



Feed the Future Innovation Lab for
Collaborative Research on
Peanut Productivity and Mycotoxin Control

Feed the Future Innovation Lab for Collaborative Research on Peanut Productivity and Mycotoxin Control

(Peanut & Mycotoxin Innovation Lab)

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The Global Challenge

Achieving Sustainable Food Security

- 925 million people suffer from chronic hunger.
- Demand for food is projected to **increase by 50 percent** over the next 20 years. Increased demand will come primarily from population and income growth in middle-income countries.
- Diversified diets increasingly in demand – especially animal source foods.



US Government Response



Feed the Future



Photo: Borlaug Foundation

- ✓ Whole of government
- ✓ Dual focus on poverty reduction and improving nutrition
- ✓ Staples-led economic growth
- ✓ Dietary diversification: legumes, animal source foods
- ✓ S&T for development

Overarching Goal: Sustainable Intensification



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Research Strategy



Three research themes:

- Advancing the productivity frontier
- Transforming key production systems
- Improving nutrition and food safety

Anchored by key geographies:

- Indo-gangetic plains in South Asia
- Sudano-sahelian systems in West Africa
- Maize and livestock mixed systems in East and Southern Africa
- Ethiopian highlands



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Feed the Future Food Security Innovation Centers

- Leads USAID's implementation of FTF Research Strategy in seven priority research areas
- Encourages a multi-disciplinary approach, better linkages among related projects, cross-project learning and management efficiencies
- Engages U.S. universities, international research centers, private sector, local agricultural research and educational institutions, think tanks



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Food Security Innovation Centers

- Climate Resilient Cereals
- **Legume Productivity**
- Advanced Approaches to Combat Pests and Diseases
- Safe and Nutritious Foods
- Sustainable Intensification
- Policy and Markets Research and Support
- Human and Institutional Capacity Development



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Program Area in Legume Productivity

- **Peanut and Mycotoxin Innovation Lab**
- Legume Innovation Lab
- Soybean Value Chain Research Innovation Lab
- Climate Resilient Bean Innovation Lab
- Climate Resilient Cowpea Innovation Lab
- Climate Resilient Chickpea Innovation Lab
- BT cowpea (AATF)
- CGIAR Research Program on Grain Legumes
- USDA Norman Borlaug Commemorative Research Initiative



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Why peanuts?

- Global importance (39 million tons, 95% in developing countries)
- Highly nutritious (protein, fiber, unsaturated fats, RUTF/RUSF)
- Valuable as a legume in cereal systems (fixes nitrogen)
- Often a women's (and cash) crop (food security)
- Drought Tolerant (Climate Smart)



Eating Peanuts Daily Significantly Reduces All-Cause Mortality

Albany, GA, November 21, 2013. - A major study published in the *New England Journal of Medicine*, showed that men and women who ate an ounce of peanuts daily reduced their risk of death from all causes by up to 20%. Results also showed that peanut eaters were leaner. This gives people another great reason to get their daily handful of peanuts.



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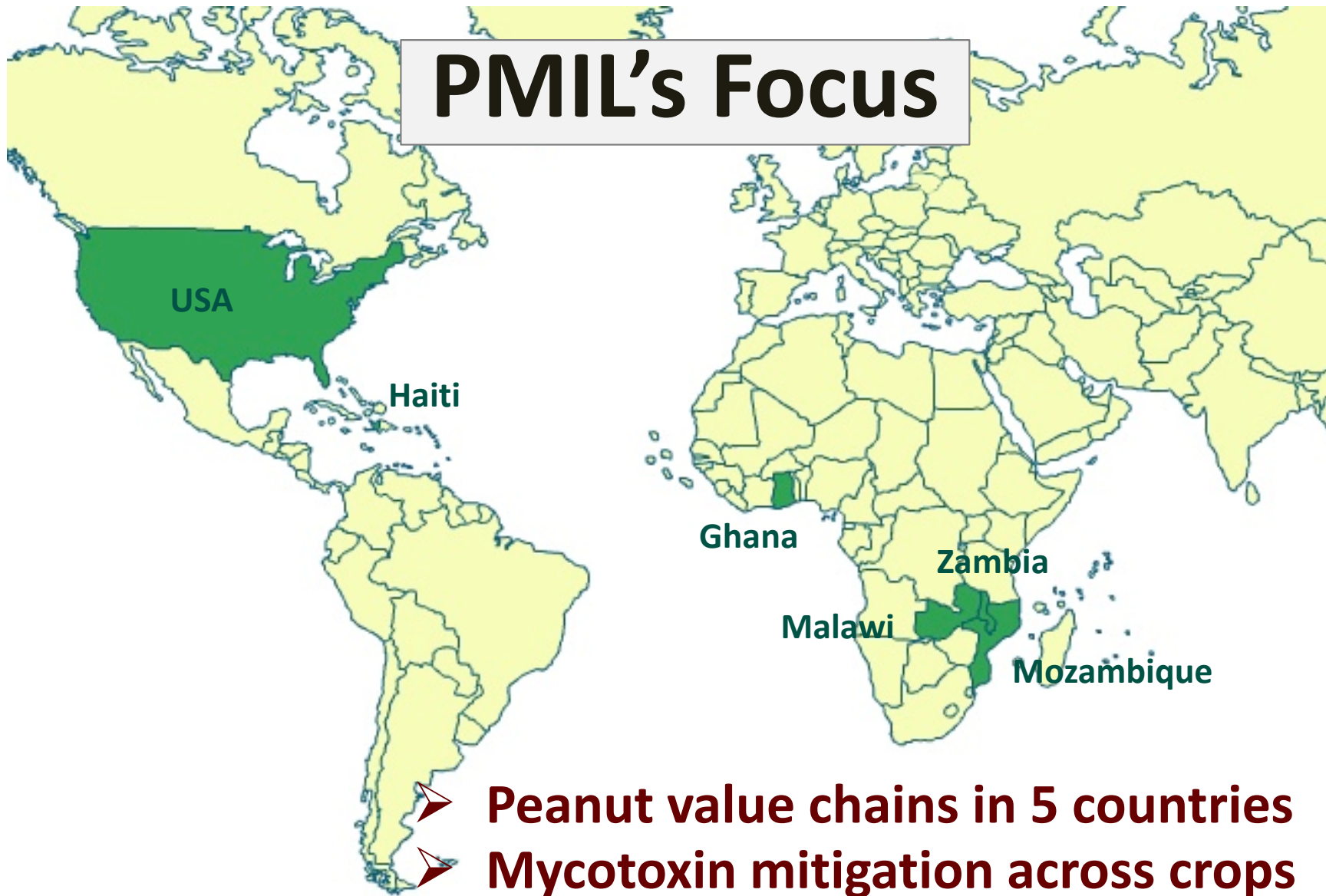
Why mycotoxins?

- Contaminate numerous crops, and livestock products
- Reduce quality and marketability
- Carcinogenic with serious health effects
- Linked with childhood stunting



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PMIL's Focus

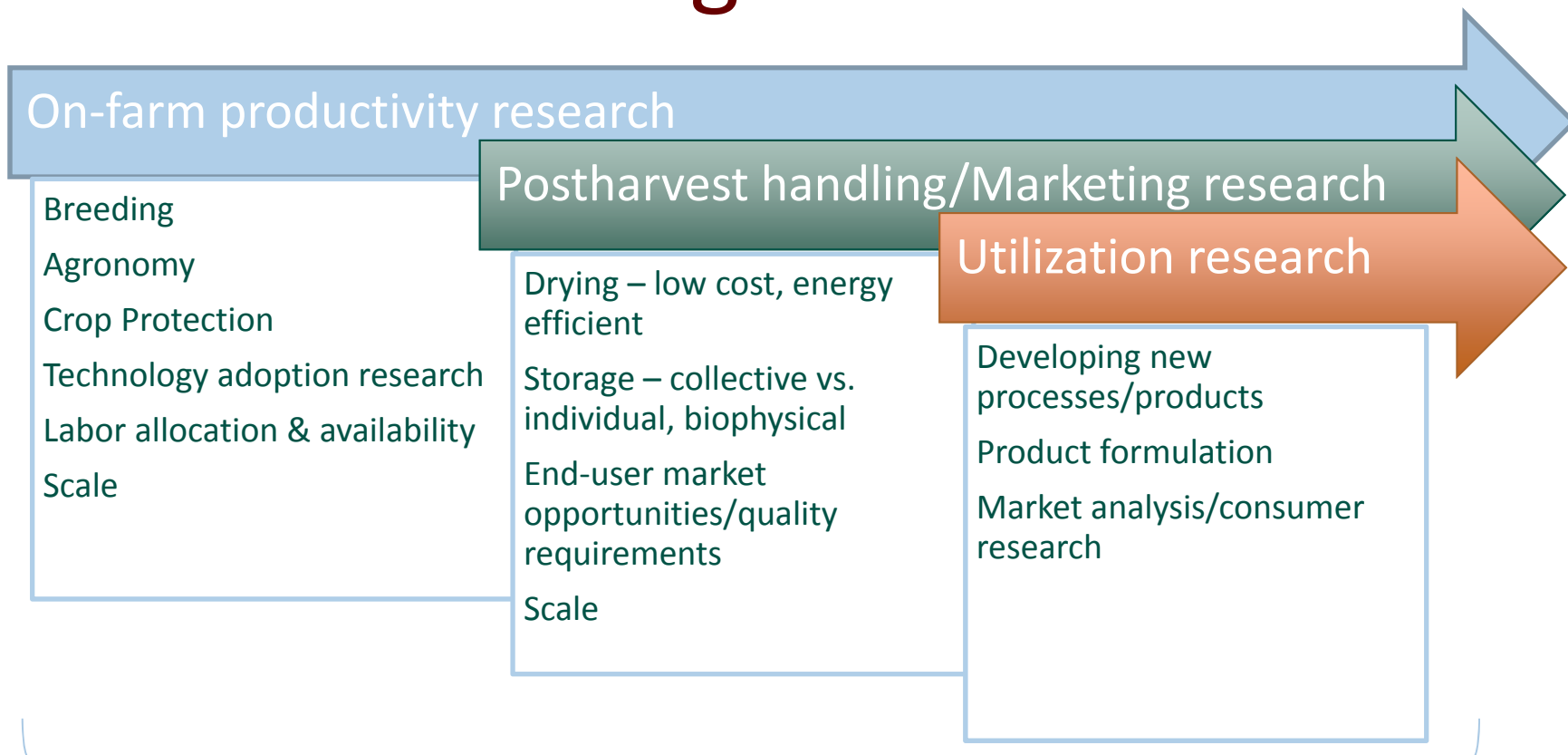


- Peanut value chains in 5 countries
- Mycotoxin mitigation across crops



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Research along the value chain



Partner outreach & engagement in each area facilitates technology uptake



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PMIL Research Portfolio



Improved peanut varieties



Mycotoxin management



Seed production



Post-harvest handling & processing



Market opportunities

- Breeding (Deom)
- Genomics (Ozias-Akins)
- RNAi (Arias)
- Aflagoggles (Yao)
- Blood samples (Wang)
- Detection (Mallikarjunan)
- Haiti VC (MacDonald)
- Ghana VC (Jordan)
- Intervention Study (Magnan)
- Malawi/Zambia/Mozambique VC (Brandenburg)
- Nutrition Study (Manary)



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Varietal Improvement

- Improved priority traits (e.g., rosette for Africa)
- Breeding software (e.g., GCP's Integrated Breeding Platform)
- Genomics-based breeding approaches
- Regional trials



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Mycotoxin detection

- Standardized methods and sampling protocols
- Simple, cost-effective detection
- Training

TABLE 1 Diagnostic technologies available commercially and under development

Diagnostic technology	Technology cost	Sample cost (\$)	Prep time (+)	Portable?	Discrimination at regulatory limits (10 ppb)?	Multi-mycotoxin analysis in same run?	Potential use for milled grain?	Potential use for whole grain?
VICAM	\$	\$\$\$	+++	No	Yes	No	Yes	No
ELISA	\$	\$\$	+++	No	Yes	No	Yes	No
UPLC	\$\$	\$\$	+++	No	Yes	No	Yes	No
LC-MS	\$\$\$	\$\$	+	No	Yes	Yes	Yes	No
TLC	\$	\$\$	++	No	Yes	No	Yes	No
NIR (proof of concept underway)	\$\$	\$	+	Yes	No	Potentially	Potential application > 200 ppb (in progress)	Potential application in kernel sorting (in progress)
E-Nose (proof of concept underway)	\$	\$	+	Potentially	No	Unknown	(In progress)	No
AgriStrips and other dipsticks	\$	\$\$	+	Yes	Yes	No	Yes	No



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Country value chain projects

- Identify critical points for interventions along the value chain
- Identify/develop most adoptable interventions at these points
- Involve national programs/institutes to build local capacity, including training



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Available technologies

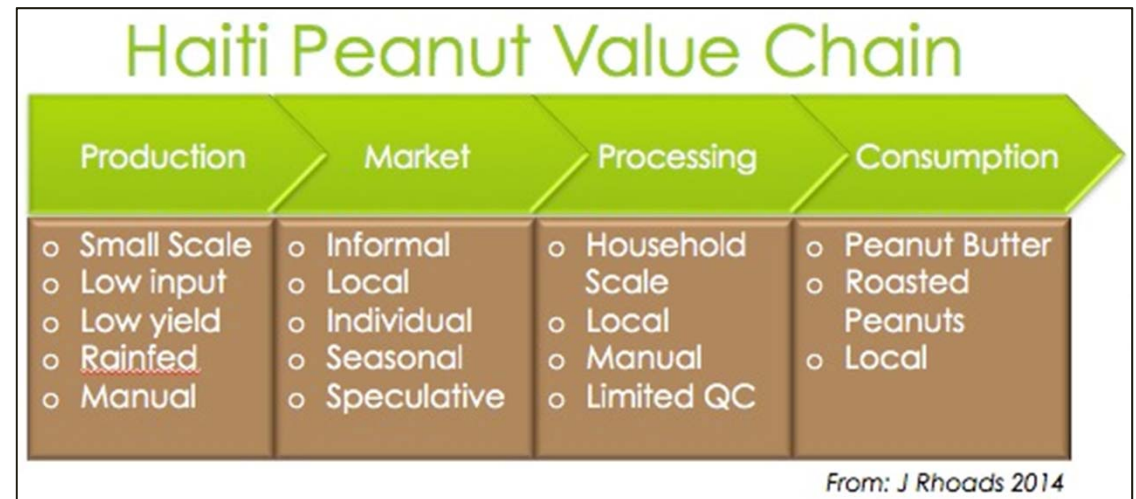
- Improved varieties (drought tolerant, disease resistant, higher yield)
- Agronomy practices (knowledge, manuals)
- Post-harvest technology (drying, storage, mechanization options)
- Processing technology (shellers)
- Market options (local, RUTF, export)
- Detection systems (ELISA, HPLC, test strips)
- Knowledge (peanuts, mycotoxins)



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Our challenges/opportunities

- Peanuts = poor women's crop
- Lack of quality control and traceability
- Government interest and policies
- Seed production and distribution
- Knowledge dissemination
- Trained scientists and staff
 - LIL/PMIL/CRP





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THANKS



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