FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Innovation Lab for Small Scale Irrigation (ILSSI)

Stakeholder Consultation Workshop Report: Ethiopia, Ghana and Tanzania - 2016

Identifying and prioritizing constraints and opportunities

USAID FROM THE AMERICAN PEOPLE · The Borlaug Institute · Texas A&M AgriLife Research · The Texas A&M University System · IFPRI International Food Policy Research Institute · IWMI · ILRI · North Carolina A&T State University

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1 Introduction and background

The USAID funded ***Feed the Future Innovation Lab for Small-Scale Irrigation*** (ILSSI) project aims to enhance food security, improve nutrition and reduce poverty. The project team seeks to do this by developing and introducing promising, context appropriate, small-scale irrigation (SSI) systems into food and agriculture production on small farms in Ghana, Ethiopia and Tanzania. The project is piloting and modelling high potential interventions in small-scale irrigation and irrigated fodder production through development and use of an *Integrated Decision Support System* (IDSS). The project runs from October 2013 – September 2018.

Texas A&M University (TAMU) leads the project in collaboration with the International Water Management Institute (IWMI), International Livestock Research Institute (ILRI), International Food Policy Research Institute (IFPRI) and North Carolina A&T State University (NCAT). ILSSI also has implementing partners in each project country, as well as close engagement with government institutions, research institutions, non-governmental organizations, farmers and other stakeholders. The project takes a continuous approach to engagement throughout the project in all study countries.

ILSSI has five major interrelated components:

- Assessment of promising small-scale irrigation technologies
- Small-scale irrigation interventions in the field
- Stakeholder consultation at multiple levels of scale
- Engagement with national partners and farmers in order to conduct field studies
- Surveys of farming families in the area surrounding the field test sites
- Analysis of the production, environmental and economic consequences of small scale irrigation options, including but not limited to interventions in farmers' fields, using the IDSS

ILSSI also emphasizes capacity development including institutional and individual training, at multiple levels of scale.

Background to the workshops

During the inception phase, the project engaged relevant stakeholders at local, regional and national levels to identify and outline the most promising small-scale irrigation (SSI) scenarios for further research. Subsequently, the project partners have implemented field surveys, pilot interventions, and analysis and modelling, which led to initial results on the potential of small-scale irrigation and irrigated fodder production. These results include identification of constraints that affect the adoption of small-scale irrigation interventions (both those studied in the field and a broader set evaluated using models).

The participatory stakeholder workshops aimed to evaluate and prioritize the constraints identified by the ILSSI research team in collaboration with the national experts and stakeholders. The workshop provided an opportunity for input based on each country's knowledge and experience, and their institutional interests and priorities. In addition, the workshops sought to produce a collaboratively prioritized short-list of constraints specific to each country. The next step after the workshop is to use the Integrated Decision Support System (IDSS) to analyze the prioritized lists of constraints. ILSSI intends to produce context-specific proposals that can be used to mitigate the constraints. Ultimately, ILSSI seeks to consider the constraints towards identifying opportunities for out-scaling small scale irrigation solutions for transformative livelihood benefits in rural communities.

2 Objectives of the workshop

The workshops had three key objectives, including to:

- Share research and experiences on small-scale irrigation and irrigated fodder interventions
- Collaboratively prioritize the key constraints that the Integrated Decision Support System can help to analyze
- Continue and expand participatory consultation with stakeholders to foster dialogue, networking and enhanced partnerships

The main workshop output was a consensus-based, prioritized list of constraints to the development of successful and productive small-scale irrigation and irrigated fodder interventions in each country, which will be the focus of the next phase of IDSS analysis.

3 Participants

Across the three workshops, 69 experts and stakeholders participated, representing government ministries and agencies, regulatory organizations, research institutions, NGOs, donors, academia and others with relevant expertise and interest in irrigation and agriculture.[1] Researchers from the ILSSI partner institutions also participated. Facilitators led the process in each country.

4 Workshop proceedings

A one-day consultation workshop was held in Ethiopia on 14 June, in Ghana on 23 June and in Tanzania on 26 July.[2] Prior to the workshops, ILSSI provided participants with a brief set of background documents to review related to the project aims, approaches, activities and the IDSS, as well as the previously identified constraints. These documents included:

- ILSSI project and IDSS background information
- Example of the IDSS gap and constraints analysis for SSI systems developed by ILSSI
- Rationale and agenda for the workshop

The workshop was split into two main sections (see **Annex 1** for agenda) providing opportunities to:

- Share presentations on approaches and findings and approaches of ILSSI research
- Collaboratively prioritize constraints to adoption and success of SSI and irrigated fodder interventions identified through ILSSI field work, household surveys and IDSS

4.1 Project presentations

Each workshop began with presentations by representatives of TAMU, IWMI, ILRI and IFPRI. The first presentation introduced the ILSSI project, provided an overview of the project, key research questions, and summary of research conducted to date, including methods. IWMI then presented on the field level pilot interventions in small-scale irrigation and agricultural water management, followed by an ILRI presentation on irrigated fodder production. IFPRI national partners presented the initial results of the baseline surveys on Small-scale irrigation

[1] Participants for each workshop can be found in the individual workshop reports. Ethiopia - 27; Ghana - 20; Tanzania - 22. These numbers exclude the professional facilitators.
[2] Workshop reports are available on the project website for each country consultation, including the presentations and outputs.

technologies and agricultural water management practices toward analyzing nutrition, health and gender outcomes. Then, TAMU presented an overview of the integration of APEX, SWAT and FARMSIM models into the IDSS model approach, demonstrating the application using data from a watershed in each country. TAMU also showed an example of using the IDSS to analyze the Robit Watershed in Ethiopia, and the associated scenarios, results, impacts, crop yields and net present value of using various water lifting technologies for small-scale irrigation. The presentations were followed by questions and discussions.

The final presentation from TAMU was on the candidate constraints identified through the ILSSI project to date, and also on the methods used for constraints analysis. The presentation showed how IDSS can be used to: analyze nutritional and economic constraints at the household level, examine field scale irrigation water management and investigate the impacts of fertilizer use on agricultural productivity.

4.2 Prioritizing constraints

After the presentations and discussion, the participants worked in groups to prioritize the constraints. Workshop participants were divided at random into 4 groups of around 5 to 6 individuals. A member of the ILSSI research team was assigned to each group as a resource person. Groups were asked to do the following (for each country respectively):

- Consider what they believe to be the key constraints to small-scale irrigation from their knowledge and experience
- Review the list of provisional constraints identified by ILSSI; Identify synergies/differences/gaps with those just identified by the group
- Discuss and prioritize these constraints based on national considerations. Suggested criteria for prioritization of constraints included but was not limited to:
  - biggest positive development impact
  - least negative environmental impact
  - biggest potential for scaling up
  - greatest opportunities to result in improved productivity and incomes
- Aim for group consensus on the top ten constraints in two short-lists of five items each:
  a) top priority
  b) important but secondary priority

A representative of each group presented the group results to all workshop participants in plenary. The plenary session involved vigorous debate about the key constraints to adoption of small-scale irrigation in each country, and how to identify the top ten and subsequently the top priority five. In plenary, the facilitator led the groups in consolidating all constraints listed; recognizing duplication to consolidate the list. The top 5 and the secondary 5 for each country are listed in the next section. With the short-listed constraints, the facilitator led participants through an exercise to further detail the specific elements of that should be considered in the next phase of IDSS modelling, where possible and appropriate.

5 Consensus-based consolidated list of priority constraints

This section outlines the top five and the secondary five constraints for each country. They are listed in the order of most overlap across groups, indicating the number of groups out of four total that had included the constraint in their short list (X/4). The group work results is followed by a consolidated table comparing each country's final prioritized list in order of identified importance.

5.1 Constraints (top and secondary) identified by each group in each country

5.1.1 Ethiopia

TOP PRIORITY CONSTRAINTS	
Water access and availability	Water and land availability (use and source at all scales); climate extremes and water availability; availability across seasons (4/4)
Market development; market access	Market demand drivers - population/urban, shelf-life of perishable agricultural products, price fluctuations; Markets for inputs (seeds, fertilizer, pest control); Lack of affordable inputs; access to livestock breeds (4/4)
SSI technology access	Access to appropriate, affordable technology options (lifting, storage, application), spare parts and maintenance; Access to technologies that are high quality, appropriate to all gender; sustainable in environment; access to finance for SSI (4/4)
Access to knowledge and extension (capacity)	Knowledge and skills (farmers and experts), access to technology: lack of understanding of how to use irrigation technologies and practices effectively; awareness and information at the local level, lack of meaningful farmer input into irrigation planning, technologies and practices; lack of extension support and knowledge for irrigation agronomy (2/4)
Institutions and organization	Scaling up small-scale irrigation is problematic because: lack effective water user associations, instability of infrastructure, no data sharing between regions (1/4)
Gender	Gender and nutrition [unspecified] (1/4)
SECONDARY PRIORITY CONSTRAINTS	
Water access	Climate and rainfall variability affecting water access/availability (1/4)
Access to knowledge and extension (capacity)	Access to information; skills/knowledge gaps of extension and of farmers (1/4)
Access to credit/SSI	Access to affordable credit for inputs (1/4)
High costs of SSI	Initial investment (cost) of for lifting and access (1/4)
Market development; market access	Enhancing/ensuring product value (including post-harvest storage) (1/4)
Institutions and organizations	Lack of policy implementation and enforcement (1/4)
Labour issues (lack of; high cost)	Female headed households have labour shortages (2/4)
Environment and sustainability	Groundwater depletion and over extraction (1/4)
Cooperation and conflict	Upstream/downstream conflict (quantity and quality of water) (2/4); Community use of source and technologies; women lose out in water sharing in communal schemes (2/4)
Tradeoffs between options	Water and land practices for fodder production (competition with crop production) (1/4)

5.1.2 Ghana

TOP PRIORITY CONSTRAINTS	
Land issues	Lack of access to land; issues with land availability; inadequate land tenure policies (4/4)
Water access and availability	Climate and rainfall variability; Water availability, storage, delivery and accessibility for individuals and at larger scales; water storage at farm level (3/4)
Market development; market access	Limited access to markets for products; inadequate access to inputs; inadequate access to labor, especially for women (3/4)
SSI technology access	Lack of water lifting technology access; high cost of SSI technologies; lack of finance for investment in SSI and related inputs (3/4)
Access to knowledge and extension (capacity)	Capacity development (seed production, irrigation management, pest and disease management) (1/4)
High costs of SSI	Energy costs related to pumping (1/4); high cost of labor (2/4)
SECONDARY PRIORITY CONSTRAINTS	
SSI technology access	Lack access to SSI technology markets; Lack microfinance for investment in irrigation technology (3/4)
Market development; market access	Lack access to input/output markets; Lack access to seeds; Post harvest losses and storage; transportation costs and markets (4/4)
Water access and availability	Climate and rainfall variability (1/4)
Access to knowledge and extension (capacity)	Skills throughout the irrigation value chain (capacity low); low level of extension for irrigated agriculture; lack of capacity and knowledge in SSI (3/4)
Access to organic and inorganic fertilizer	Lack access to organic manure (water retention, improves soil fertility, reduces production costs) (1/4) ; poor timing of subsidized fertilizer distribution (1/4)
High costs of SSI	High labor requirement and cost (1/4); high energy costs (2/4)
Pests/diseases	High incidence of pests and disease (1/4)
Low mechanization	Low mechanization of agriculture (1/4)

5.1.3 Tanzania

TOP PRIORITY CONSTRAINTS	
Land tenure issues	Tenure arrangements weak (4/4)
Water availability and access	Climate change, rain variability, extreme events; water availability and quality (3/4)
Institutions and organizations	Policy constraints relate to water use, infrastructure development and lack of enforcement (3/4)
Access to SSI technologies	Finance modalities (credit and insurance) at various levels (farm to public) (3/4)
Access to knowledge and extension (capacity)	Capacity low; Lack good extension and knowledge support; Lack knowledge on technologies for SSI (3/4)
Market development and market access (input and output)	Access to input markets (seed, fertilizer) and output markets (2/4); High cost of SSI inputs

Fodder and livestock constraints	Low genetic potential of livestock; fodder technology targets only specific production systems (2/4)
Gender constraints	Lack of attention to gender across issues (2/4)
SECONDARY PRIORITY CONSTRAINTS	
Access to reliable/affordable energy for SSI	Lack affordable and general source of energy for water lifting and conveyance (1/4)
Access to knowledge and extension (capacity)	Lack of knowledge and support services; Poor extension services (e.g. Irrigation and crop calendar knowledge) (1/4)
Labor requirement	Labour requirements for irrigation high (1/4)
High costs of SSI	Operational costs high (1/4)
Institutions and organizations	Legislative requirements [not specified] (1/4)
Socio-cultural context	Cultural and social practices hinder SSI development (1/4)
lack of mechanization	Lack of Mechanization (1/4)

5.2 Cross country comparison of ranked priority constraints

Each workshop produced a consolidated, ranked list of the priority constraints, outlined below in order ranked by the workshop participants. Further detail for some constraints related to each country context can be found in the **Annex 2** of this report.

Rank	Ethiopia	Ghana	Tanzania
1	Access to markets	Access to markets	Capacity development and irrigation expertise
2	Water availability and access	Water lifting technology access	Finance modalities and access to electricity, solar and wind
3	Access to appropriate SSI technology and knowledge	Climate change	Policy constraints and market access
4	Market access: Affordable and relevant inputs	Water availability and access	Climate change: water, temperature variability
5	Risks and vulnerabilities	Land issues	Competing water uses (with other sectors)
6	Institutional issues	Diseases and Pests	Soil management and fertility
7		High labour cost for women	Cultural and social practices of stereotyping crops e.g. fodder vs rice perception
8		Access to knowledge and information services (capacity development)	Fodder technology is targeted to specific systems, either intensive or extensive system
9		Inadequate access to inputs and labor	Low genetic potential for livestock
10			Source of energy

6 Significance of the workshops

The stakeholder workshops in Ethiopia, Ghana and Tanzania succeeded in bringing key national stakeholders together to share research and experiences on small-scale irrigation and irrigated fodder interventions, foster dialogue, networking and enhanced partnerships, and collaboratively prioritize the key constraints to successful and productive small-scale irrigation and irrigated fodder interventions in each country. The workshop outputs will be used for the next phase of analysis through the Integrated Decision Support System. The results of the modelling in combination with the other research results will contribute to national dialogues towards out-scaling and up-scaling small scale irrigation, including irrigated fodder, for improving livelihoods in each project country.

Annex 1. Agenda[3]

Duration	Activity	Lead person
	Registration	
10 mins	Welcome Recognize External Advisory Committee member for each country and government officials Opening Comments	Partner country/regional representative Member of the External Advisory Committee for each country
20 mins	Participant introductions and icebreaker exercise	Facilitator
15 mins	*Presentation:* Overview of the ILSSI project: objectives, partners and activities - 10 mins ; Q&A – 5 mins	Representative of Texas A & M University
15 mins	*Presentation:* Field level pilot interventions in small-scale irrigation and agricultural water management (SSI/AWM) - 10 mins; Q&A – 5 mins	Representative of IWMI
15 mins	*Presentation:* Field level pilot irrigated fodder and integrating livestock – 10 mins; Q&A - 5 mins	Representative of ILRI
15 mins	*Presentation:* Household level surveys on impacts from SSI/AWM (including gender and nutrition) – 10 mins; Q&A – 5 mins	Local partner representing IFPRI
30 mins	Group photo followed by tea/coffee break	
20 mins	Presentation: Overview of Integrated Decision Support System (IDSS) -15 mins; Q&A - 5 mins	Representative of Texas A & M University
30 mins	Presentation: Candidate constraints from research experience and a preview of the constraints analysis methods - 20 mins; Q&A – 10 mins	Representative of Texas A & M University
40 mins	Group work on preliminary constraints identified	Facilitator
1 hour	Lunch	
15	Welcome back, review, icebreaker	Facilitator
60 mins	*Group Work:* Prioritization of constraints to adoption (nationally) of small scale irrigation interventions studied in each country, for further analysis.	Facilitator
30 mins	Group representatives present back to plenary	Group reps / facilitator
30 mins	Consolidate list of prioritized constraints, summarize group work outputs and describe how these will be used for the next steps of the project	Facilitator / Representative of Texas A & M University
25 mins	Coffee break	
15	Next Steps	Representative of Texas A & M University
30 mins	Closing remarks Wrap up	External Advisory Committee Member Representative of ILSSI partner institution Facilitator

[3] This agenda is a generic version and adapted for each country. See workshop reports for each country for more detail on specific proceedings.

Annex 2. Ranked constraints with country detail

Prioritized and ranked constraints with further detail on the issues as they occur in each country context.

Rank	Ghana	Tanzania	Ethiopia
1	**Access to markets**	**Capacity development and irrigation expertise**	**Access to markets**
	• Transportation infrastructure poor and costly • Guaranteed pricing (fluctuations) • Timing of production as related to demand • Organized market (lack of)	• First degree hydrology (not enough of trained hydrologists) • Poor knowledge of farmers on irrigation technologies • Irrigation and crop calendar—optimizing cropping period and water needed • Poor extension services due to a gap in knowledge and skills • Lack of access to knowledge and information by irrigation technicians	• Negotiating power (aggregation of individuals or communities) • Market information • Creation of markets and market linkages • Distance to markets • Infrastructure to get produce to market • Post-harvest management and processes • Seasonal price fluctuations
2	**Water lifting technology access**	**Finance modalities and access to electricity, solar and wind**	**Water availability and access**
	• Cost of technology • Operation and maintenance	• Community organized finance and micro-credit schemes • High initial costs of irrigation inputs e.g. drilling, land acquisition and pumps • Operational costs for repair and maintenance of pumps and scarcity of spare parts • Labour demanding, e.g. maintenance of canals, farrow, rain harvesting structures • Affordability, availability of machinery to mechanize irrigation; pumps difficult to use • Agricultural financing e.g. credit, saving and insurance	• Ration of available water to availability of land • Land suitability for irrigation • Efficiency of water use (economics and biological) • Watershed management and water storage • Upstream/downstream conflict or collaboration • Water quality • Technological access • Sustainability of water use

3	**Climate change**	**Policy constraints and market access**	**Access to appropriate SSI technology and knowledge**
	• Rainfall variability • Extreme weather events	• Market functions of irrigation value chains • Irrigation infrastructure and policies, e.g. by-laws for water abstract and schemes are not finalized • Legislative requirements • Land tenure is a disincentive to invest • Limited accessibility to markets due to poor infrastructure • Land tenure and gender limits adoption in some technology i.e. fodder production	• Cost effectiveness of technologies • Supply of technologies • Training on technologies • Ability to purchase and maintain technology • Gender appropriateness of SSI technologies • Provision of knowledge and opportunities
4	**Water availability and access**	**Climate change: water, temperature variability**	**Market access: Affordable and relevant inputs**
	• Water availability • Cost of access and storage	• Water availability and quality • Extreme events i.e. drought and flooding	• Access to improved seeds, fertilizer, tillage tools • Access to livestock breeds • Access to credit for inputs
5	**Land issues**	**Competing water uses (with other sectors)**	**Risks and vulnerabilities**
	• Land availability • Land policies • Land banks - aimed at promoting ability to use land for longer term	Weak enforcement of regulation on water use/regulations and inadequate staffing	• Extreme climate events • Pests and diseases • Crop mortality • Political instability • Availability of appropriate insurance • Water use conflict
6	**Diseases and Pests**	**Soil management and fertility**	**Institutional issues**
		For integrated irrigation, gabion and nutrient efficiency, the soil needs micro and macro nutrients e.g. in SRI	• Organization and regulation • Institutional sustainability • No water user associations • No data sharing between regions

7	**High labour cost for women**	**Cultural and social practices of stereotyping crops e.g. fodder vs rice perception**	
8	**Access to knowledge and information services (capacity development)**	**Fodder technology is targeted to specific systems, either intensive or extensive system**	
	• Seed production • Irrigation management • Pests and disease management		
9	**Inadequate access to inputs and labor**	**Low genetic potential for livestock**	
10		**Source of energy**	
		• Access to inputs e.g. fertilizer, labor, fuel • Gender i.e. inter and intra-household activities for irrigation; labor access	