



# FEED THE FUTURE

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



Boosting crop productivity and incomes through solar powered irrigation  
Photo: Mulugeta Ayene/WLE

## ECONOMIC GROWTH

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

#### Key Messages

- » Small scale irrigation directly contributes to economic growth by generating higher profits and incomes for farmers compared to rainfed agriculture.
- » Availability and affordability of labor are crucial components in the viability of small scale irrigation.
- » Small scale irrigation, using motorized or solar pumps, can be profitable for smallholder farmers, and others along the value chain.
- » Strengthening markets for both irrigation equipment and irrigated produce can be a win-win for smallholder farmers, the private sector and others.
- » Farmer investment in irrigation technologies and production requires access to appropriate finance solutions.
- » Access to small scale irrigation can lead to, but doesn't assure, improved equity.

#### Small scale irrigation directly contributes to economic growth by generating higher profits and incomes for farmers compared to rainfed agriculture.

Small Scale irrigation (SSI) can substantially reduce poverty if it reaches its potential for expansion. Over the next ten years millions of smallholder farmers could benefit from irrigated production of nutrient-dense crops and fodder in areas suitable to it.

SSI supports supplemental irrigation for rainfed crops amid increasingly unreliable rainfall, and the expansion of production into the dry season. Irrigating farmers are more resilient to extreme weather events across seasons. Farmers can irrigate high-value cash crops and more nutrient dense horticultural crops, though some crop-technology combinations show higher profitability than others. Irrigators in Ethiopia achieve double the agricultural income per hectare during the dry season compared to non-irrigators.



## Availability and affordability of labor are crucial components in the viability of small scale irrigation.

Labor availability is often limited in rural areas. Investment in labor-saving technologies for lifting, application and management of water for irrigation can improve profitability. This can also increase the likelihood of adoption and sustained use of the technologies. Without mechanization, low availability of labor is a major constraint to the expansion of SSI, [especially for women farmers](#). Scaling SSI effectively, and ensuring profitability, requires recognition of the high cost of labor.

## Small scale irrigation, using motorized or solar pumps, can be profitable for smallholder farmers, and others along the value chain.

SSI offers a range of opportunities along the value chain for entrepreneurship, innovative business models and SMEs. Value chains for irrigated feed, fodder and seed production can provide new sources of income and profit to farmers and others. Irrigated production also improves the stability and quality of product supply. Differing combinations of SSI technology and crop types result in different profit profiles. Producing high-value vegetables with motorized pumps can generate three to five times the net profit of irrigating staples with manual devices. [Solar pump irrigation of high-value vegetables can achieve a payback](#) period of around two years. The payback period for lower-cost motor pumps can be less than one year, but offers lower returns over time. Farmer investment in pump technologies is often restricted by lack of access to affordable finance.

## Strengthening markets for both irrigation equipment and irrigated produce can be a win-win for smallholder farmers, the private sector and others.

The private sector can help to foster a robust market system and develop more accessible technology supply chains. Companies can also strengthen agriculture value chains by improving integration. There are many opportunities available to the private sector to foster [innovation and entrepreneurship](#) throughout the technology supply, and irrigated value, chains. More inclusive business models, involving partnerships between companies, entrepreneurs and financial organisations would enable more farmers to invest in irrigation technologies and benefit from them.

## Farmer investment in irrigation technologies and production requires access to appropriate finance solutions.

Farmers become less willing to invest in irrigation technologies when access to capital, affordable credit or other appropriate finance products is limited. The scarcity of appropriate finance solutions places a significant constraint on farmers. For example, a primary barrier preventing smallholder farmers from adopting and benefitting from SSI is a [lack of affordable credit](#) to purchase pumps and other irrigation equipment. Payment of the up-front, and ongoing, costs of SSI may only be feasible with improved finance solutions. Greater adoption of SSI by smallholder farmers

Country	Smallholder farmers benefitting	Net profit per year
<a href="#">Ethiopia</a>	around 5.8 million	US\$2.6 billion
Tanzania	around 3 million	US\$781 million
<a href="#">Ghana</a>	around 0.7 million	US\$285 million

may be fostered through innovative finance mechanisms and business models, such as lease-to-own, [‘uber for irrigation’](#), mobile money and others being piloted.

## Access to small scale irrigation can lead to, but doesn’t assure, improved equity.

Unequal access to SSI significantly undermines the potential it could offer to millions of smallholder farmers and to national and regional economic growth. SSI offers potential for improved equity through increased involvement of women and youth in, for example, processing of high-value crops and animal based food products. Innovative collaboration with, and between, private sector actors in technology markets, agricultural produce markets and finance would enable SSI to play a greater role in fostering advances in gender inclusion. In making the most of these opportunities, the right balance needs to be found between supporting the wider use of diverse, context specific irrigation-related technologies and approaches, and understanding the trade-offs that each of these may require.

Sustainable and profitable scaling of SSI also demands an awareness of the trade-offs. [Scaling up the use of pumps](#) needs to be [balanced](#) with managing the risks of increased water scarcity and groundwater depletion. Trade-offs often need to be made between different SSI technologies and water uses, and between irrigated production for household consumption, and nutrition or income. Solar powered irrigation has good potential to generate income and profit. Clear alignment between the resilience of people and the environment to climate shocks and stresses is not always immediately obvious.



Improving agricultural returns by investing in irrigation pumps, Ghana  
Photo: Nana Kofi Acquah/IWMI

[Links to these publications, and other resources, can be found here: https://ilssi.tamu.edu/knowledge/economic-growth/](#)

Contacts: Dr. Nicole Lefore, Director, ([Nicole.Lefore@ag.tamu.edu](mailto:Nicole.Lefore@ag.tamu.edu)) or Matt Stellbauer, Program Manager, ([Matt.Stellbauer@ag.tamu.edu](mailto:Matt.Stellbauer@ag.tamu.edu))