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
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

- **SWAT**: Watershed impacts
- **APEX**: Crop and forage growth
- **FARMSIM**: Economic and nutritional impacts
- **PHYGROW**: Pasture conditions
- **NUTBAL**: Animal performance

**IDSS**: Production, environment, economics, and nutrition
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

Upland Processes

Channel/Flood Plain Processes
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

- Small reservoirs
- Manual wells
- Individual pumps

Capture and store water
Lift and use water
Women Farmers Conducting Research on Drip Irrigation