

Solar pumps improve irrigation options for farmers

Rain-fed agriculture can be a high-risk venture, particularly with changing rainfall patterns and high-value crops such as fruits and vegetables. Irrigated cropland is twice as productive as rain-fed agriculture (World Development Report 2008), but many farmers do not have access to irrigation infrastructure, including a nearby water source and power to move the water to and through their fields. Combining drip irrigation kits, newly affordable photovoltaic panels and off-the-shelf, 12-volt pumps can result in a cost-effective system for supplying water for irrigation. Solar-powered irrigation has the potential to increase incomes dramatically, particularly for the most remote producers.

How the solar pump system works

A 50-watt photovoltaic solar panel can power a 12-volt pump, which can move 1,300–2,600 liters per hour (or 350–700 gallons). Standard plastic fittings and half-inch piping connect these elements to a water saving tank of 500–1,000 liters. A sturdy stand should be built for the water tank to provide gravity flow, and a frame should also be constructed to provide the best angle for the solar panels. Multiple filters are needed to protect the life of the pump and minimize clogging in sprinkler emitters and tubes. A solar pump combined with affordable drip irrigation kits can be used with a wide variety of high-value crops to increase water efficiency, minimize fertilizer loss, and irrigate hilly terrains.



A solar-powered pump — shown here at the Horticulture Innovation Lab's Regional Center at Kasetsart University—can enable drip irrigation in remote locations, where access to electricity, high costs of securing fuel, and distance from a water source can make irrigation prohibitively difficult for smallholder farmers.

Benefits

- Solar irrigation can increase incomes dramatically, particularly for remote producers with inconsistent access to electricity or fuel.
- Pump irrigation reduces labor for water delivery.
- By targeting water at a crop's roots, drip irrigation can reduce weed and disease pressures, and increase efficiency of chemical applications.
- Drip irrigation significantly increases water use efficiency.

Basic costs

- Solar panels and frame
- 12V water pump and electric wire
- Water level switches
- PVC piping, connectors, valve
- 500L water storage tank and stand
- Filters
- PVC cutter
- Irrigation tape or tubing

These basic materials are available from local suppliers at low costs.

What's next? Scaling up

- **Education:** Continue to provide training through the Horticulture Innovation Lab Regional Centers and our network of partners.
- **Research:** Test components available in partner countries to find the most effective and affordable combinations.
- **Partnerships:** Work with the Horticulture Innovation Lab's network of partners to provide training, consulting and extension services to small-scale fruit and vegetable growers.

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