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

Strategic partnerships to achieve Feed the Future Global Hunger and Food Security Research Strategy Objectives

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USAID
FROM THE AMERICAN PEOPLE



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The Global Challenge



By 2050, the **world's population** is projected to increase by a third, to more than **9 billion**.

Most of that increase will occur in the **developing world**, where hunger is already concentrated

Food production will have to **increase 70% by 2050 (FAO)** if we wish to leave our children a less hungry, more stable world.



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Sustainability

Climate change already impacting yields - drought, high temperatures and unpredictable climates

As arable land is lost to urbanization and other uses, we need to produce **more food on less land**

Water, energy, labor and fertilizer availability constraining production

System diversification needed to improve diets and enhance nutrition and incomes





- 1. Help farmers produce more*
- 2. Help farmers get more food to market*
- 3. Support Research & Development to improve smallholder agriculture in a changing climate**
- 4. Strengthen Regional Trade*
- 5. Create a better Policy Environment*
- 6. Improve Access to Nutritious Food and Nutrition Services*





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New Ways of Doing Business under Feed the Future

- ***Country-led***
- ***Focus on Women and Gender***
- ***Integrate Nutrition and Agriculture***
- ***Support Sustainable Intensification***
- ***Increase Economic Resilience***
- ***Strengthen Capacity of Local Institutions***
- ***M&E to support real-time learning***
- ***Impact analysis to build a strong evidence base***





Research strategy developed - USAID & USDA

Prioritized geographies

Key researchable constraints

Integrated approach to
gender, climate change, NRM

Research strategy vetted by scientific community (w/ BIFAD & APLU)

Purdue meeting
January 2011

E-consultation
May 2011

Research Forum, Washington,
DC, June 2011

Strategic program review to identify priority focal areas and areas for alignment

Restructure research portfolio

Majority of resources to
address three longer-term
research thrusts

Emphasis on translational
research

Research anchored in four
major production systems



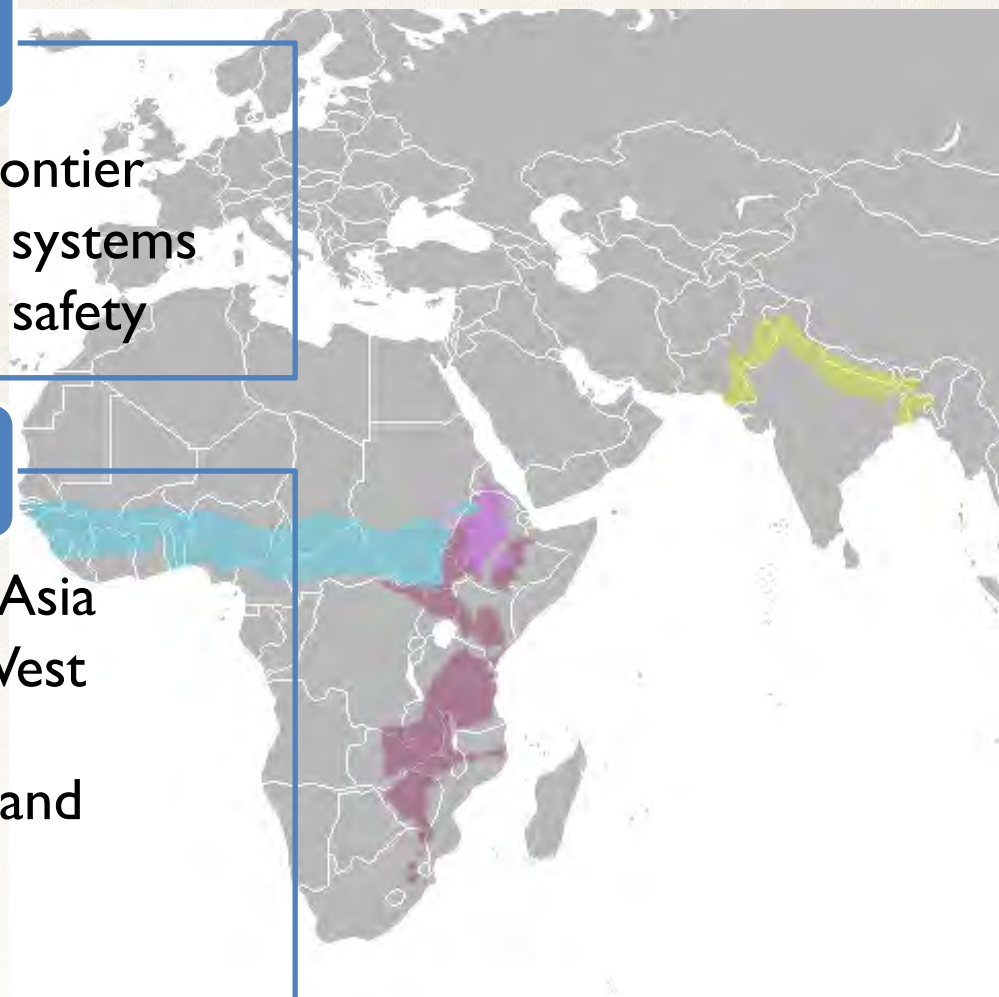
Overarching Goal Emerged: Sustainable Intensification

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-mixed systems in East and Southern Africa
- Ethiopian highlands





Longer-Term Investments

Near-Term Impact

Longer-term Research - Major Themes

1. Heat and drought tolerant, climate adapted cereals
2. Advanced technology solutions for animal and plant diseases
3. Legume productivity for improved nutrition and household incomes

Application of Advanced Research for Productivity, Profitability and Resilience

- Policy, social science and nutrition research (e.g. utilization of food)
- Increased availability and access to high quality foods for improved diets (animal sourced food, horticulture, aflatoxin control)

Sustainable Intensification of Key Production Systems

Complement Mission investments in select value chains
Integrate component technologies, policies, social sciences, nutrition

South Asia Indo-
Gangetic Plains

Maize-mixed
East & Southern
Africa

Sudano-Sahelian
West Africa

Ethiopian
Highlands

Deep Dive Countries

Bangladesh

Tanzania

Ghana

Ethiopia



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Long Term Research Area #1 Climate Resilient Cereals



Challenge: Climate change (heat, drought) impacts cereal yields

Tropical maize yields to decline 7% with one degree C temperature rise

25 million ha of crop land are affected by drought annually

Recent heat waves caused losses of 30% in wheat and 70% in maize hybrids



Solution: Higher yielding, heat tolerant, climate resilient cereals

Climate resilient wheat: help boost food security for 900 M people

Improved rice: 9.6 M more tons of rice in S.Asia by 2020

Drought and HT maize: lift 4 M Africans from poverty by 2016



How ?

Partner with private sector to advance “big win technologies”

Focus resources on drought and heat tolerance in rice and wheat

Selectively leverage other investments (esp private sector) in maize

Maintain ongoing investments in rice, wheat, maize, sorghum & millet



Long Term Research Area #2 Animal and Plant Diseases



Challenge: Diseases threaten production of key animals and crops essential for food security and smallholder incomes

East Coast Fever (ECF) kills one animal every 30 seconds, 26M cattle in Africa at risk

Cassava Mosaic Virus and Cassava Brown Streak Virus may be Africa's biggest threat to food security (Science, Feb 2010)



Solution: Animal vaccines and crops resistant to major diseases

ECF vaccine would create >\$100 M/yr in savings and yield gains of ~244 million liters of milk

Bioengineered cassava demonstrates resistance to both viruses in field trials in Uganda, with potential to avert enormous yield losses



How ?

Continue to lead in use of biotechnology to combat major pests & diseases

Develop staple crop varieties important for smallholders – late blight resistant potato, brown streak and mosaic virus resistant cassava , black sigatoga and bacterial wilt resistant banana

Support development of ECF vaccine - collaboration with USDA & ILRI



Long Term Research Area #3 Grain Legume Productivity



Challenge: Lagging yield gains in legumes, key for nutrition and income, are leading to increased prices and reduced consumption

From 1965 to 2009, bean yields in Africa have remained stagnant (0.6-0.7 tons/ha) while maize yields have doubled

Optimal dietary ratio of cereals to legumes is 2 to 1. In South Asia, the current consumption ratio is skewed towards cereals at 9 to 1



Solution: Enhanced yield and biotic and abiotic stress tolerance

Improved biological nitrogen fixation

200 million Africans consume cowpea: Bt cowpea effective against *Maruca*

New varieties with improved heat and drought tolerance

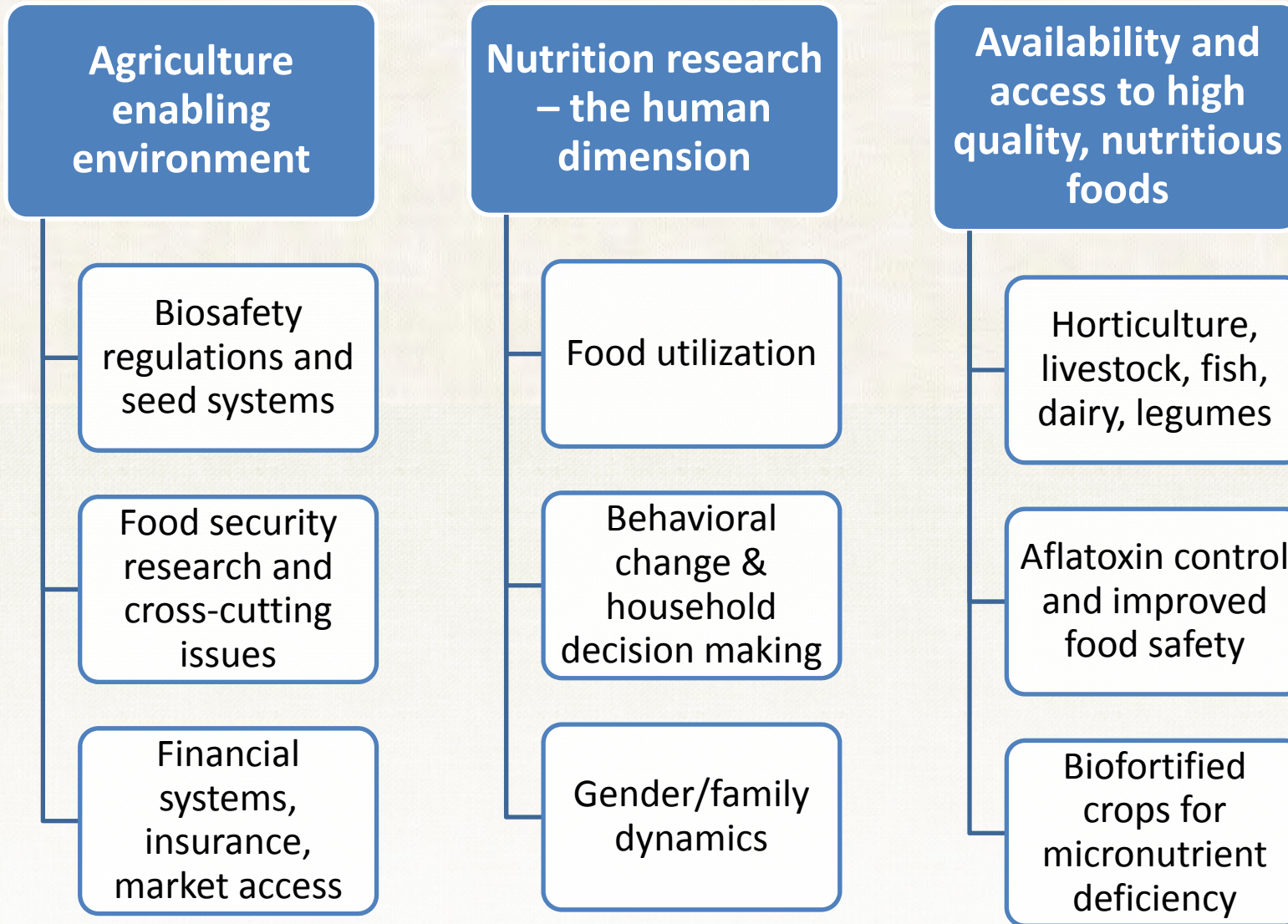
Enhanced resistance to soil-borne pathogens



How: Address main constraints by strengthening collaborations between USAID partners to achieve major gains in legume yield

Cowpea yields can increase by more than 0.5 ton/ha with greater heat, drought and biotic stress tolerance in Sudano-Sahelian agro-ecosystem.

Chickpea yields in South Asia's Rice-Wheat system can increase by ~0.4 tons/ha with greater biotic stress tolerance combined with heat and drought tolerance.





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Sustainable Intensification of Key Production Systems – Approach



Focus on agricultural systems with concentration of poor

Link global research investments to regional and national efforts

Achieve sustainable system level productivity increases

Integrate available technologies with best practices

Incorporate lessons learned from social and policy context



- Legumes positioned across all three themes of research strategy
- Key ingredient in our sustainable intensification programs
- Ratio of cereals to legumes in USAID FY11 research investments: 1.24 to 1





Dry Grain Pulses CRSP

Peanut CRSP

CGIAR – CRP 3.5 Grain Legumes

Bt Cowpea project with AATF

New Sustainable Intensification Programs

**USDA Collaboration: Norman Borlaug
Commemorative Research Initiative**

Borlaug 21st Century Leadership Program



Project led by African Agricultural Technology Foundation, with CSIRO, Monsanto, IAR (Nigeria), INERA (Burkina Faso), CRI (Ghana), IITA, Purdue Univ.

- Bt gene confers resistance to Maruca podborer – already a proven technology in other crops – cotton, maize
- Nigeria cowpea production value: \$870M annually
- Projected increased value of the Bt cowpea over 20 years is \$141M per year
- Successful field trials in Nigeria, ongoing in Burkina Faso, pending in Ghana
- Parallel investments in biosafety capacity building through Program for Biosafety Systems at IFPRI





What?

Sustainable Intensification

Integrates component technologies (varieties, breeds, practices)
NRM, socio-economics, nutrition, gender, policies

Where?

Specific focal agroecologies

Targeted geographies and value chains with USAID Missions
Spillovers to other region

How?

Aligning partnerships

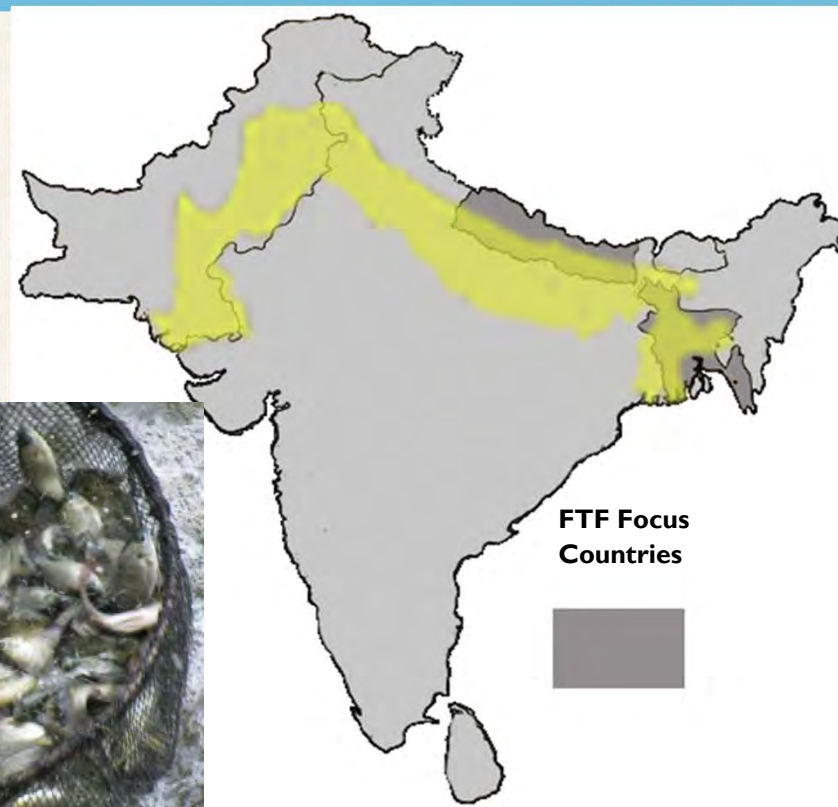
National and regional CAADP plans
US Universities (e.g., CRSPs)
International Ag Research Centers
National Agriculture Research Systems
Development donors
NGOs
Private Sector – local and international



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Sustainable Intensification System #1: Indo-gangetic Plains of South Asia



Cereal Systems Initiative for South Asia



IRRI

CIMMYT



ILRI



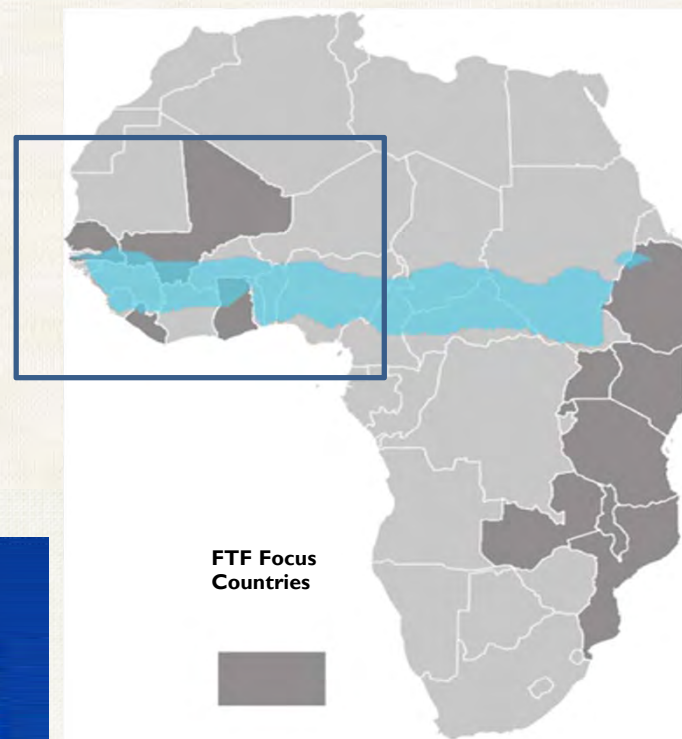
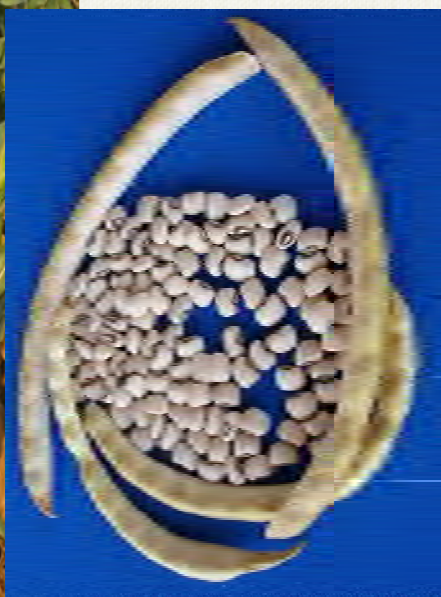
BILL & MELINDA GATES foundation



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Sustainable Intensification System #2: Sudano-sahelian systems in West Africa



19.7 million rural people in cereal root crop mixed and agro-pastoral millet/sorghum systems

10.6 million people living on less than \$1.25/day

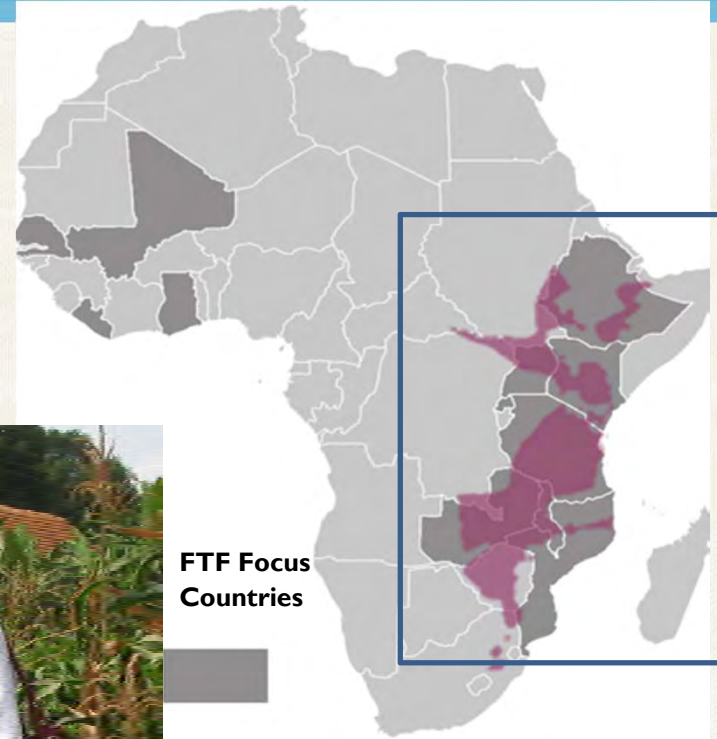
24-38% stunting in children less than 5 years old



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Sustainable Intensification System #3: Maize-mixed systems, E & S Africa



22.6 million rural people in maize-mixed systems

20.9 million people living on less than \$1.25/day

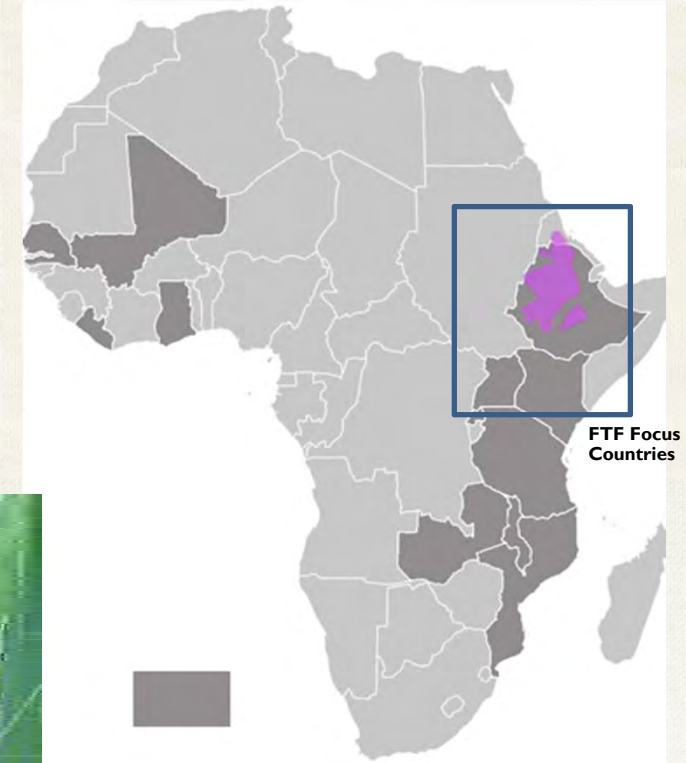
38-47% stunting in children less than 5 years old



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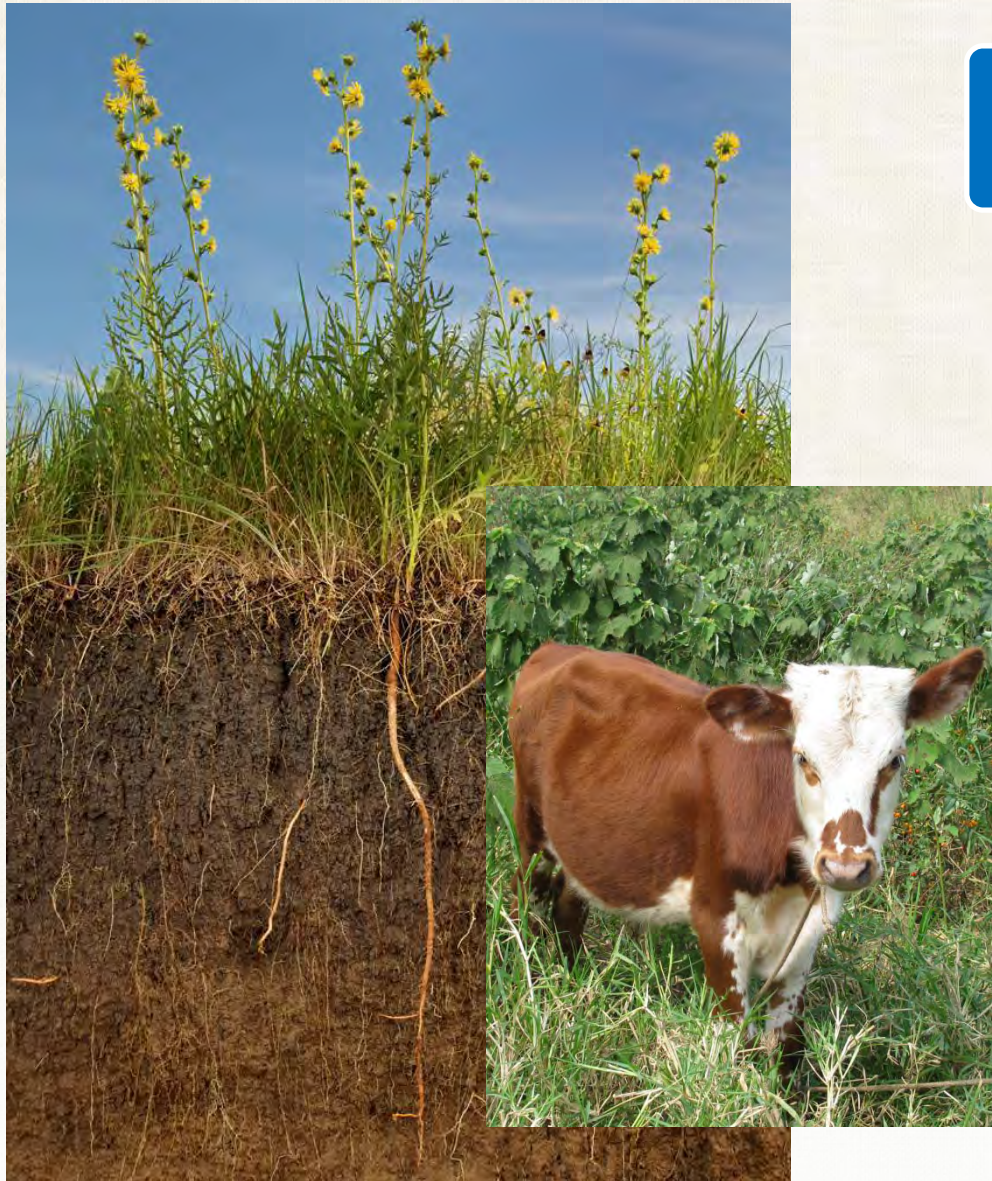
Sustainable Intensification System #4: Ethiopian Highlands



24 million rural people in highland temperate mixed

15.9 million people living on less than \$1.25/day

52% stunting in children less than 5 years old



Increasing productivity, sustainability and resilience through research on:

Avoid unnecessary external inputs, especially environmental hazards

Utilize ecological processes: BNF, natural predators

Diversify systems – integrate legumes, animals, horticulture

Minimize greenhouse gas emissions & adapt to climate change

Maintain and improve soil & water quality

Acknowledge local environmental & cultural conditions



The challenge of transforming systems: beyond tradeoffs ?

- Increase above- and below-ground biomass to improve soil health & system productivity (e.g., fertilizer trees, legumes, N/P fertilization)
- Diversification (crop & enterprise) for greater resilience, productivity, and nutrition
- Integrating livestock and mechanization into conservation agriculture
- Improve water productivity to reduce risk & enhance investment
- Focus research at the household level



- Takes advantage of scientific expertise at USDA/ARS. Enables ARS scientists to make their work more internationally relevant and build stronger international partnerships.
- Four working groups under NBCRI:
 - Wheat stem rust – new greenhouse in St. Paul, MN
 - Animal productivity – East Coast Fever vaccine and goat genomics
 - Legume productivity
 - Food Safety – aflatoxin control
- Additional collaboration with NIFA - competitive call for US institutions to do research with international partners



- Andean diversity panel for common bean: identify sources of resistance to diseases common to E. and S. Africa and tolerance to heat and low soil fertility
- Develop and deliver parental materials to breeders in FTF countries (eg Rwanda, Uganda, Tanzania)
- Strengthen partnerships with DGP CRSP, BeanCAP, CIAT, US Universities and NARS
- Leverage technical capacities and resources at ARS to advance international agricultural development under Feed the Future

Questions: Ask Phil Miklas, Tim Porch, and Karen Cichy



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Borlaug 21st Century Leadership Program

Major new Feed the Future investment to strengthen the human and institutional capital base necessary for agricultural sector innovation



Photo: Borlaug Foundation

- Critical Entry Points:
 - Educational institutions
 - Building researcher capacity
- New five-year program
 - Degree training, US and foreign students
 - Sandwich programs
 - Institutional capacity building
 - University linkage programs
 - Donor coordination



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Why relationships?

Where do we need improvement?

- USAID provides funding support – we rarely implement programs. Our impact is dependent on strong relationships.
- DGP CRSP evidence of good partnerships between US Universities and NARS
- Need to build and strengthen more partnerships between USAID supported research programs – eg. CRSPs and CRPs.
- Welcome your thinking on how to build stronger partnerships between USAID Mission value chain programs and CRSPs and other USG research investments.
- Where is the private sector in legume research collaborations?



Call for concept notes to develop climate resilient cereals through USAID's Global Development Alliance

Objectives:

- 1) Develop new climate resilient cereal varieties with enhanced abiotic stress tolerance and improved yield
- 2) Establish partnerships that leverage resources, including technical assistance or sharing costs, to improve agricultural productivity for small holders
- 3) Support product development of technologies that can be applied globally in support of Feed the Future Initiative objectives

Alliance proposals should leverage resources at a minimum of 1:1

www.grants.gov: APS-567-12-00001

www.feedthefuture.gov/news-and-events

Deadline: **February 29, 2012**

Questions: Jenny Gu (jgu@usaid.gov)



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Happy Valentine's Day!



www.feedthefuture.gov