

# Promotion of Energy Efficient and Water Saving Technologies for Smallholder Irrigation

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## Introduction

During PHASE I, Africa RISING (AR) project has tested and piloted solar pump based water lifting for smallholder's irrigation. This was linked and tested with different water delivery and application systems to test which application methods lead to most efficient and maximum benefits. Following AR-PHASE I, the Agricultural Transformation Agency (ATA) has taken an initiative to pilot solar based irrigation. Hence, knowledge created through PHASE II of AR will be used to support ATA's initiative to further out scale solar pump beyond the current plan of 14 pilot districts.

## Key challenges and lessons

- Solar pump irrigation is new and expensive to afford for rural households in Ethiopia.
- Access to credit and financing is a problem.
- Lack of knowledge is constraining factor.
- Lengthy procurement procedure cause delay to implement/pilot the technology.

## Method/Approaches

MoU is initiated between IWMI and ATA. AR-IWMI will contribute through research, knowledge sharing, monitoring and evaluation (M&E) and capacity building. A stratified sampling technique was employed to select respondents for a base line survey. The study population includes rural hhs in 6 SNNP woredas and 2 woredas each in Oromia, Amhara and Tigray regions.



Table 1. Number of surveyed sample households.

Region	No. of target hhs for solar pump	Diesel Pump	Manua l Pump	Only Rainfed	Total sample hhs
Oromia	28	28	28	28	112
SNNPR	72	72	72	72	288
Amhara	40	40	40	40	160
Tigray	20	20	20	20	80
<b>Total</b>	<b>160</b>	<b>160</b>	<b>160</b>	<b>160</b>	<b>640</b>

Table 2. Comparison of drip and furrow irrigation.

Parameters	Drip	Furrow
Demonstration plot (m <sup>2</sup> )	200	200
Amount of water used m <sup>3</sup> /demonstration plot	52	105
Amount of water m <sup>3</sup> /ha	2600	5266
Pumping capacity l/second	0.5	0.5
Total discharge l/hr.	1800	1800
Total discharge m <sup>3</sup> /day	14	14
Cropping season (days)	80	80
Total discharge m <sup>3</sup> /season	1152	1152
Potential irrigable land (m <sup>2</sup> )	4431	2188

## Results/Achievements

- The feasibility of solar pump depends on the method of water application, crop type, land size and discount rate.
- As compared to furrow and overhead water delivery systems, drip system is more productive and less labor intensive (Table 2).
- Investment in solar pump is feasible and worthy.
- Solar powered water pumping is in line with the Ethiopian Government's CRGE strategy.

## Plan for 2019

- Implantation of solar pump irrigation in 16 districts in Oromia, SNNPR, Amhara and Tigray
- Follow up survey
- Impact evaluation using Difference-in-Difference approach.

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