

# Solar Pumping: Solar Pumping Irrigation System

Solar Irrigation The sun's energy at the service of your harvest.

The Solar Pump is a solar irrigation system that uses photovoltaic pumps operating on direct current (DC), without an inverter. Its capacity varies depending on the area being irrigated, the water requirements of the crops, and site conditions. For a plot of approximately 1 acre (0.4 ha), a 1.5 hp system with a flow rate of 5 to 8 m<sup>3</sup>/hour and a manometric height of 25 to 40 m, powered by three 400 W solar panels, can be used. The pump can be submersible or surface-mounted depending on the water source, and can irrigate approximately 0.1 ha at a time, covering several blocks per day.



**International Water Management Institute**  
Adebayo Oke

Commodities

All Crops

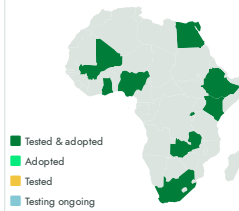
Sustainable Development Goals



Categories

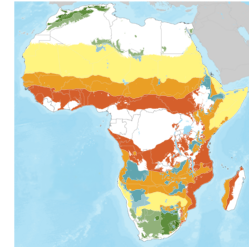
Production, Equipment, Irrigation

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Farmers, Cooperatives and Agribusinesses

This technology is **pre-validated**.

9-9



Scaling readiness: idea maturity 9/9; level of use 9/9

**7500 USD**

Cost per hectare

**12300 USD**

Revenue per hectare

**4800 USD**

Net income per hectare

**64 %**

ROI Per Year



Open source / open access

## Problem

- **Lack of affordable energy for irrigation:** Limited access to reliable energy reduces the productivity of small farms.
- **Costly dependence on fossil fuels:** Fuel-powered pumps increase costs and greenhouse gas emissions.
- **Untapped solar potential:** In sub-Saharan Africa, financial constraints are slowing the adoption of solar pumps.

## Solution

- **Efficient irrigation:** Provides reliable water to improve crop productivity.
- **Solar autonomy:** Independent of fuel and the power grid, reducing costs.
- **Lower emissions:** Replaces fuel-powered pumps, limiting greenhouse gases.
- **Suitable for smallholders:** Irrigates multiple plots per day.
- **Harnessing solar potential:** Exploits the high levels of sunshine in sub-Saharan Africa for sustainable irrigation.

## Key points to design your business plan

The Solar Pump enables smallholders to irrigate their crops reliably and sustainably, improving productivity while reducing costs and emissions associated with fuel pumps. Comprising solar panels and a durable DC pump that is easy to install and maintain even off-grid, it offers an economical solution and can irrigate several crop blocks per day via drip, sprinkler, or simple hose. Training on installation, use, and maintenance ensures optimal operation, and multiple units can be deployed to increase irrigation capacity. The Solar Pump thus ensures regular and efficient irrigation, harnesses local solar potential, and enables small-scale producers to increase productivity and income.

Inclusion assessment

5

Climate impact

6



Solar Pumping

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