



FEED THE FUTURE

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



REPORT ON

Improving Smallholder
Women Farmers' Access to

FINANCE

for Small-Scale
Irrigation Technologies



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FEED THE FUTURE INNOVATION LAB FOR SMALL SCALE IRRIGATION

THE PROBLEM

Scaling out successes in finance pilots that target irrigation pumps to poor smallholders, women, and youth

The potential benefits of small-scale individualized irrigation technologies are enormous.

Widespread use of small power pumps in South Asia has revolutionized agricultural production since the 1970s. In the past few years, solar photovoltaic pumps have become affordable alternatives to diesel and grid-powered electric pumps. While their initial investment is higher, the near-zero operating costs make them extremely attractive (Xie et al. 2021; Lefore et al. 2021). They have additional benefits, including reducing the national fuel import bill; and producing no greenhouse gases. Small solar-powered pumps are portable and can be used for many purposes (Shah et al. 2018). India, among others, is investing billions of Indian Rupees in subsidies to ramp up their use; and partnerships among private firms, NGOs,

governments, researchers, and investors are trying to expand their uptake in sub-Saharan Africa.

A major downside is that most irrigation pumps are being acquired by relatively wealthy male farmers, exacerbating already high levels of inequality in rural communities (Lefore et al. 2019). Poor smallholders, especially women, cannot meet the required credit checks and therefore cannot purchase the pumps (Merrey and Lefore 2018; Lefore et al. 2021). Nor do they have access to finance to purchase complementary inputs such as fertilizer and seeds. In response, various research institutions, pump manufacturers, and NGOs are exploring how to target irrigation pumps to poor smallholders, women, and youth. **Many studies and pilot programs have been implemented and shown positive results. The challenge is to scale out the successful pilots based on lessons learned.** This brief explores the lessons learned and identifies potential ways forward.



LESSONS LEARNED

Financial products and processes that favor women show promise, but there is no single solution.

Credit is critical to increase capital investments in agriculture, but access is nearly always insufficient to meet the need. It is not only a problem of availability, though that is important; it is also the design of credit products and the criteria used for assessing creditworthiness. Further, smallholder farmers are understandably risk-averse: they are reluctant to take on debt that could become a burden if crops fail (Balana et al. 2022).

Women farmers face additional challenges, such as more limited access to information, finance and fewer assets. However, most projects and actors aiming to increase irrigation fail to take a gender- and youth-sensitive approach, thus increasing the access gap. And even if efforts are made to support women with technologies, men might well take over the use or benefits (Theis et al. 2018; Izzi et al. 2021). Contexts vary, but all too often the opportunity structure is stacked against women.

➤ **Women are often at a disadvantage in terms of access to information and to suppliers of credit; they rarely have sufficient assets or a documented financial history in their name to qualify as credit-worthy when standard criteria are used; and there is also evidence that they are even more risk averse than men in the agriculture sector (e.g., Balana et al. 2022).**

There is now substantial literature reporting approaches to targeting credit, and access to small-scale irrigation technologies such as solar pumps to smallholder farmers, including women farmers (Merrey and Lefore 2018).

Some examples include:

- Private-sector-NGO or private-sector-only provided financing mechanisms, offering a range of rent-to-own ("PAYGO"), leasing, and lay-away plans (e.g., Kickstart).
- Private startup firms or solar cooperatives using mobile solar pumps to sell irrigation services; there are many small-scale examples, e.g., from Bangladesh, India (Shirsath et al. 2020), Rwanda (Akaliza et al. 2023) Ghana, and Senegal (Merrey and Lefore 2018).
- Partnerships between pump manufacturers (e.g., Futurepump) and finance institutions, with financial institutions providing suitable credit for the purchase of the equipment.
- Collaboration of research institutions (e.g., IWMI), manufacturers, and sometimes finance institutions to design creditworthiness criteria that reflect women's capacities, accompanied by communication channels aimed directly at women (Merrey and Lefore 2018; Lefore et al. 2021).

There is strong demand from women to acquire solar pumps. Moreover, women often use the irrigation pumps for other household needs, such as for livestock watering; and express a preference for solar pumps that are mobile or installed near the homestead (Nigussie et al. 2017).

It is clearly possible to design financial products and processes that are more favorable for women.

However, an important insight is that there is no single solution to providing credit and other services to women and poorer smallholders.

As promising as these experiences are, they do not address the fundamental social, economic,

and political inequities characterizing most rural societies: Men own most of the land and other assets and have better access to education and information than women, and men hold most of the power and in most geographies dominate household and community decision making. This structural reality creates a difficult challenge but is not static; in many rural areas where men migrate for labor, women are gaining more access to land and water resources and are better able to make decisions and participate in community decision-making; similarly, in West Africa, men sometimes invest in irrigation for the household to enable women to access water for multiple uses, including dry season production, and reduce women's seasonal out-migration (Nicole Lefore, personal information based on unpublished research).

11%

OF SOLAR PUMP SALES BY PROJECT PARTNERS 2021-2022 WERE TO WOMEN FARMERS

64%

OF THESE WOMEN BUYERS USED ASSET-BASED CREDIT



CASE STUDY

Making solar irrigation available to women farmers in Ghana

In Ghana, [PEG Africa \(now BBOXX\)](#), a PAYGO solar product financier, has worked with the Innovation Lab for Small Scale Irrigation to develop financial instruments to increase women farmers' access to solar irrigation pumps. The company provides non-collateralized pump loans with a 17-month repayment period tailored around cropping seasons; that is, repayment amounts are scheduled to be higher at harvest time and lower at other times. PEG's credit assessment process also targeted increasing equity for women farmers. Company sales agents provide training to potential women clients on financial documentation aimed at building their creditworthiness. The company's credit scorecard explicitly ranks female borrowers higher due to their better loan repayment behavior and uses proxy or alternative criteria to those that discriminate against women (such as asset ownership as collateral) (Agbejule et al. 2022). Throughout the credit review, credit applications from women are allocated more time and consideration.

POTENTIAL SOLUTIONS

Adapting approaches to increase women's access to productive assets like small-scale irrigation technologies.

Several South Asian countries, especially India, Bangladesh, and Nepal, are following a different path to scaling out solar pumps than most sub-Saharan countries: most rely on generous subsidies to encourage rapid uptake. Many countries in sub-Saharan Africa lack the financial resources for major subsidy programs and instead encourage the development of value chains that revolve largely around private firms. Potential solutions will

therefore be quite different in these two regions, and even within the regions.

It is wishful thinking to believe that outsiders can mandate major structural changes to make societies more equitable, or that there is a single solution that will work everywhere. Therefore, we must identify practical locally adapted approaches that will increase women's access to productive assets like small-scale irrigation technologies.

➤ **As greater numbers of women obtain such assets, their overall status and empowerment may improve, and over time, combined with other social and economic changes, this may lead to a process of social transformation.**

BASED ON THIS PREMISE, WE MAKE THE FOLLOWING FIVE RECOMMENDATIONS:

1. Governments should adopt and implement strong policies to support equitable access to credit, or to small-scale equipment such as solar pumps. They can require financial institutions to design women-centered credit and subsidy programs and demonstrate effective implementation (in terms of reaching and benefiting poorer women and youth farmers) as a condition for receiving favorable credit themselves. To grow financial inclusion, institutions can, for example, design targeted communication for women farmers, or direct higher subsidies to women than to men as is done in Nepal (though this may lead to women being used as a conduit for men to obtain pumps).
2. Governments and development finance institutions should co-invest in programs to encourage more private investment in the entire solar pump value chain, especially in sub-Saharan Africa, with a special (but not exclusive) focus on women. Manufacturers need credit to scale up, as do wholesalers, retailers, and farmers. Providing credit guarantees and linking these to effective targeting of women and poor smallholders will support reaching more people. Possible ways forward include:
 - Encourage expansion of women-owned private and cooperative irrigation service providers, laying the groundwork for a profitable, competitive, and sustainable industry.
 - Support NGOs and companies offering lease and rent-to-own programs to women and poor smallholders to identify how to become more efficient and to scale them out to reach large numbers.
 - Link women's self-help groups with private technology firms and carbon credit providers to lower initial investment costs; a successful example of such a collaboration exists for biogas technologies in Gujarat, India (Claudia Ringler, personal communication).
3. We recommend making credit provision part of larger packages. Depending on local needs, these may include access to water resources (e.g., drilling boreholes [Balasubramanya et al. 2023]), crop insurance, agronomic and weather advice, and input supply. Bundling has been shown to be effective in some contexts, such as the provision of climate information services plus index crop insurance, agronomic advice,

and inputs (e.g., Amarnath 2019) and supporting financing of solar pumps and boreholes in Ghana (Nicole Lefore, personal communication), but has not been tested and implemented sufficiently for solar pumps. Bundled products and services may encourage risk-averse smallholders, including women, to make the leap to solar irrigation; and will likely further increase their profitability.

4. We must recognize that we still do not know how to make access to solar pumps and complementary inputs more equitable on a large scale, whether within a market system approach or through public support programs, such as subsidies. Therefore, continued investment is needed for research. Researchers have a critical

role to play in designing tools and interventions to achieve equity, especially for resource-poor women: assessing what works under what circumstances and what does not work; supporting additional pilot programs in partnership with companies to test new alternatives; evaluating impacts; and educating policymakers, investors and practitioners.

5. Finally, governments must begin now to develop effective policies, institutional models, and skilled specialists to ensure the long-term sustainability of aquifers with limited recharge capacity.

KEY POINTS:

Recommendations

- Governments should implement strong policies aimed at giving women as well as men affordable access to the means to obtain small-scale irrigation equipment such as solar pumps as well as complementary inputs.
- Governments and development agencies should invest in scaling out affordable credit to the entire solar pump value chain and scale out those women-oriented approaches that are most effective.
- Governments and private firms should offer bundled packages that include, as needed, access to solar pumps, subsidized borehole drilling, crop insurance, weather information services, and agronomic advice and inputs.
- Researchers should assess what works and what does not work; support pilot programs to test new alternatives; evaluate impacts; and use the findings to educate key stakeholders.
- Governments need to identify ways to ensure the sustainability of aquifers as the number of groundwater irrigators rises.

REFERENCES

- Agbejule, F.; Mattern, M.; Mensah, J. I. 2022. Savings at the Pump: Financing Solar Irrigation to Support Rural Women. CGAP. cgap.org/blog/savings-pump-financing-solar-irrigation-to-support-rural-women
- Akaliza, N.; Bodnar, L.; Brozović, N.; Mukarusagara, G.; Turatsinze, F.; Urujeni, R. 2023. *Current state of irrigation-as-a-service for smallholder farmers in Rwanda*. Lincoln, Nebraska: [Dougherty Water for Food Institute at the University of Nebraska](https://www.doughertywaterinstitute.org/).
- Amarnath, Giriraj. 2019. *Bundled solutions of index insurance with climate information and seed systems to manage agricultural risks (BICSA)*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land, and Ecosystems (WLE). gspace.cgiar.org/handle/10568/103394
- Balana, B.R.; Mekonnen, D.; Haile, B.; Hagos, F.; Yimam, S.; Ringler, C. 2022. Demand and supply constraints of credit in smallholder farming: Evidence from Ethiopia and Tanzania. *World Development* 159: 106033. doi.org/10.1016/j.worlddev.2022.106033
- Balasubramanya, S.; Buisson, M.-C.; Mitra, A.; Stifel, D. 2023. Price, credit or ambiguity? Increasing small-scale irrigation in Ethiopia, *World Development* 163: 106149. [sciencedirect.com/science/article/pii/S0305750X22003394](https://www.sciencedirect.com/science/article/pii/S0305750X22003394)
- Izzi, G.; Denison, J.; Veldwisch, G.J. (eds). 2021. *The farmer-led irrigation development guide: A what, why and how-to for intervention design*. Washington, DC: World Bank. pubdocs.worldbank.org/en/751751616427201865/FLID-Guide-March-2021-Final.pdf
- Lefore, N.; Giordano, M.; Ringler, C.; Barron, J. 2019. Sustainable and equitable growth in farmer-led irrigation in sub-Saharan Africa: What will it take? *Water Alternatives* 12(1): 156-168. [water-alternatives.org/index.php/alldoc/articles/volume-12/v12issue1/484-a12-1-10/file](https://www.water-alternatives.org/index.php/alldoc/articles/volume-12/v12issue1/484-a12-1-10/file)
- Lefore, N.; Closas, A.; Schmitter, P. 2021. Solar for all: A framework to deliver inclusive and environmentally sustainable solar irrigation for smallholder agriculture 2021. *Energy Policy* 154: 112313 doi.org/10.1016/j.enpol.2021.112313
- Merrey, D.J.; Lefore, N. 2018. *Improving the availability and effectiveness of rural and "micro" finance for small-scale irrigation in Sub-Saharan Africa: A review of lessons learned*. Colombo, Sri Lanka: International Water Management Institute (IWMI). (IWMI Working Paper 185). [doi: 10.5337/2018.225](https://doi.org/10.5337/2018.225)
- Nigussie, L.; Lefore, N.; Schmitter, P.; Nicol, A. 2017. Gender and water technologies: Water lifting for irrigation and multiple purposes in Ethiopia. Nairobi, Kenya: International Livestock Research Institute (ILRI). hdl.handle.net/10568/79989
- Shah, T.; Rajan, A.; Rai, G.P.; Shilp Verma, S.; Durga, N. 2018. Solar pumps and South Asia's energy-groundwater nexus: Exploring implications and reimagining its future. *Environ. Res. Lett.* 13: 115003. doi.org/10.1088/1748-9326/aae53f
- Shirsath, P.B.; Saini, S.; Durg, N.; Senoner, D.; Ghose, N.; Verma, S.; Sikka, A. 2020. Compendium on Solar Powered Irrigation Systems in India. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). core.ac.uk/download/pdf/334815914.pdf
- Theis, S.; Lefore, N.; Meinzen-Dick, R.; Bryan, E. 2018. What happens after technology adoption? Gendered aspects of smallscale irrigation technologies in Ethiopia, Ghana, and Tanzania. *Agriculture and Human Values* 35: 671-684. doi.org/10.1007/s10460-018-9862-8
- Xie, H.; Ringler, C.; Hossain Mondal, M.A. 2021. Solar or diesel: A comparison of costs for groundwater fed irrigation in sub-Saharan Africa under two energy solutions. *Earth's Future* 9: e2020EF001611. doi.org/10.1029/2020EF001611



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OTHER RESOURCES

Bryan, E.; Lefore, N. 2021. Women and small-scale irrigation: A review of the factors influencing gendered patterns of participation and benefits. Washington, DC: International Food Policy Research Institute (IFPRI). IFPRI Discussion Paper O2025. ifpri.org/publication/women-and-small-scale-irrigation-review-factors-influencing-gendered-patterns

Theis, S.; Bekele, R.B.; Lefore, N.; Meinzen-Dick, R.; Ringler, C. 2018. Considering gender when promoting small-scale irrigation technologies: Guidance for inclusive irrigation interventions. Washington, DC: IFPRI. IFPRI-REACH Project Note. ifpri.org/publication/considering-gender-when-promoting-small-scale-irrigation-technologies-guidance-inclusive

Theis, S.; Lefore, N.; Bryan, E.; Ringler, C.; and Meinzen-Dick, R. S. 2017. Integrating gender into small-scale irrigation. Feed the Future Innovation Lab for Small Scale Irrigation (FTF-ILSSI) Project Notes 2. Washington, DC: International Food Policy Research Institute (IFPRI) and International Water Management Institute (IWMI). ifpri.org/publication/integrating-gender-small-scale-irrigation

