



FEED THE FUTURE

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



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RESEARCH
PROGRAM ON
Water, Land and
Ecosystems



THE TEXAS A&M UNIVERSITY SYSTEM

Feed the Future Innovation Lab for Small-Scale Irrigation

April 2015

Major Elements

Small Scale Irrigation Coop Agreement

- **Identifying** promising, context appropriate, small-scale irrigation interventions, management and practices for poverty reduction and improved nutrition outcomes
- **Evaluating** production, environmental, economic, nutritional, and gender impacts, trade-offs, and synergies of small scale irrigation technologies and practices
- Identifying key **constraints and opportunities** to improve access to small scale irrigation technologies and practices
- **Capacity Development and Stakeholder Engagement**



Countries

- **Ethiopia – initial pilot**
- **Tanzania**
- **Ghana**

Methods

- **Assess recent innovations in SSI**
- **Stakeholder engagement (iterative)**
- **National partners for field research**
- **Detailed experimental design**
- **Ex ante assessment of consequences**
- **Environmental assessment**
- **Field studies**
- **Ex post assessment and scaling out**
- **Constraints analysis and mitigation**
- **Capacity Building and Training**

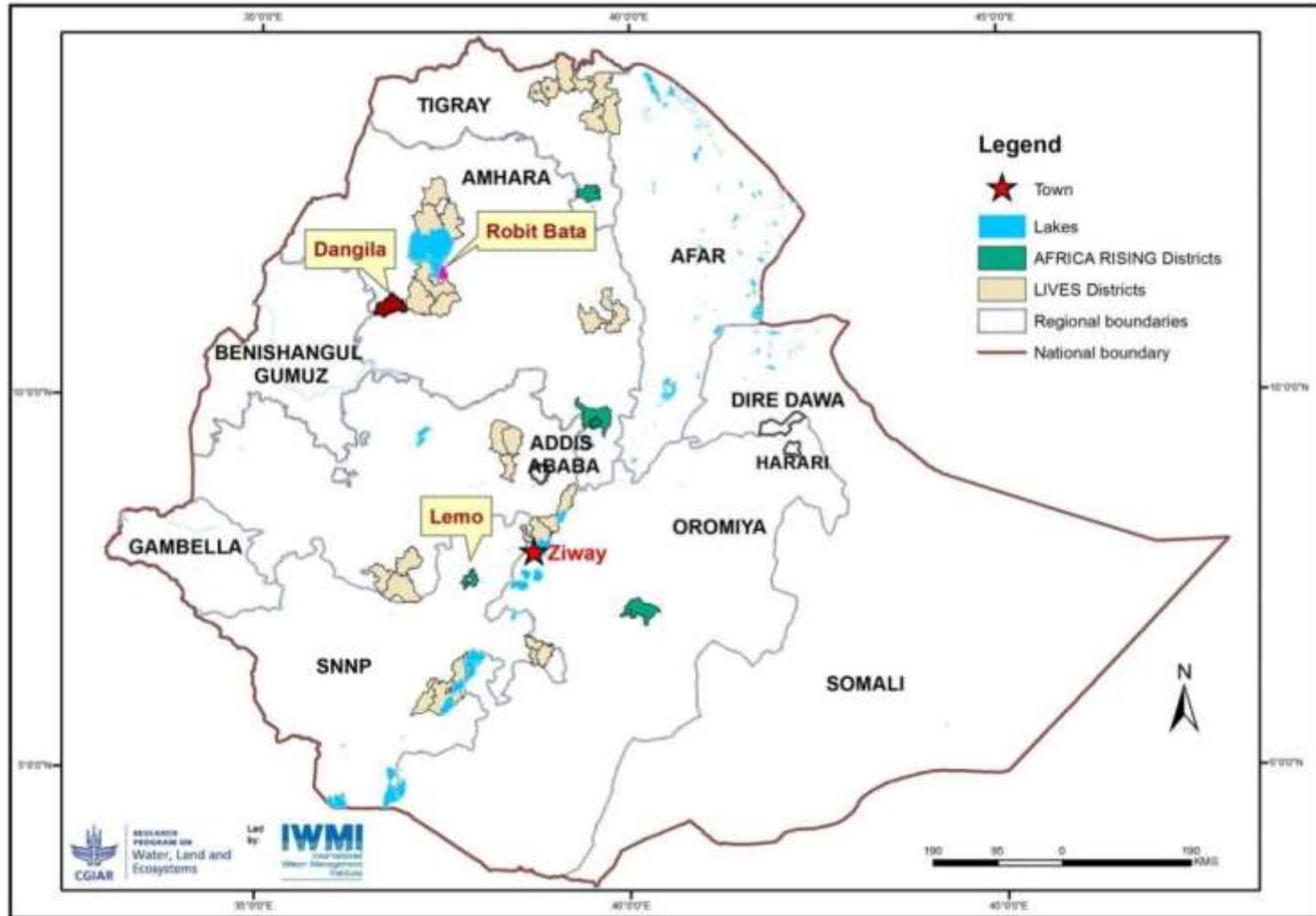
Cross Cutting Issues

- Factors affecting/enhancing gender in adoption and use of interventions
- Impact on/enhancing human nutrition at household levels
- Impact on/ameliorating effects of SSI on water safety at farm and stream levels
- Environmental assessment of SSI at farm and watershed levels

Candidate Innovations

- **Low cost water lifting devices**
- **Watershed management**
- **Water recharge**
- **In-situ water harvesting**
- **Irrigated fodder**
- **Drip irrigation**

Ethiopia locations



CGIAR
RESEARCH PROGRAMS ON
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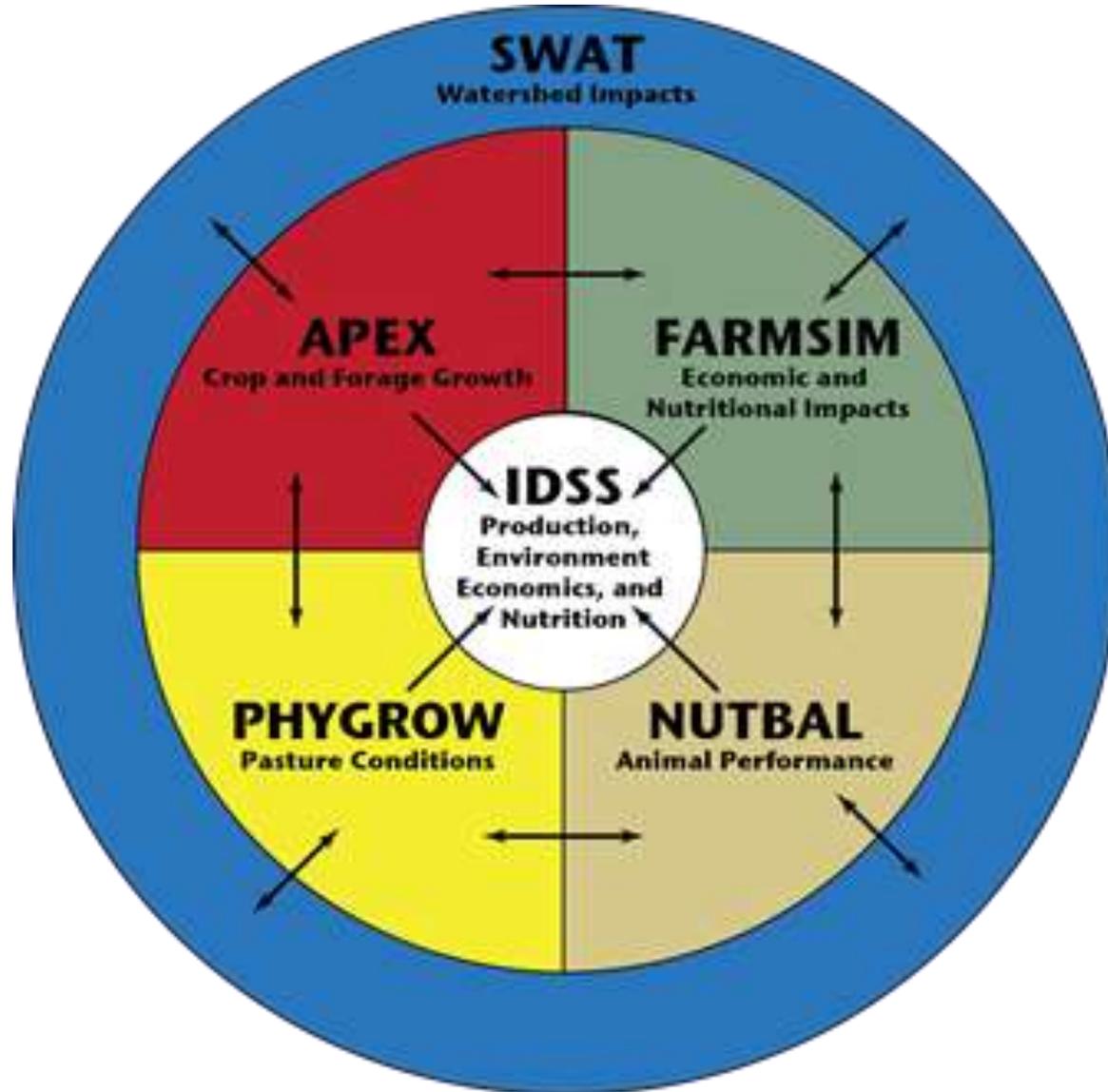
Ex Ante Analysis of Consequences

- Definition of innovations and locations for field studies (FtF zones)
- Geographic characterization of the area
- Existing data on cropping systems, prices etc.
- Integrated Decision Support System
- Production, environmental, economic consequences
- Scaling up and out
- Environmental consequences

Key Questions

1. How much water (and land) available for irrigation?
2. How many farmers/households can it support?
3. How sustainable is it (now and in the future)?
4. What are the bottlenecks and opportunities (technologies, social/cultural; economics)? Labor, population growth, water quality (salinity, fecal, enrichment)
5. What are the optimum mixtures of interventions (source, storage, conveyance, use)?
6. What difference will it make in income, nutrition and for women?
7. What changes in policy, practice and investments are necessary (local, regional, national)?

Integrated Decision Support System



Linkages with Other FtF Innovation Labs

- Comprehensive IDSS/IFPRI models
- Global natural resource and economic databases
- Crops, livestock, soil and water resources, land use and climate change, technologies, environmental and economic impacts
- Scalable from farm scale to continental scale
- Buy-in possibilities for extending FtF ILSSI
- Initial engagement with other innovation labs
- Cooperate on existing projects
- Prepare joint proposals for additional research

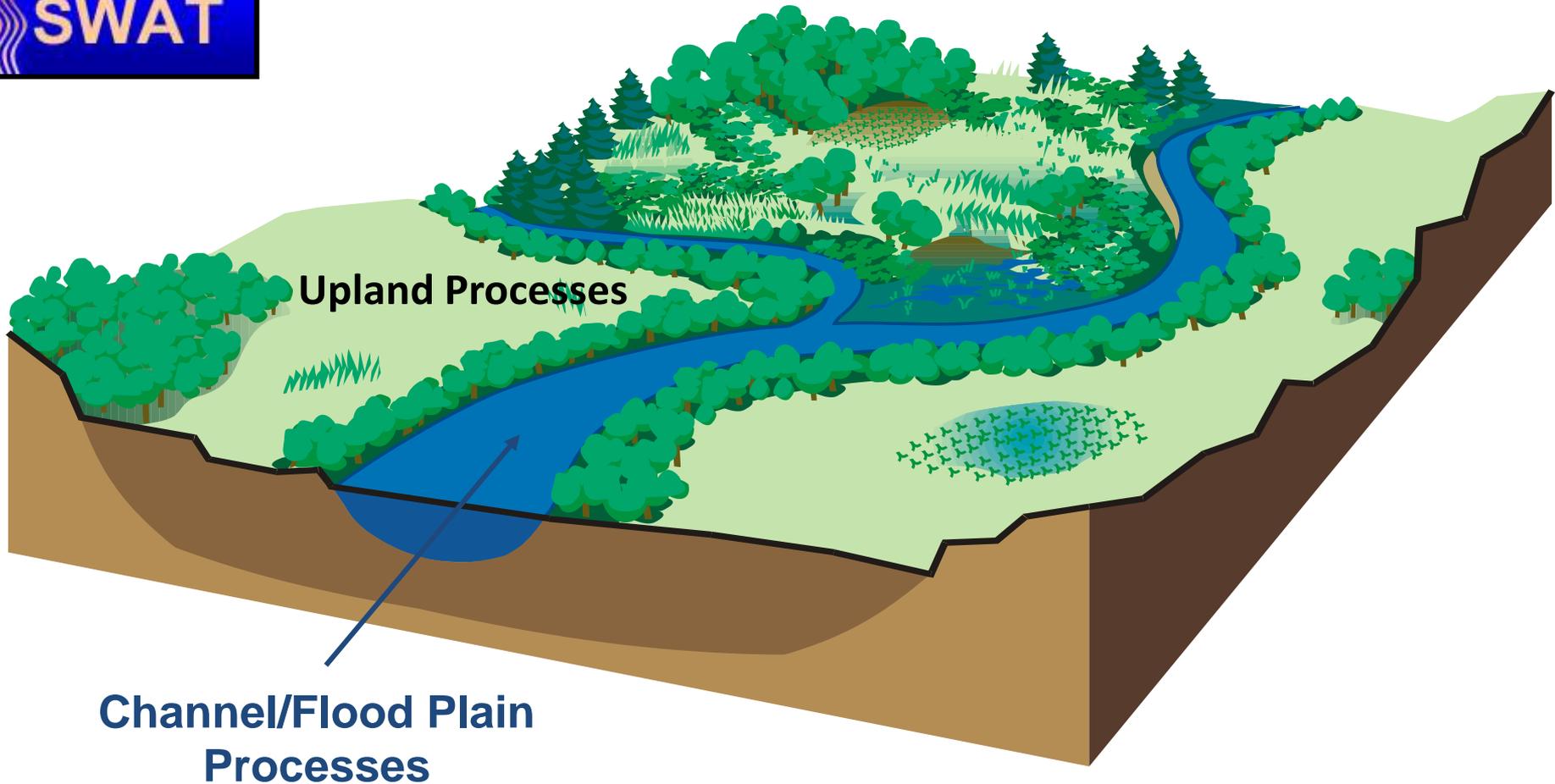
Cooperators

- **Confirmed**
 - Africa RISING
 - LIVES (CETA)
 - iDE
 - Sustainable Intensification

- **Pending**
 - Horticulture
 - Nutrition
 - CISA

IDSS Core Model

SWAT Watershed System



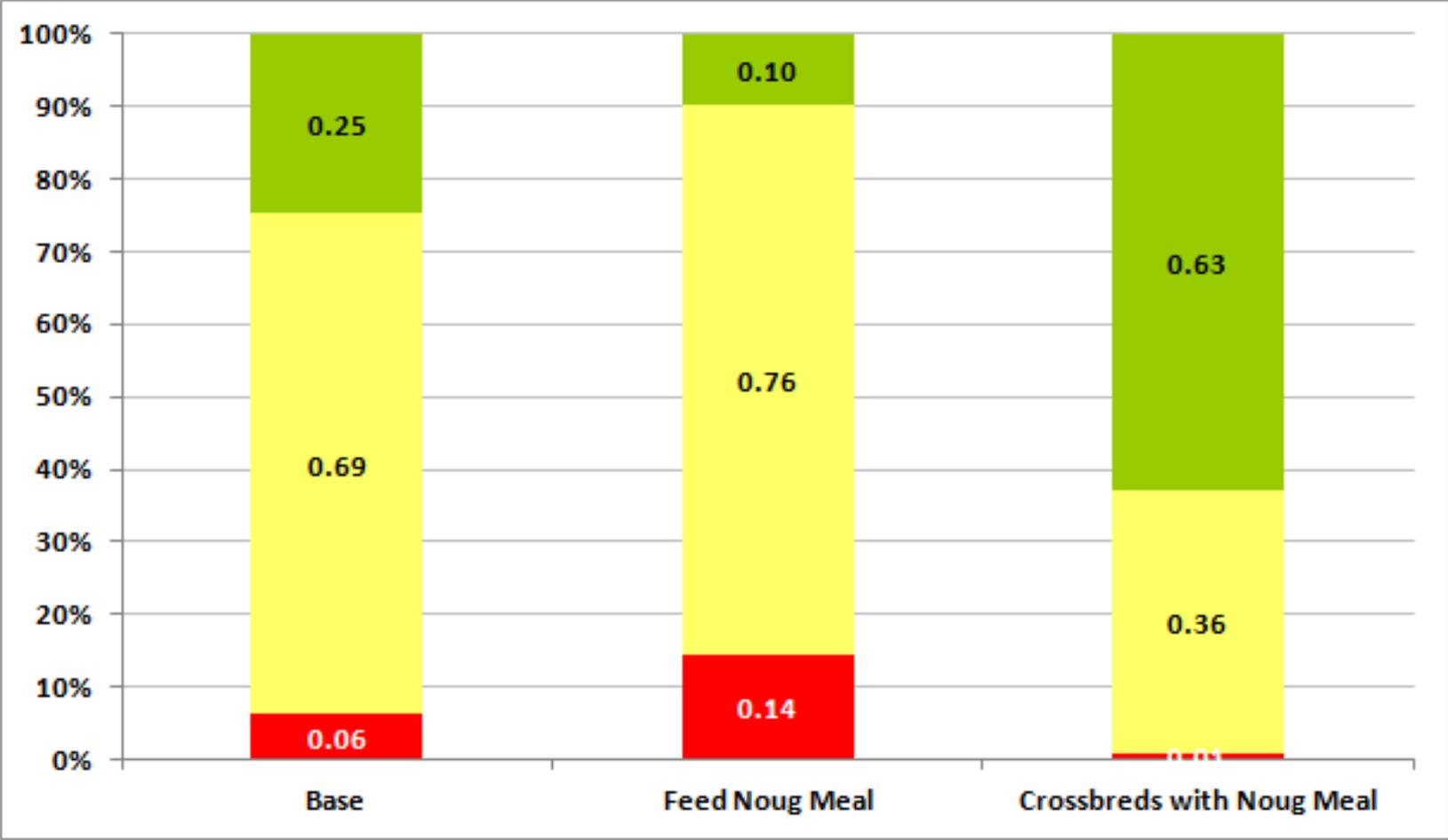
Modeling Farm Level Impacts

- To model income and nutritional impacts of technology, we must consider changes in:
 - Production (yield) risk for all crops on the farm
 - Cost of technology and its related inputs
 - Mix of crops and livestock on the farm
 - Prices for farm raised products and purchased food
 - Annual consumption of food by family
 - Animal feed requirements
 - Livestock production due to changes in forage and grain production
- Farm level modeling depends on inputs from sector models, e.g., price changes from IFPRI

FARMSIM Outputs

- Risk comparison of the following variables for the base and alternative technologies:
 - Annual net cash farm income
 - Annual ending cash reserves
 - Net present value, benefit cost ratio, rate of return on investment
 - Changes in net worth
 - Changes in nutritional self sufficiency
 - Annual intake of calories, protein, calcium, iron, fat, and vitamin A
 - Comparison to minimum requirements

StopLight Chart for the Probability that Net Cash Farm Income will be Less than 1000 Birr and Greater than 2000 Birr



Related Farm Household Surveys

- **Baseline and post field study assessment**
- **Household level surveys in communities involved in field studies**
- **Assess:**
 - gender issues
 - human nutrition
 - economic consequences

Early Results

- **Stakeholder workshops in all countries**
- **Field research underway in Ethiopia**
- **Plans in progress for Tanzania and Ghana**
- **Field research planned in all countries in year two**
- **Training workshops - all countries in year two**

Ethiopia

Small-Scale Water Capture for Irrigation



Examples of some of the AWM technologies

TEXAS A&M
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Small reservoirs

Capture
and store
water



Manual wells



Individual pumps

Lift and
use water





Women Farmers Conducting Research on Drip Irrigation

