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USAID's Agricultural Research Strategy: The Role of Post-Harvest Loss

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Office of Agricultural Research and Policy
USAID Bureau for Food Security

UC-DAVIS Post Harvest Forum
July 24, 2014 Washington DC

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OUTLINE OF TALK

1. *Overview of FTF PH Investments*
2. *Examples*
3. *Issues/Challenges*

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Major USAID FTF PH Initiatives

Run by ARP Office (Wash-DC)

1. *Innov. Labs (Hort, IPM, RPHL, Food Processing, Bean/Cowpea, INTSORMIL)*
2. *AVRDC (Core + PH)*
3. *CGIARs (IRRI, CIMMYT, CIP, CSISA)*
4. *Biotechnology (ABSP2 – LBR potato/AATF – insect resistant cowpea)*

Run by MPI (Wash-DC)

1. *AflaSTOP*

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Major USAID FTF PH Initiatives

Run by Missions

1. *Rwanda – PHH + storage*

2. *EAR – Compete/MLI*
3. *Tanzania – TAPP, Tuboroshe*
4. *Kenya – KHCP/KAVES*
5. *Ghana – ADVANCE*
6. *Uganda – WFP-P4P, UCE, DANIDA/ABI-Trust*

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FSIC Program Areas

Program for Sustainable Intensification (e.g. IPM IL, SANREM IL,CSISA, Africa Rising)

Program for Climate Resilient Cereals (e.g. Cereals RFA, DTMA, Arcadia PPP, Ceres PPP, CGIAR Rice/Wheat/Maize, Sorghum/Millet RFA)

Program for Advanced Research on Animal and Plant Diseases (e.g. USDA Partnerships under NBCRI, LCC IL, Virus Resistant Cassava)

Program for Productive Legume Research (e.g. Dry Grain Pulse IL, Peanut /Mycotoxin IL, CGIAR Legumes, NBCRI

Program for Safe & Nutritious Foods (e.g.Horticulture IL, Nutrition IL, Aquafish IL, AVRDC, Aflatoxin under NBCRI , Post Harvest IL)

Program for Policy Research & Support (e.g. AMA IL, Program for Biosafety Systems, Enabling Agricultural Trade)

Program for Human & Institutional Capacity Development (e.g. MEAS, InnovATE, MAETS, AWARD, LEAP)

Program for Research on Safe and Nutritious Foods

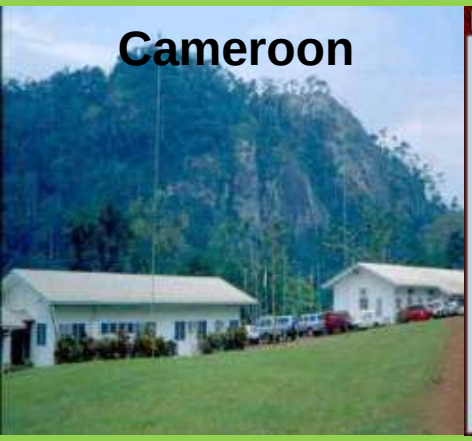
Links research on the production and processing of safe, nutritious agricultural products to a learning agenda on household nutrition, including the utilization and access to fruits, vegetables, meat, fish, dairy and legumes with the goal of improving child survival, securing family investments in agriculture, and preventing and treating under-nutrition.

Program Area Technical Lead: John Bowman

Current Activities	Activity Manager	Institution
Horticulture Innovation Lab	John Bowman	UC - Davis
Horticulture Innovation Lab Assoc. Award: LAC Assessment	John Bowman	UC - Davis
World Vegetable Center-AVRDC (Core)	John Bowman	AVRDC
World Vegetable Center-AVRDC (Post Harvest)	John Bowman	AVRDC
USDA/NBCRI/Aflatoxin	Tor Edwards	USDA/ARS
Post Harvest Loss Reduction Innovation Lab	Ahmed Kablan	Kansas State University
Nutrition Innovation Lab - Africa	Maura Mack	Tufts University
Nutrition Innovation Lab - Asia	Maura Mack	Tufts University
CRP 4.0 - Nutrition	Maura Mack	IFPRI
Adapting Livestock to Climate Change Innovation Lab	Joyce Turk	Colorado State University
Aquafish Innovation Lab	Shivaun Leonard	Oregon State University
Aquafish Innovation Lab Associate Award	Shivaun Leonard	Oregon State University
CRP 3.7 – Meat, Milk and Fish	Shivaun Leonard	ILRI
Food Processing Innovation Lab	Angela Records	University of Illinois
Harvest Plus	Vern Long	IFPRI
Golden Rice	John McMurdy	IRRI

USA one of the Founding Nations of AVRDC – The World Vegetable Center

AVRDC – Global Agricultural R&D



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AVRDC – PHL Mgmt.

Breeding

Crop management

Fresh produce handling

Processing

Variety trials on station/on farm

Quality/shelf life responses to irrigation

Packaging, storage, special treatments

Drying; sauce processing

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AVRDC: Tomato - disease resistance and better marketability

+ 40% increase in production and incomes in Tanzania

Tomato varieties ‘Tanya’, ‘Tengeru-97’, ‘Kiboko’, ‘Tengeru 2010’ and ‘Duluti’ – disease resistant, more even ripening but also with thicker, stronger skins that make the tomato fruits better able to withstand transportation to market without bruising.

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AVRDC – PH quality issues

Abiotic and biotic stress tolerance, selection for Brix values (sugar) and lycopene content for paste and sauce production – activities often done in partnership with private sector producers and processors.

New: POST HARVEST LOSS PROJECT

-AVRDC ESA Office, Arusha, Tanzania

- Global: Tanz., Kenya, Mali, Ghana, Ethiopia, Bangladesh, Cambodia

-Reduce postharvest losses of high volume, high value vegetable commodities

- Participatory assessments, gap analysis, workshops/trainings

- Develop and promote appropriate, low-cost postharvest technologies in collaboration with public and private sectors

AVRDC PH TRAINING CENTER

AVRDC PH TRAINING CENTER

AVRDC PH TRAINING CENTER

WODSTA WOMEN'S PROCESSING: AVRDC/HORT LAB

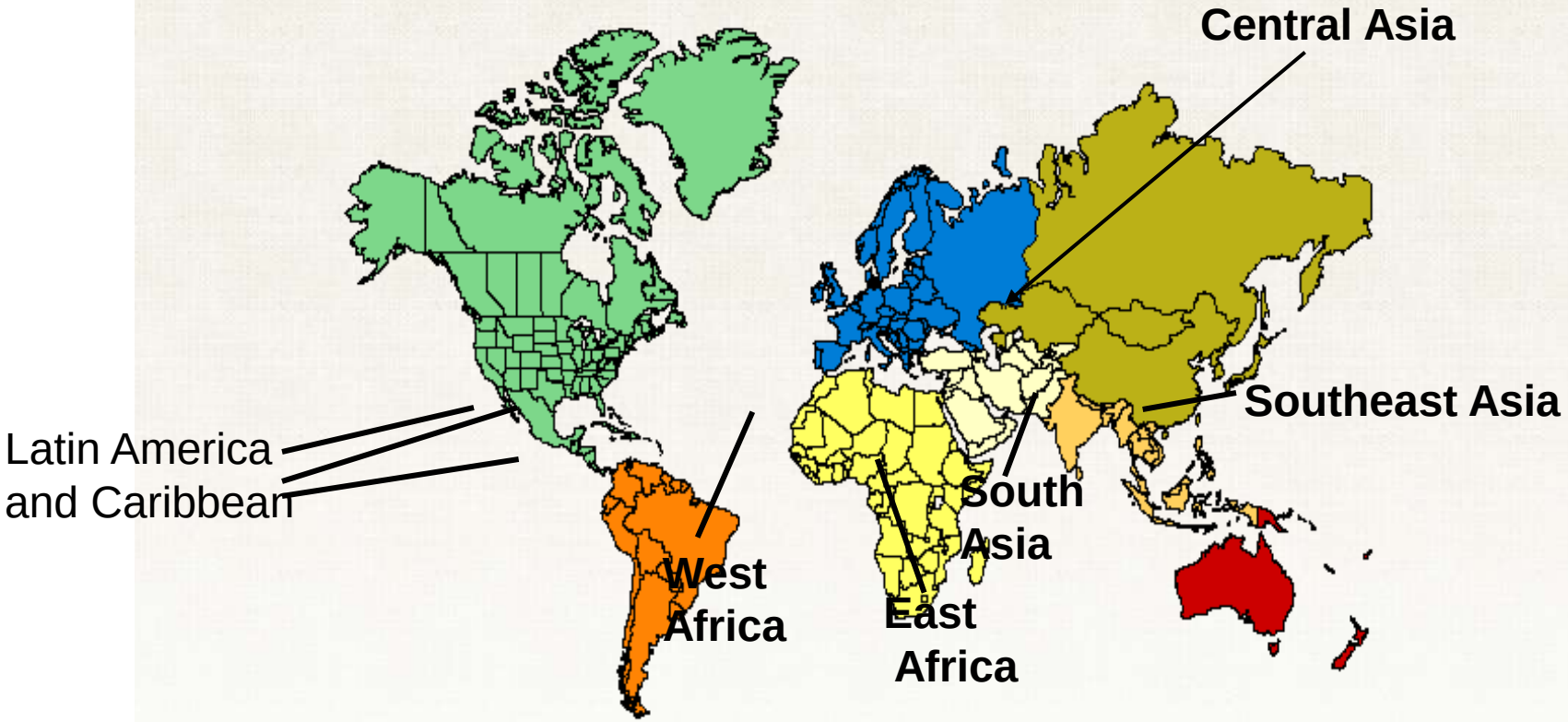
WODSTA WOMEN'S PROCESSING: AVRDC/HORT LAB

IPM Innovation Lab Program (formerly CRSP)

Virginia Tech University

http://www.oired.vt.edu/ipmcrsp/

IPM CRSP Host Country Regions in 2009-2014
6 Regions – 17 Countries



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IPM Packages - Components

- Soil treatment – Solarization, VAM, *Trichoderma*
- Seed treatment – *Trichoderma*, *Pseudomonas*
- Physical control – Hot water, Sticky traps
- Grafting – Bacterial and Fusarium wilt resistance
- Cultural control – Roguing, Host free period
- Biopesticides – Neem, NPVs, Bt, *Metarhizum*
- Pheromone traps – Fruit flies, *Helicoverpa*
- Resistant varieties – Virus and bacterial diseases
- Biological control – Use of parasitoids and predators

Potato Tuber Moth Larva/ Pupa

Potato Tuber Moth Adult

Potato Tuber Moth

- **Pheromone traps for monitoring potato tuber moth population in Mali**
- The study was designed to provide information on the occurrence of potato tuber moth (PTM) *Phthorimaea operculella.*
- Traps baited with pheromone lures were used for monitoring potato tuber moth populations in Mali.

Sweet Potato Weevil - Indonesia

Grub feeding on a tuber

Sweet potato weevil adult

Resulting damage

Sweet Potato Weevil

- **Pheromone traps for sweet potato weevil in West Sumatera**
- The objective of this study was to compare the use of sex pheromone traps and traps using fresh sweet potato tubers.
- The study showed that the trap using pheromone caught more adults of *Cylas formicarius*.
- Currently pheromone traps combined with biocontrol agents, *Metarhizium* and *Beauveria* are being tested.

Universal Trap for Sweet Potato Weevil- Indonesia

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Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss

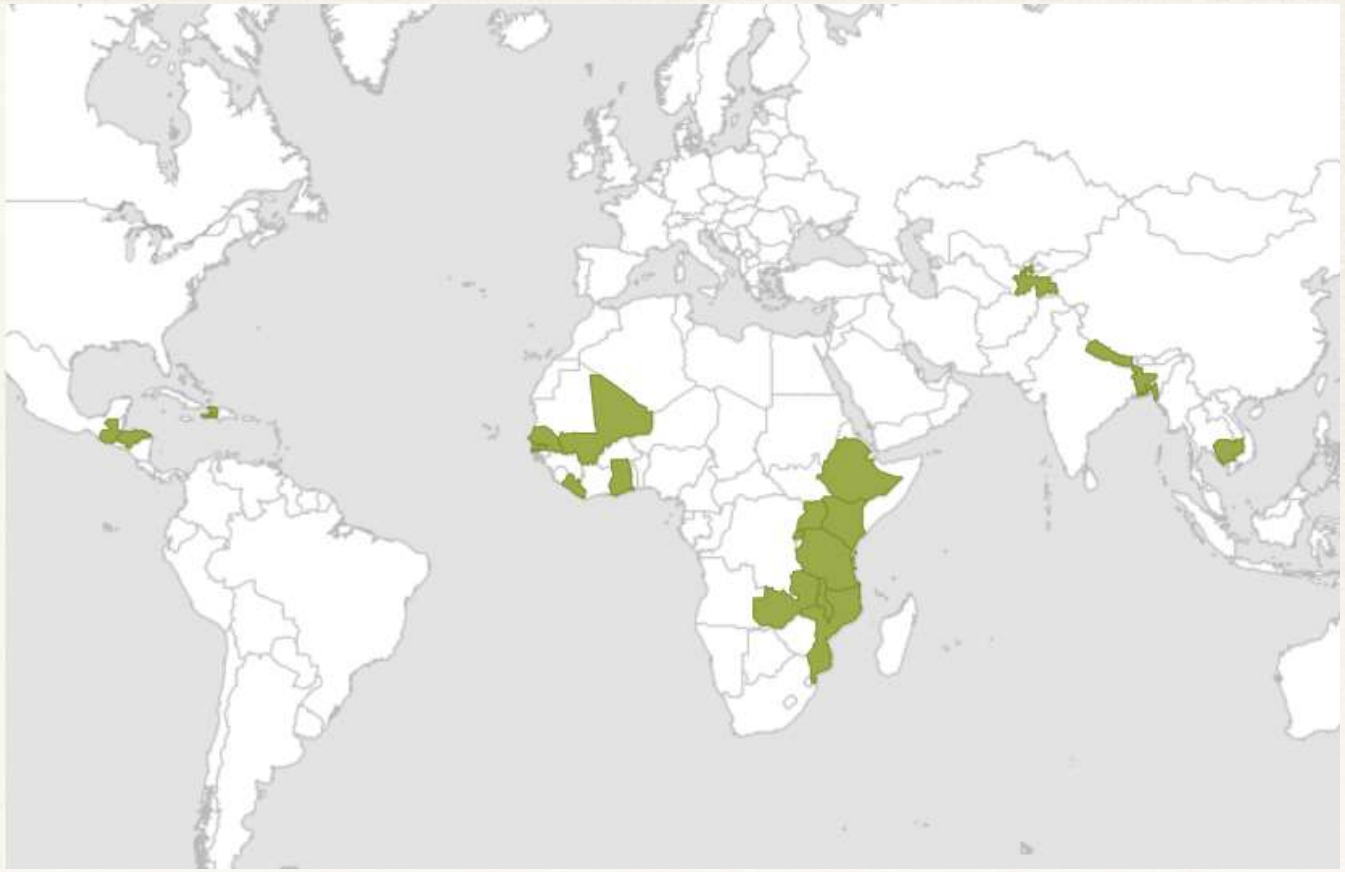
Funded by:
USAID: Global Hunger and Food Security Research Strategy: Climate Resilience, Nutrition, and Policy
(RFA-OAA-12-000036)

Program Area 5:
Reduced Post-Harvest Losses and Food Waste

University Partners:
Kansas State University
University of Illinois at Urbana-Champaign
Oklahoma State University
Fort Valley State University
South Carolina State University
University of Nebraska, Lincoln
University of Kentucky

PHL Innovation Lab Initial FtF Focus Countries

- Bangladesh
- Ethiopia
- Ghana
- Guatemala



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PHL Lab Goals

- Enhancing **capacity** to improve drying, conditioning, handling, storage, pest management, transportation, grading, standardization and marketing of their crops
- Expanding access to Post-Harvest Service Centers utilizing "Warehouse Receipt Systems" (WRS) (**value chain access**)
- Pilot testing of promising "on the shelf" and "in the field elsewhere" **best practices and technologies**

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PHL Lab Team

Team Members (U.S. Institutions)

- Oklahoma State University
- University of Nebraska
- Fort Valley State University
- University of Kentucky
- USDA-ARS Center for Grain and Animal Health Research
- South Carolina State University
- University of California Davis

PHL Lab Team

Alliance Partners (International Universities)

- Bahir Dar University (Ethiopia)
- Bangladesh Agriculture University (Bangladesh)
- Bern University of Applied Science (Switzerland)
- Kwame Nkrumah University of Science (Ghana)
- Makerere University (Uganda)
- Mekelle University (Ethiopia)
- University of Hohenheim (Germany)
- Universidad Del Valle (Guatemala)
- …

PHL Lab Team

Alliance Partners (International Agencies)

- CGIAR's International Rice Research Institution (IRRI)
- CGIAR's International Center for Agricultural Research in the Dry Areas (ICARDA)
- CGIAR's International Maize and Wheat Improvement Center (CIMMYT) (invited)
- United Nations Food and Agriculture Organization (FAO)
- …

PHL Lab Team

Alliance Partners (Companies)

- ADM (USA)
- Agri Commercial Services (Ghana)
- Hiwot Agricultural Mechanization (Ethiopia)
- John Deere (USA)
- Pens Food Bank (Ghana)
- Romer Labs (Austria)
- Vestergaard Frandsen (Switzerland)
- Woods End (USA)
- …

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Improve On-farm Drying

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Solar Grain Dryers

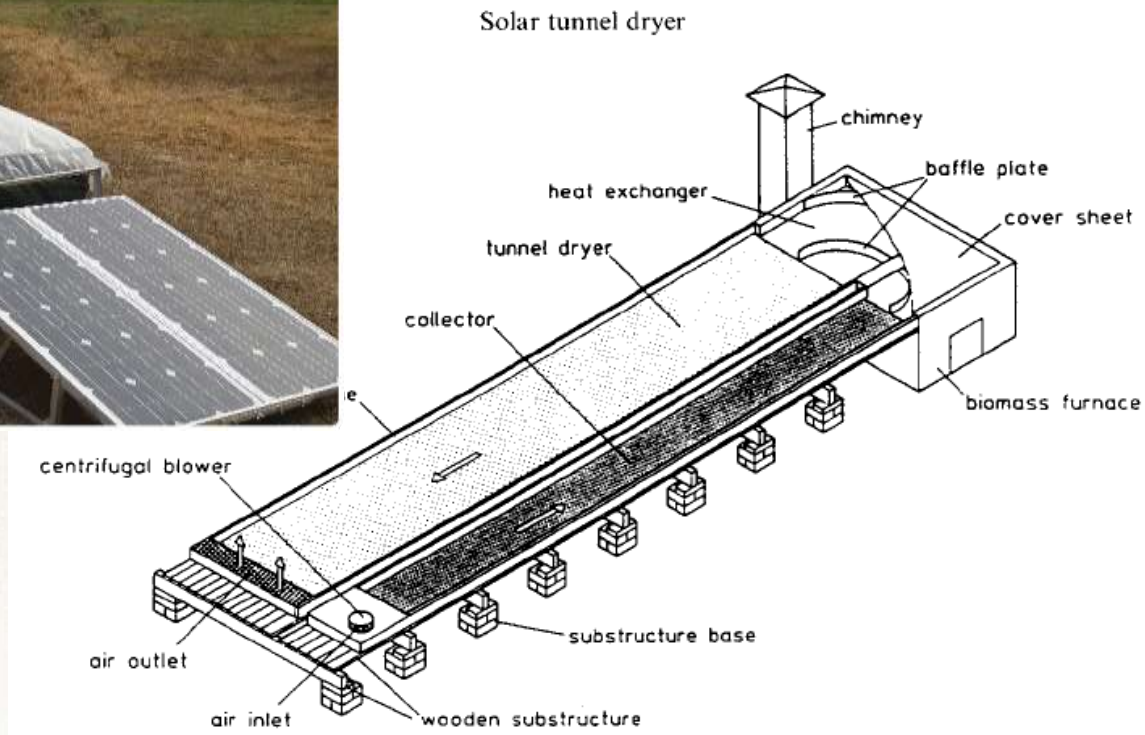

Fig. 1. Solar tunnel dryer with integrated collector and biomass furnace.

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Hermetic Storage

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Cocoons (GrainPro Design)

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Silos (CIMMYT/SDC Design)

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www.reducePHL.org

"Leaders & Knowledge for the Global Grain Industry"

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Feed the Future Innovation Lab for Food Processing and Post-harvest Handling (Purdue Food Processing Lab)

Funded by

USAID: Global Hunger and Food Security Research Strategy: Climate Resilience, Nutrition, and Policy
(RFA-OAA-12-000036)

Program Area # 5:

Reduced Post-Harvest Losses and Food Waste

Partners:

North Carolina A&T State University
University of Pretoria, South Africa
Institut de Technologie Alimentaire, Senegal
Jomo Kenyatta Univ. of Agric. & Technology, Kenya
University of Eldoret, Kenya
CIMMYT, Kenya
International Institute of Tropical Agriculture, Nigeria
A to Z Textiles, Arusha, Tanzania

Food Processing Lab

Goal: To develop sustainable, market-driven value chains that reduce food losses, improve food and nutrition security, and contribute to economic growth for farmers in **KENYA** and **SENEGAL**, and other FTF countries

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FPIL Research and Innovations

Product Development

- High quality processed products
  - Pre-gelatinized instant porridges
  - Couscous
- Nutritionally enhanced products

Improving Processes/Mechanization

Agglomerator

Decorticator

Packaging

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Entrepreneurship: Incubation Centers

Services at the Center

- **Training**
  - Technical /business skills
  - Process demonstrations
  - Testing learned skills with oversight
- **Exceptional support**
  - Business and market consultation
  - Equipment repair
  - Limited facility use
- **Optimized product output**
  - Continuous R&D
  - Scale-up support
- **Farmer organizations**

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USAID-KHCP PRESENTATION




fintrac

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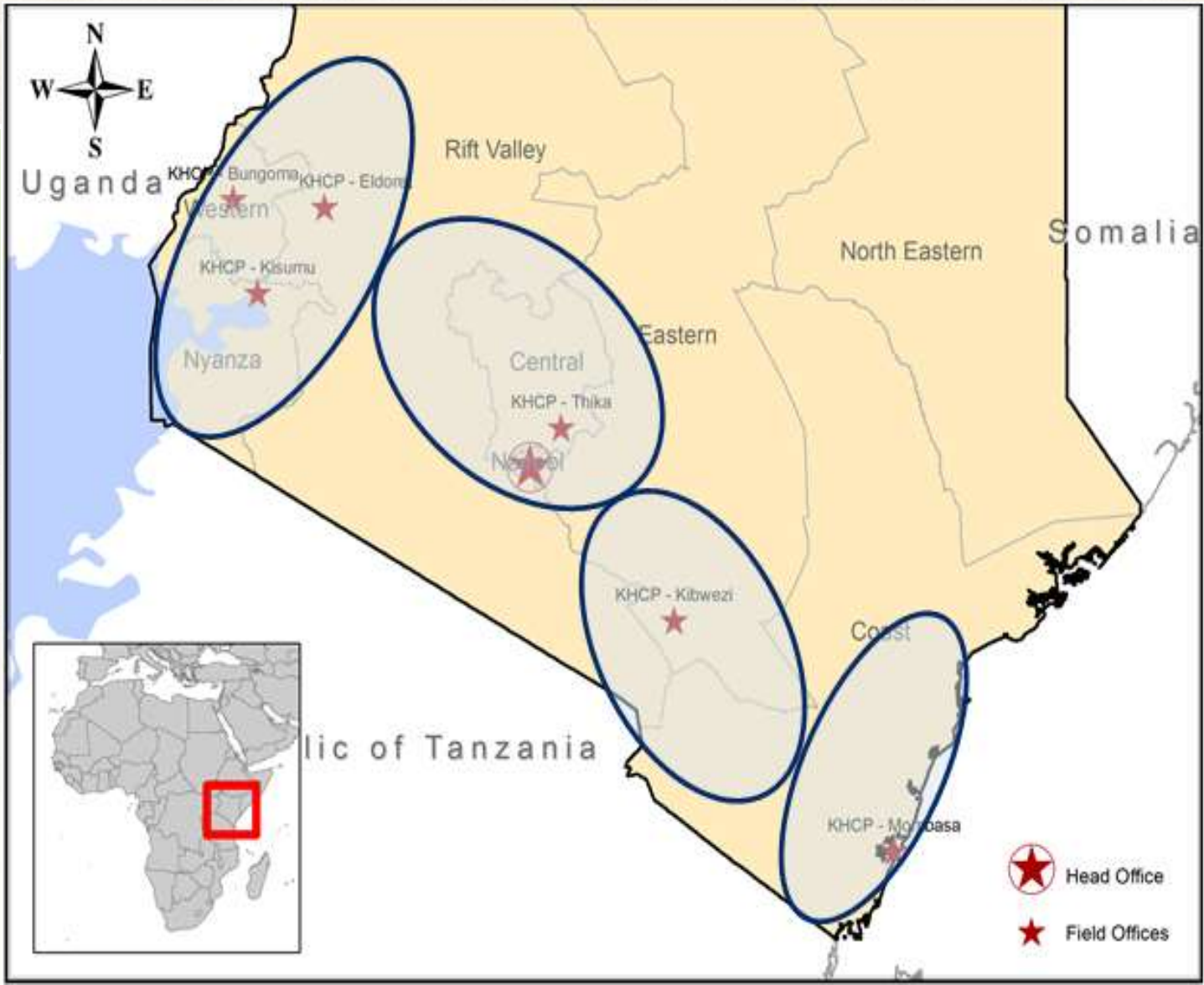
USAID - KHCP

Map of USAID-KHCP Activities



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Fine beans production for export

Chillies processing & indigenous amaranth dehydration for export

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TAPP
TANZANIA AGRICULTURE PRODUCTIVITY PROGRAM
Mapato zaidi kupitia kilimo bora

Tanzania Agriculture Productivity Program (TAPP)

Managed by Fintrac Inc.

fintrac

Increasing incomes

1. Improved production practices and higher yields

E.g. Good Agricultural Practices doubled carrots profits for father and son, Oldonyosambu, Arusha

- Use of raised beds
- Carrots planted 8 centimeters intervals for proper room to grow
- 150 grams of seed used in a 250 square meter farm
- Controlled watering plan *(5 hours watering in 12 days)* – drip irrigation system
- 8 bags of weighed 80 kg harvested in a 250 square meter farm



Charcoal Coolers – Zanzibar

Such coolers are useful as the first part of a cold chain, i.e. the produce will go to a cold truck or fridge

They can take out the field heat in the field, which can reduce the load on subsequent coolers easier

Correct Curing

Onions well cured can store much longer giving access to higher priced markets. Training is given for correct field conditioning

Curing of vanilla is part of a partnership with TAPP/USAID/Fintrac and Kilimanjaro vanilla farmers.

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USAID - TAPP

TAPP is embarking on solar drying programme with womens groups. By improving the drying techniques – dried snacks – pineapple, mango; dried teas – rosella , lemon grass; dried baby foods – butternut squash; dried green leaved – eg spinach sweet potato leaves are all turned into processed products

LUSHOTO PACKHOUSE - GoT

LUSHOTO PACKHOUSE - GoT

TAHA COLLECTION CENTER: MIDAWE

TAHA COLLECTION CENTER: MIDAWE

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USAID Aflatoxin Summary

Key Washington Research Projects (ARP/MPI)

- Peanut/Mycotoxin Innovation Lab
- Nutrition Innovation Lab/Uganda Community Connector
- NBCRI with USDA/ARS
- Venganza Research Grant
- KSU Post Harvest Innovation Lab
- Purdue Food Processing Innovation Lab

- MPI: AflaSTOP Post Harvest Storage Structures
- Africa Bureau: Regional EA for Aflasafe

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USAID Aflatoxin Summary

Key Field Mission Projects

- East Africa Regional Mission (APPEAR)
- Kenya/Ghana/So. Africa (SPS Capacity Building)

- Zambia (Maize/Groundnuts: Biocontrol)
- Mozambique (Maize/Groundnuts: Biocontrol)
- Rwanda (Maize/Cassava: Biocontrol)
- Tanzania (Maize – Prevalence/Markets)
- Malawi (Maize/Groundnuts – Biocontrol)

Key Future Research Drivers

- Partnership with USDA
- Agriculture/Nutrition Linkage
- Technology Scaling Effort (G8 Countries: Ghana, Ethiopia, Mozambique, Tanzania)
- Get evidence base on stunting/leverage Health money

USAID FROM THE AMERICAN PEOPLE

BILL & MELINDA GATES foundation

AflaSTOP

Program Update

Rex Raimond, Meridian Institute
Sophie Walker, AflaSTOP CoP

11 April 2014

Implemented by:

Meridian Institute
Connecting People to Solve Problems

ACDI VOCA
Expanding Opportunities Worldwide

ASI
Make It Happen

In Support of:

PACA Partnership for Aflatoxin Control in Africa

P-SAPP supports implementation of PACA objectives

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Project Objectives

AflaSTOP aims to develop and commercialize new technologies for post-harvest storage and drying of staple crops to help prevent and control the spread of aflatoxin.

Storage

- Establish whether there are storage devices capable of limiting further aflatoxin contamination

Drying

- Develop commercial drying technology suitable for investment in by smallholder farmers

Commercialization

- Articulate commercial models to scale up sale of storage and drying devices

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Meru: 26th March – 8th April

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FUNDING ISSUES FOR PHL SECTOR

1. *Many inquiries (esp. grains), but low funding levels persist…*
2. *Reliance on VC "component" approach for PH*
3. *Reluctance to invest due to dependence on private sector (high losses persist even in DCs)*
4. *"Increasing" production more compelling than "reducing" loss*
5. *Donors doubt hyped-up and variable loss estimates*
6. *Needs: CoPs; public/private sector research collaboration; results oriented" conferences to promote economic advantages of PH mgmt…*

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PH FUTURE CHALLENGES (John Lamb, Abt Assoc.)

1. *Need more user friendly PH knowledge platforms*
2. *Long term investment in human, instit., social capital*
3. *More risk-based assessments (HACCP-type)*
4. *More decision-support tools for VC actors*
5. *More adaptive research on predicting results of biotic stress, and SM and BCC*

PH FUTURE CHALLENGES

5. *Farmers can't afford to wait for price increases*
6. *Lack of credit for PH*
7. *Small-holder resistance to break bad habits and take on risk*
8. *Lack of drivers, especially incentives in the marketplace, WTP (willingness-to-pay for results of PH upgrades)*

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Thank you!
(www.feedthefuture.gov)