# Feed the Future Innovation Laboratory for Small Scale Irrigation (ILSSI)

The Feed the Future Innovation Laboratory for Small Scale Irrigation, initiated in 2013, is a central focal point of the USAID investment strategy to provide improved efficient methods of supplying water to small holder farmers. The project works in Ghana, Ethiopia and Tanzania to create research-based evidence that will contribute to increased food production, improved nutrition, accelerated economic development and the protection of the environment. The project involves stakeholder-driven field studies to evaluate small scale irrigation (SSI) interventions and household surveys to assess the impact of SSI on nutrition, economic status and women's empowerment. An integrated suite of analytical models, the Integrated Decision Support System (IDSS) is used to plan, evaluate, and interpret results from field studies. A continuous dialogue with stakeholders and capacity development help to ensure sustainability.

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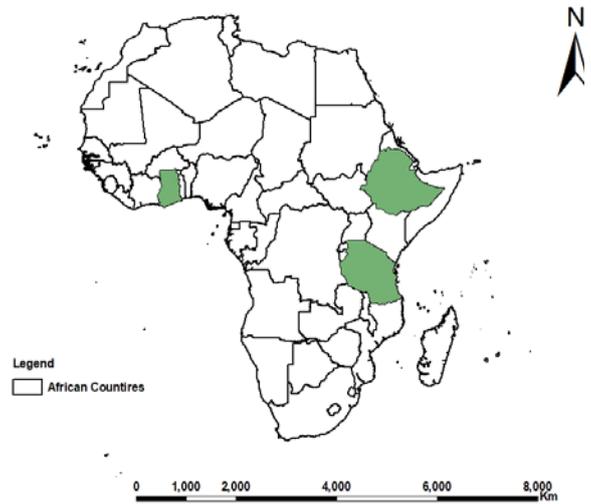
Project countries: Ghana, Ethiopia, Tanzania

SSI technologies enable farmers to move toward sustainable intensification

Research in farmer's fields allows evaluation of SSI farming systems. Field interventions include high value vegetable production with water lifting, in-field water distribution and irrigation scheduling. Farmers prefer systems that reduce labor, such as water lifting using solar and fuel-powered pumps. Lower labor technologies are generally most profitable; labor is usually the highest cost for small-scale irrigators. On farm water management through irrigation scheduling tools is found to improve water use efficiency, make better use of inputs, reduce environmental risks, and save labor. Conservation agriculture with low tillage and mulch cover under drip irrigation shows potential profitability and water saving to commercialize household gardens. Microfinance presents a viable option to enable farmers to purchase irrigation equipment.

Solar pump user in Lemo, Ethiopia
Photo credit: IWMI

Promising irrigated value chains: Irrigated fodder

The project is also evaluating potential value chains that would be strengthened by SSI and practices such as a conservation agriculture. Irrigated fodder production in the dry season is found to be financially competitive as a cash crop with horticultural crops. Irrigated fodder as feed to farmer's animals can also provide more income through increased production.

Fodder market in Ethiopia.
Photo credit: ILRI

Small scale irrigation improves nutrition by improving incomes and dietary diversity

Vegetable market in Ghana
Photo credit: IWMI

Household surveys support evaluation of the economic, nutritional and gender-related consequences of small scale irrigation. A unique nutritional survey is providing additional insights into the influence of enhanced production systems on household nutrition. Results show that irrigation improves both household income and production diversity though not always dietary diversity. Irrigation is more likely to influence nutritional outcomes through improved income rather than household consumption of food grown.

Results from the Women's Empowerment in Agriculture Index generally show that women irrigators are better off than non-irrigators. Results also suggest women face constraints to adoption of irrigation technologies, including lack of access to and control over assets required for adoption, limited ability to participate in decision-making over use of water resources for irrigation, and low control over management of technologies and the benefits from adoption by the household. Women favor labor saving technologies, such as mechanized water lifting and installation of the technologies near the home for multiple uses.

Scaling and Impact Analysis: Integrated Decision Support System

The integrated decision support system (IDSS) enables assessment of the consequences of small scale irrigation interventions on production, environmental and economic outcomes, based on data collected from the field. Initial model results have forecasted the availability of water and other natural resource inputs for siting small scale irrigation studies at local, regional and national levels. Studies provide a quantitative and stochastic estimate of the consequences of introduction of a variety of small scale irrigation interventions. Ex post analyses of the impact of SSI based on the field and survey data are providing quantitative estimates of the impact of constraints to adoption and options for mitigating these constraints. The IDSS models production at the farm level to estimate the best combination of water, fertilizer and management practices. The IDSS and a new agent-based model have been used to scale results from field to national levels to show potential, as well as limitations to scaling. The national model allows planners to cite and evaluate the potential consequences of small scale irrigation interventions. Model results show that the interventions employed in the farmer-driven field studies are not expected to have major environmental consequences.

Capacity Development: The project trains farmers and local authorities participating in field studies, including in microfinance and maintenance of irrigation and related equipment. Collaborators in partner universities have been trained in the use of household survey instruments. Hundreds of students, researchers and civil servants have been trained to use IDSS for analyzing field studies and data to enable continued use of the models for planning and impact analysis.

Partners in the cooperative agreement include the International Water Management Institute (IWMI), the International Food Policy Research Institute (IFPRI), the International Livestock Research Institute (ILRI), North Carolina A & T State University (NCAT) and the lead institution, Texas A&M AgriLife Research (TAMUS) via the Borlaug Institute for International Agriculture.

Please see the ILSSI website for further details on the project: http://ilssi.tamu.edu
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