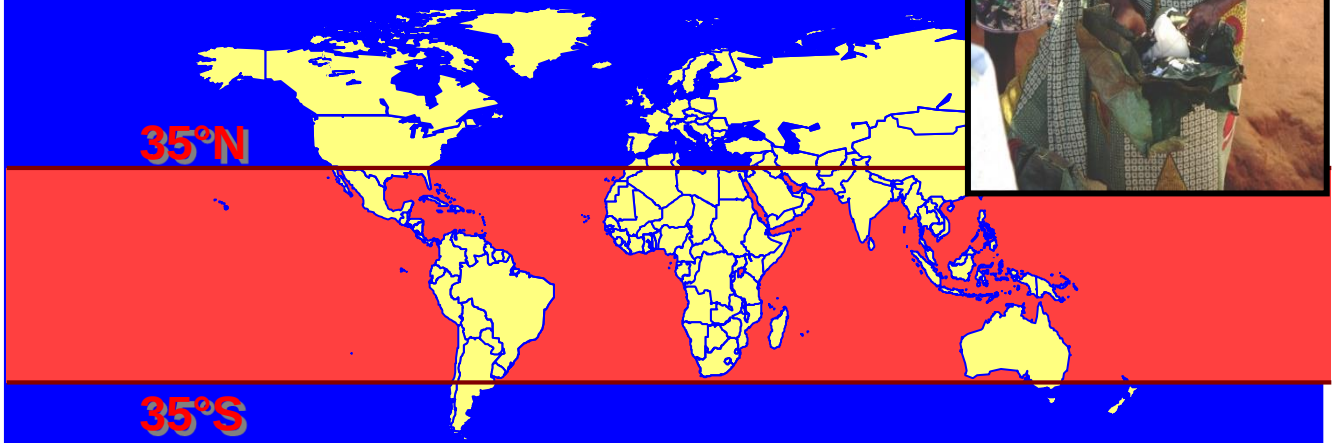
Aflatoxins on crops



Aflatoxin Contamination: A Perennial Concern in Warm Climates

Certain weather events make contamination worse.
During droughts the contaminated zone enlarges.





Human and Animal Exposure

Biological Factors

-Susceptible crop
- Compatible toxigenic fungi

Environmental Factors

-Temperature
- Moisture availability
- Mechanical injury
-Insect/ bird damage

Harvesting

- Crop maturity
- Temperature
- Moisture
-Handling

Processing & Storage

-Structure;
-Moisture; -Temperature

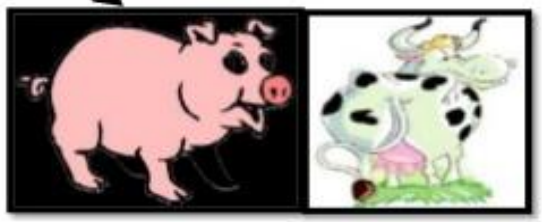
Animals

Humans

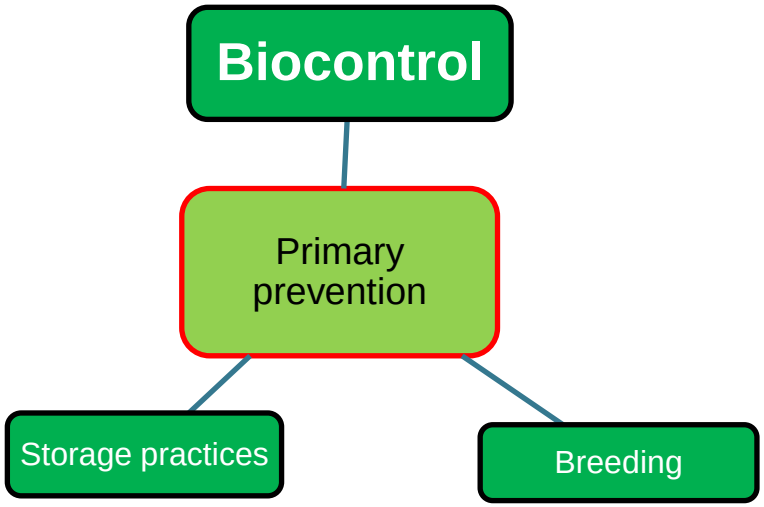
Distribution

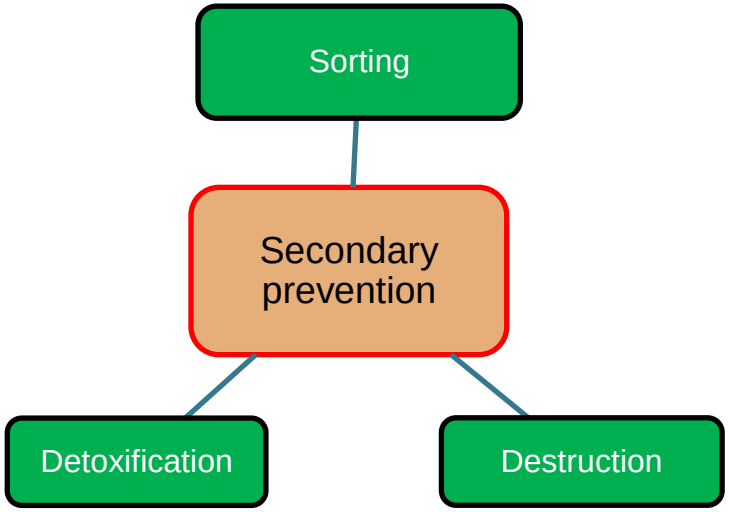
Detection/diversion

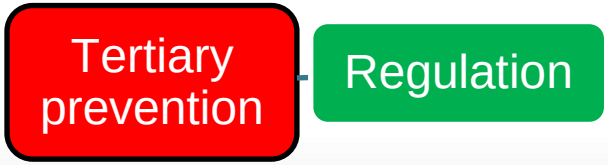
Animal Products



Prevention strategies







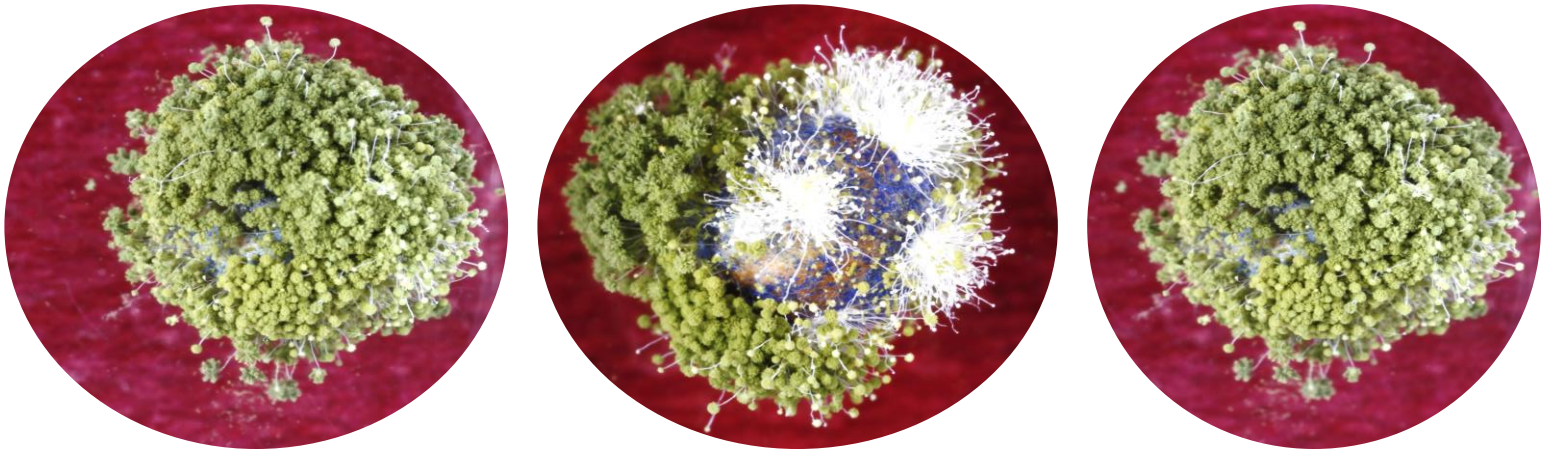
Tertiary prevention

- Aflatoxins are highly regulated in more than 100 countries.
- In the United States, the maximum allowable limits for aflatoxin content of all foods (except milk [0.5 ppm]) is 20 µg/kg).
- Although highly effective, requires strong institutions, highly trained manpower, and a lot of $$$

http://poisonousplants.ansci.cornell.edu/toxicagents/aflatoxin/aflatoxin.html

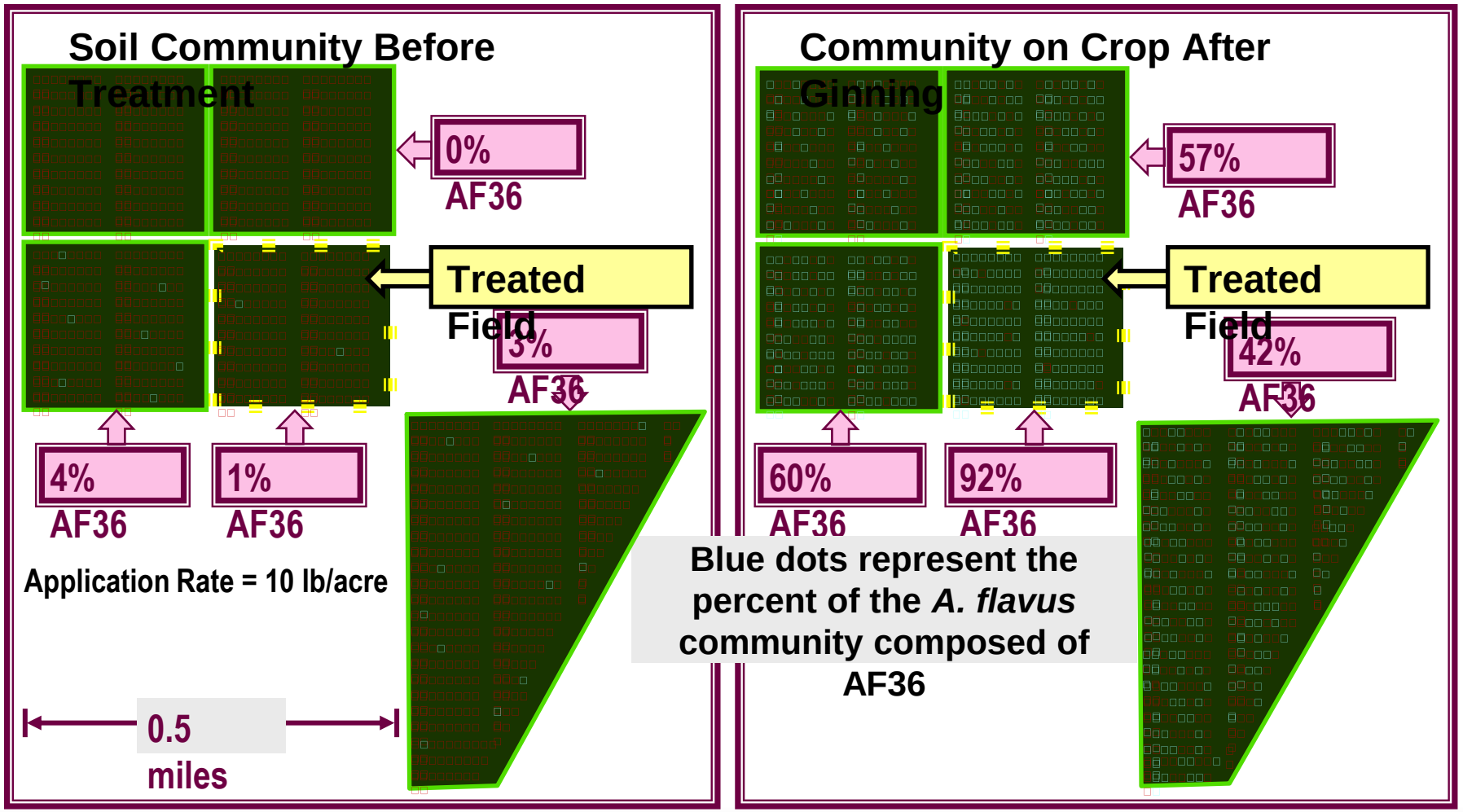
Based on scale, cost of adoption, and proven efficacy, aflatoxin biocontrol strategies have increased in popularity.

Biological control of Aflatoxins



Biocontrol with atoxigenic strains of *A. flavus* is the most effective method for preventing aflatoxins contamination of maize, groundnut, and other crops.

Application of Atoxigenic Strain AF36 in Commercial Cotton Influences the Composition of Fungi on Crops in both Treated and Nearby Fields



Aflatoxin Biocontrol in the US

- First Patent Application: 1989
- 1st Conference with U.S. Environmental Protection Agency: 1992
- **Used on commercial crops in US since 1996.**
- Three Products with Unrestricted Registrations (more coming).
- **Over 1 Million Acres Treated Annually**
- Registered Target Crops: Maize Grain & Silage, Pistachios, Cottonseed, Peanut (Almond & Fig expected in 2017).

1970s, Arizona

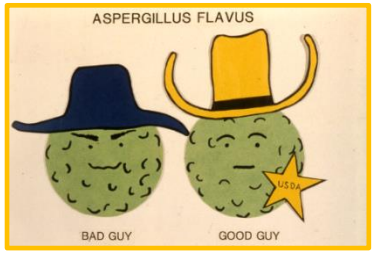

1980s, Arizona First Tests

Aflatoxin Biocontrol in Africa

- Severe Human Exposure to Aflatoxins in Several Nations.
- Products registered in Nigeria, Burkina Faso, Ghana, Kenya, & Senegal/Gambia.
- Target Crops: Maize & Groundnut.

Aflatoxin Biocontrol in Europe

- Target Crop: Maize.
- 15,000 ha treated in 2015 – very effective.
- Maize required to be below 3 ppb for cheese industry.



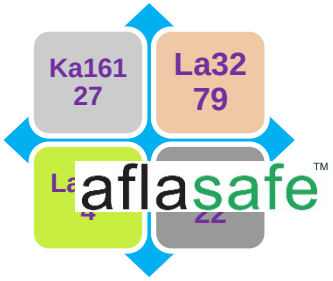
1st Biocontrol Talk 1988

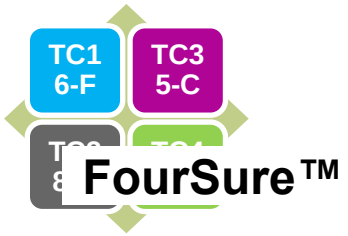
Biocontrol products using Atoxigenic *A. flavus*

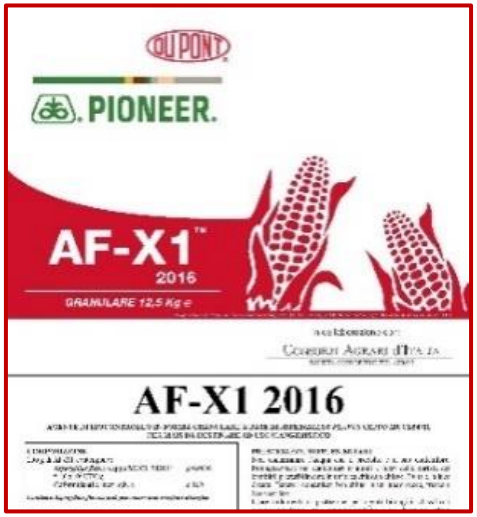
- Some biocontrol products consist of multiple *A. flavus* genotypes. Several of these are registered for commercial or experimental use in Nigeria, Burkina Faso, Ghana, Kenya, & Senegal/Gambia.

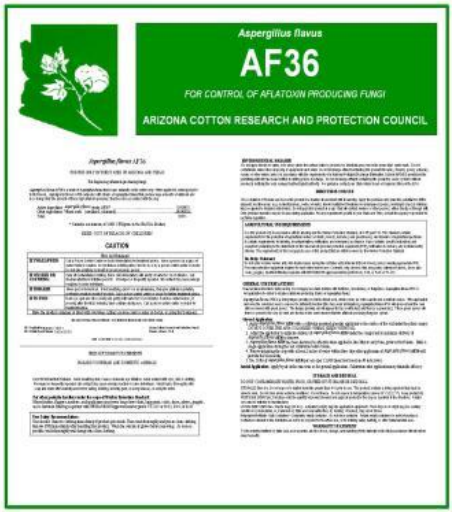
- FourSure™ is registered for experimental use in Texas, USA, through a collaboration between USDA-ARS and the Texas Corn Producers Board.

- **These biocontrol products have reduced Aflatoxin contamination in Maize significantly, ensuring safe and wholesome food in many parts of the world.**







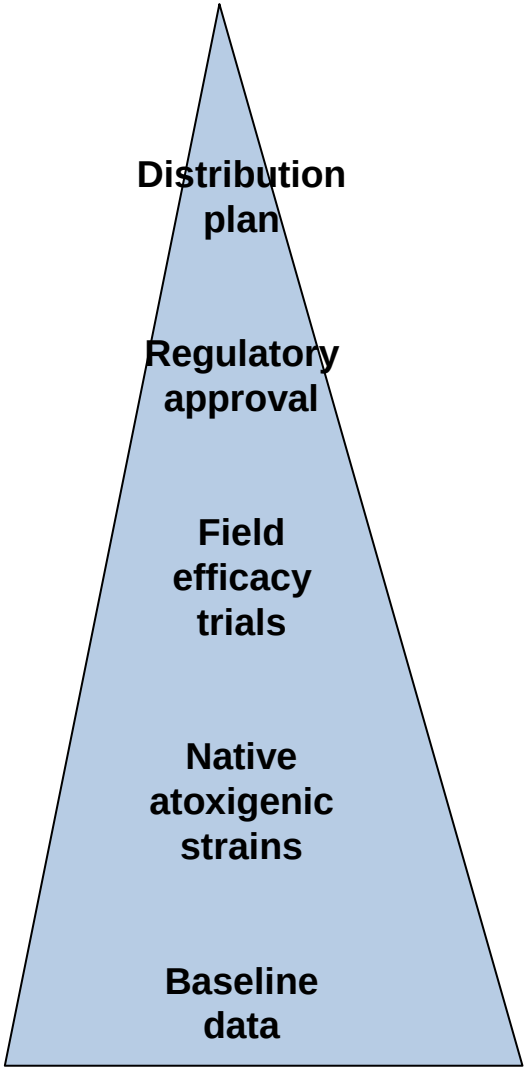


Recommendations

- Aflatoxin biocontrol technology transfer (labs, training, production facilities).
- Emphasis on GAPs.
- Premium per product payments.
- SPS (regulatory) capacity building.

For more information, visit:
https://cals.arizona.edu/research/cottylab/

Role of Partnerships in Aflatoxin Biocontrol



Private sector

International organizations

Government bodies & key actors (national, regional, continental)

Donor community & development partners

Academia, research, & labs

Inter-Agency Collaboration on Aflatoxin Control

- Long term collaboration within USDA between FAS and ARS
- Aflatoxin control in Africa as a case study for collaboration
  - Established aflatoxin as key concern for continent
  - Emphasized biocontrol as important solution
    - The International Institute of Tropical Agriculture (IITA) took the lead with support from USDA and many partners
      - www.aflasafe.com
  - Developed body within the African Union Commission (AUC)
    - The Partnership for Aflatoxin Control in Africa (PACA)
      - http://www.aflatoxinpartnership.org/

Being collaborative, communicative, and sharing resources and responsibilities creates positive and sustainable impact!

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Questions and Answers

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Knowledge for a Food-Secure Future

Contact: jmaccartee@usaid.gov

Comment on today's topic: https://bit.ly/2HoleS3

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