



**FEED THE FUTURE**

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

# Feed the Future Food Security Innovation Center

## Sustainable Intensification and Integrated Pest Management



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March 15, 2013



**USAID**  
FROM THE AMERICAN PEOPLE



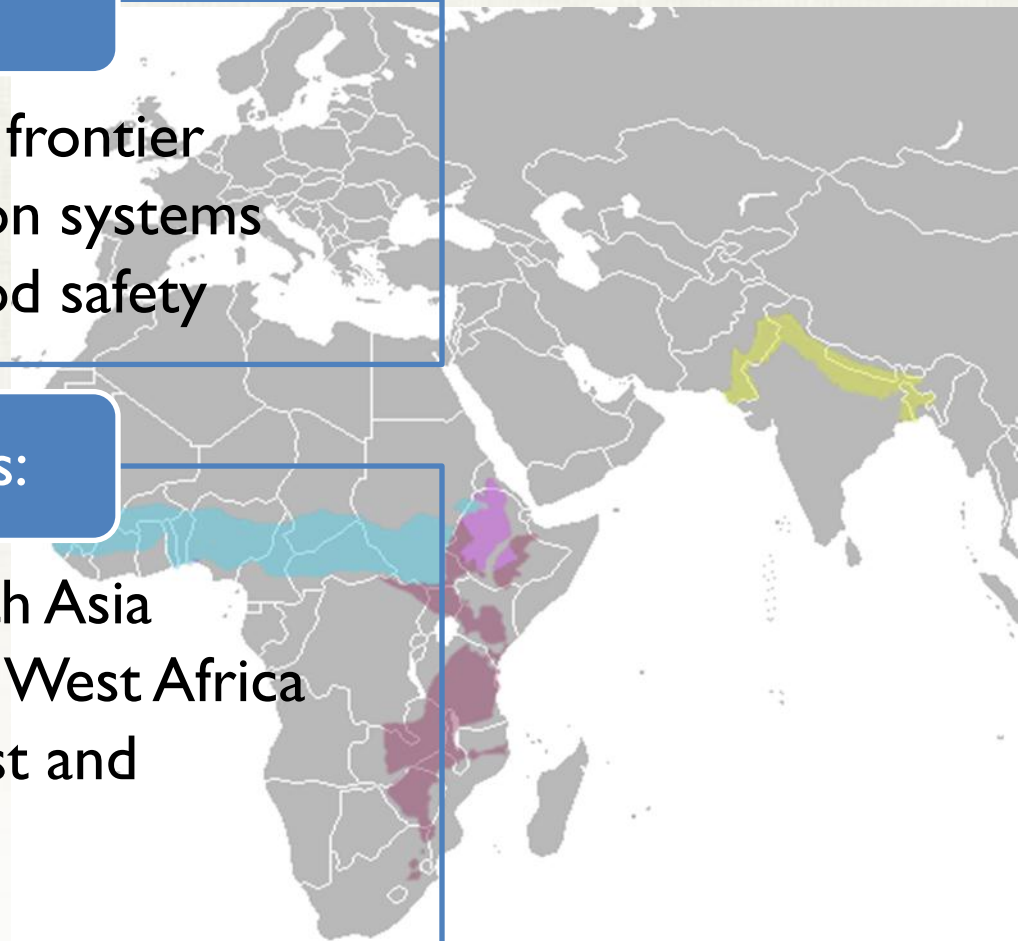
## Overarching Goal: Sustainable Intensification

### 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





## Feed the Future Food Security Innovation Center

- Created in response to BIFAD CRSP study recommendations
- 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



## **Challenge:** Increase cereal yields and adapt to climate change

- Cereals account for approximately two-thirds of all human energy intake
- An estimated 1.2 billion poor people depend on wheat

## **Solutions:**

- Invest in development and dissemination of improved cereals
- Take advantage of emerging biotech and genomic tools
- Partner with private R&D companies and US universities
- Leverage BMGF investments

## **Example Projects:**

- Rice, wheat, maize, dryland cereal CRPs
- Arcadia – abiotic stress tolerant rice
- Drought/heat tolerant maize and wheat
- New Sorghum and Millet Innovation Lab
- UC Davis Abiotic Stress Tolerant Millet





## **Challenge:** Increase productivity and availability of legumes

- Abiotic stresses decrease legume yields by up to 40%
- Pests and diseases can decrease yields by up to 35%
- The grain legume value chain directly benefits women, especially in Africa

## **Solutions:**

- Elevate legumes as major investment area under the research strategy
- Tackle yield, climate resilience and biotic stresses for staple legumes
- Utilize private sector knowledge and skill in transgenic and emerging genomic tools.

## **Example Projects:**

- Grain Legumes Innovation Lab
- Peanut & Mycotoxins Innovation Lab
- AATF Bt Cowpea
- CGIAR Grain Legumes CRP





## **Challenge:** Protect animals and tropical staples from major pests and diseases

- Plant diseases on major food crops cause up to 40% of pre-harvest losses
- Over 90% of the world's wheat acreage is susceptible to wheat stem rusts

## **Solutions:**

- Leverage US science and leadership in advanced genomic/biotech tools
- Utilize transgenic tools for critical plant diseases
- Build public sector capacity to use biotech tools

## **Example Projects:**

- Virus Resistant Cassava for Africa
- East Coast Fever vaccine development (USDA)
- Venganza—Wheat Stem Rust & Mycotoxins
- Late blight resistant potato





## **Challenge:** Sustainably increase production and consumption of highly nutritious foods and diversify diets

- Fruits and vegetables provide critical micronutrients for child development
- One third of children under five in low income countries are stunted
- Half of all children and pregnant women are anemic

## **Solutions:**

- Nutrition research on behavior, food utilization and household dynamics
- Research on production/consumption biofortified and nutrient-rich crops
- Develop options to strengthen post harvest handling and food safety
- Invest in nutrition, horticulture, animal sourced foods

## **Example Projects:**

- Meat, Milk & Fish and Nutrition CRPs
- Horticulture, Livestock, AquaFish & Nutrition Innovation Labs
- World Vegetable Center





## **Challenge:** Fundamentally Transform Key Production Systems

- In Africa, 65% of agricultural land suffers from physical and chemical degradation
- African cereal yields are less than half the global average

## **Solutions:**

- Integrate research outputs, policy and nutrition in production systems
- Focus multiple interventions within targeted geographic areas
- Diversify major production systems with crops and animals
- Evaluate and disseminate improved soil and water management practices

## **Example Projects:**

- Integrated Pest Management Innovation Lab
- Africa RISING
- Cereal Systems Initiative for South Asia
- Sustainable Agriculture and NRM Innovation Lab







## **Challenge:** Create supportive agricultural policy environments

- Help countries embrace predictable, inclusive, evidence-based and transparent policy formulation and implementation

## **Solutions:**

- Work with host-country governments and multilateral institutions to improve enabling policy environments
- Address land and natural resource governance and resilience policy, nutrition policy constraints.
- Improve function of and access to markets

## **Example Projects:**

- Feed the Future Policy Plan
- Assets and Market Access Innovation Lab
- Program for Biosafety Systems
- New Alliance partnerships





## **Challenge:** Professional and organizational capacities are inadequate to address agricultural challenges and opportunities

- Public agricultural institutions are weak
- Private sector needs skilled employees
- Experienced faculty and managers are retiring
- Women hold few management positions

## **Solutions:**

- Strengthen human and institutional capital base
- Support best practice development
- Support women in agricultural research
- Develop human skills through fellowships and long-term degree training

## **Example Projects:**

- InnovATE – Agricultural Training & Education
- African Women in Agricultural Research and Development (AWARD)
- Borlaug Higher Education for Agricultural Research and Development





## Criteria for Research Investment

(from Feed the Future Research Strategy)

- **Relevance to poverty, women and children** and reduced vulnerability objectives
- **Likelihood of success:** Technical merit, clear pathways for deployment/adoption
- **Cost/Benefit:** Estimated cost to develop technology vs. potential returns in terms of impacts.
- **Economic sustainability** for producers/adopters
- **Natural resources sustainability:** water, soil, ecosystem and climate change.
- **Institutional sustainability/impact on capacity:** engagement of national and regional partners
- **Time Frame:** timeline, milestones
- **Risks:** potential impacts on vulnerable groups, environment or breakdown in key pathways



## IPM in Feed the Future Research Portfolio

- Productivity – reduced losses to pests and diseases
  - Food Safety – fewer contaminants/spoilage
  - Systems Intensification – Diversify systems and diets
- 
- World Vegetable Center (AVRDC)
  - Horticulture Innovation Lab
  - CGIAR CRPs: GRiSP, WHEAT, MAIZE
  - Sorghum and Millet Innovation Lab
  - Grain Legumes Innovation Lab
  - Peanut and Mycotoxins Innovation Lab
  - Integrated Pest Management Innovation Lab



# Integrated Pest Management Innovation Lab

- Led by Virginia Tech University, - research to address
  - agricultural losses due to pests
  - damage to natural ecosystems including loss of biodiversity
  - pollution and contamination of food and water supplies
- 20 countries in six regions, 13 are FTF focus-countries
- Working with 17 US Universities and over 50 overseas partners
- Development and deployment of over 100 IPM technologies
- Impact is in range of \$20-40 for every dollar spent (first 20 technologies)
- Strong partnerships with USAID Missions on critically important issues



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## Sustainable Intensification & Integrated Pest Management





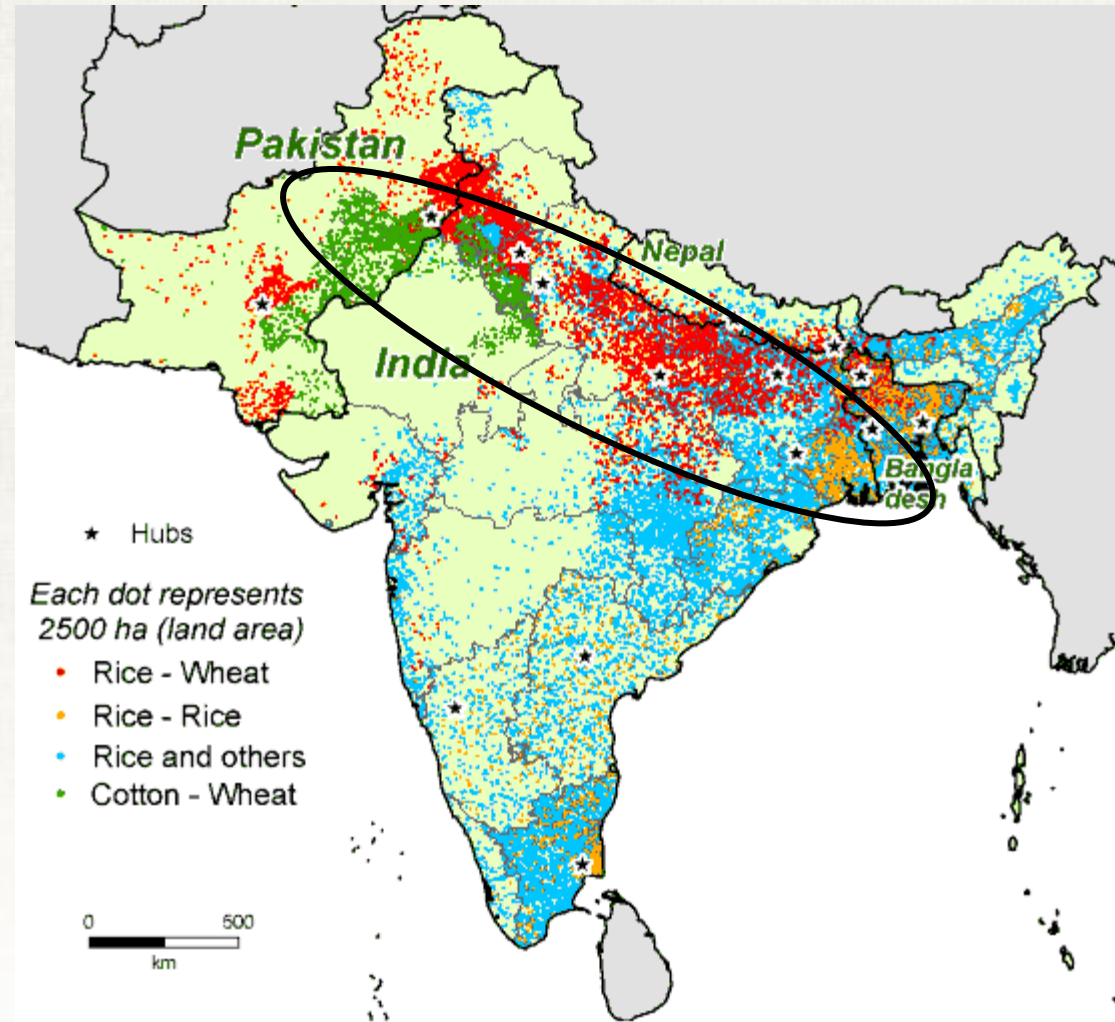
## Sustainable Agriculture and Natural Resources Management Innovation Lab

- Led by Virginia Tech University - Global focus on conservation agriculture production systems (CAPS) designed to provide smallholders with the capacity for sustainable intensifying production systems through:
  - climate-smart agriculture and
  - resilient agro-ecological systems
- 13 countries in seven regions, 8 are FTF focus-countries
- Working with 7 US Universities and 34 overseas partners
- Long term research awards to: Generate knowledge, promote innovation, build capacity and engage stakeholders to develop sustainable CAPS



## Production Systems in the Indo-gangetic Plains

- Home to 900M people (1/7 world population)
- Dominated by rice-wheat, rice-rice, rice cotton systems
- Breadbasket of S. Asia
- Key constraints
  - Water availability
  - Labor/energy shortages
  - Soil erosion/nutrient depletion
  - Arable land







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# Cereal Systems Initiative for South Asia

Diversification

New varieties

Sustainable  
System  
Transformation

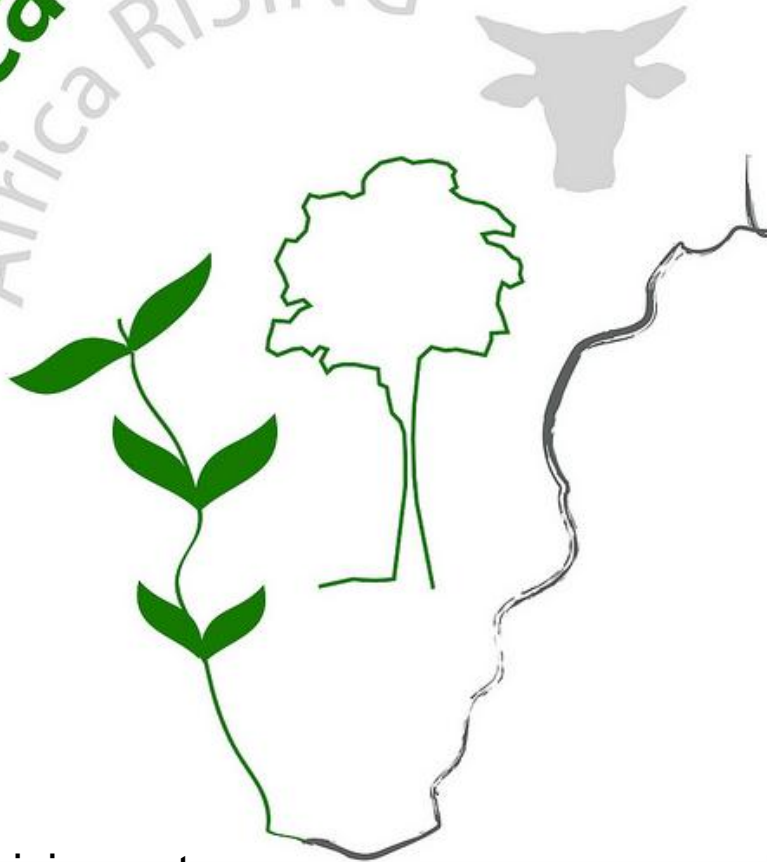
Improved  
Management

Innovative  
Policies





**Africa RISING**  
Africa RISING



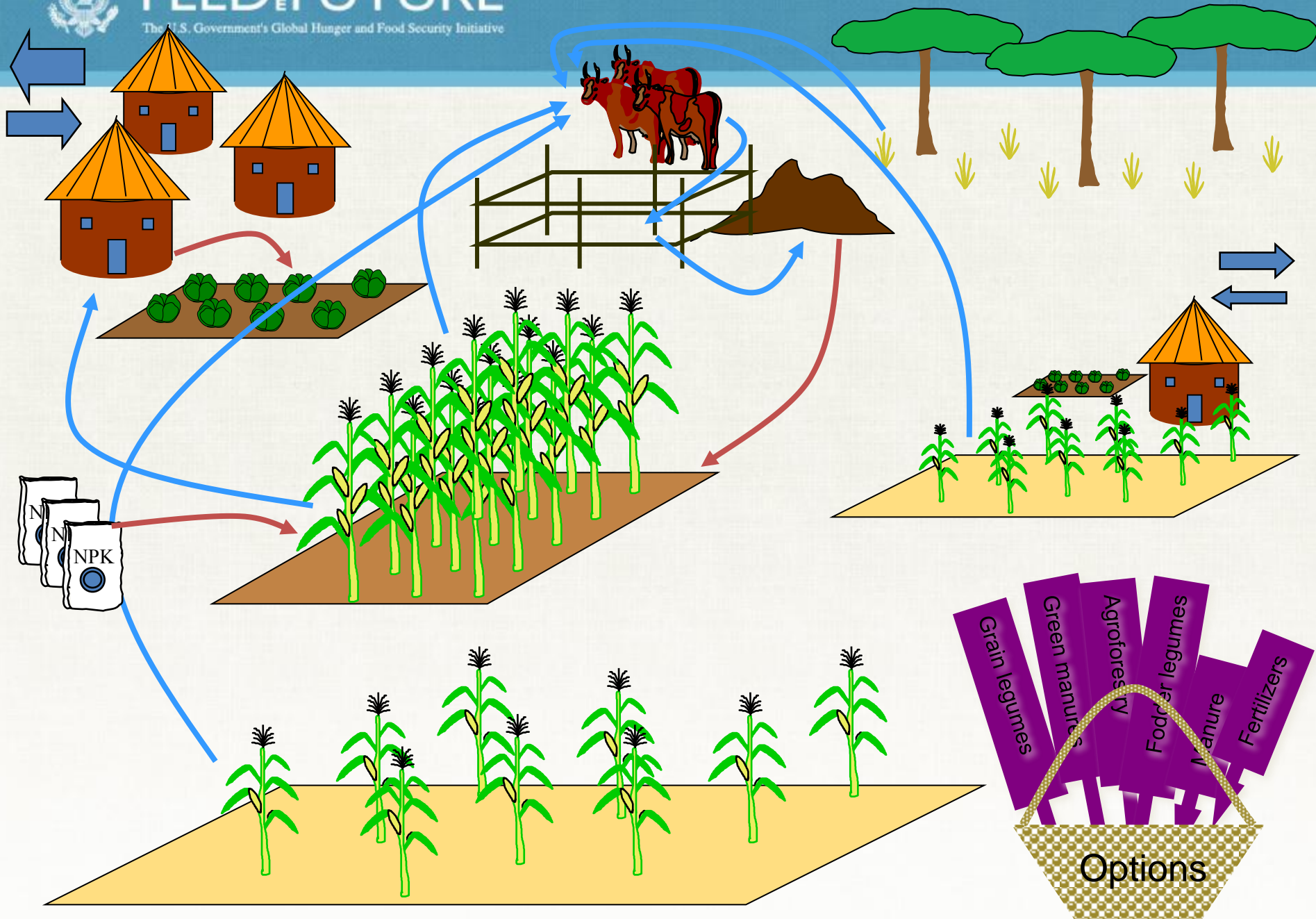
Transforming production systems in Africa through **Sustainable Intensification**

- Maize-legume-livestock systems in **East and Southern Africa**
- Crop livestock systems in **Ethiopian Highlands**
- Cereal based farming systems in **West Africa**



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## Research and Coordination Approach

- Research design framework
- Collaborative management structure
- Monitoring and evaluation framework
- Communications strategy

## Program Outcomes

- Increase whole-farm productivity
- Improve natural resource management
- Establish links to markets & input suppliers
- Decrease malnutrition and poverty, especially for women and children
- Enhance economic & environmental resilience



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**Thank You!**

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