

# Solar Water Pumping System (SWPS) : there is no one size-fits-all solution



SWPS installation requires sound understanding of its key components: solar system technology, available water source (surface/underground/rainfall), water storage unit, water saving technology for crop production and crop production area.

## Scale for smallholders

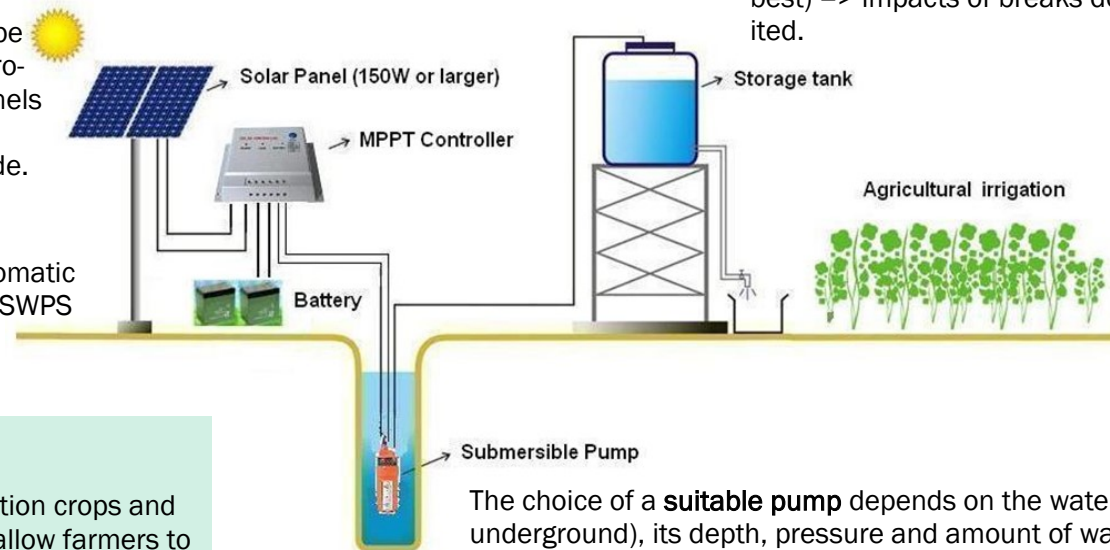
- Water storage tanks should be in capacity to contain 3-5 days of water needs = around 10m<sup>3</sup>-15m<sup>3</sup>
- PV panels : 100-1000W (depends on the necessary power)
- For crop production area between 1000 to 5000m<sup>2</sup>, 5-8m<sup>3</sup> of water is required.

According to 2012 statistics, farmers of Cambodia are using 231,942 units of pumping engines.

**Water storage unit** is recommended : during the day (higher solar inputs), the pump is used to fill a tank on a stand. Then, in the morning/evening (cooler periods), irrigation is gravity fed by a water system (drip system is best) => impacts of breaks down or cloudy days are limited.

If not mobile, the **solar system** should be fixed near water source and close to production area. The photovoltaic (PV) panels (which turn the sunlight into electricity) should face sun trajectory with no shade.

Sun-tracker, remote monitoring or automatic activation system can further improve SWPS efficiency.



SWPS should be tailored made to specific water needs, which depend on crops, lands size, water source(s) and existing irrigation system. Storage unit capacity and efficient irrigation system are key considerations for success.

## Did you know?

Fewer water consumption crops and mulching techniques allow farmers to use fewer water and reduce its evaporation resulting in better soil moisture.

The choice of a **suitable pump** depends on the water source (surface/underground), its depth, pressure and amount of water required:

- suction pumps (for surface water) can be cheaper with a satisfying water discharge from 2.5 to 10m<sup>3</sup> per hour for the smallest models.
- submersible pumps apply to underground water such as drill well.



In partnership with the Royal University of Agriculture and the Ministry of Agriculture, Forestry and Fisheries of Cambodia and with the financial support of the International Fund for Agricultural Development

# Bringing together the conditions for a successful transition

- Low interest loans & government incentives to facilitate initial capital cost ;
- Service fee system for in-debted farmers ;
- Expanded warranty period for the pump and the panels ;
- Risk reducing solutions to counter PV panels' exposure to degradations and thefts (installation close to housing, protection grating, anti-thefts screws).

4 experienced (min 10 years) solar service providers in Cambodia : KAMWorks, Solar Green Energy Cambodia, Eco Sun and IMB (Cambodia) Group. Atom solar and FuturePump explore opportunities to reach Cambodia.

Technologies price range\* : \$600-1500 for 3-8m<sup>3</sup> of water/day

\$3000-14000 for 30-80m<sup>3</sup> of water/day

\*Excluding water reservoir construction, water connection & drip system



1. Technology availability in Cambodia



Social Client approach



Organization From conception to distribution and maintenance

- Partnership between solar and agriculture companies to design the most suitable system ;
- Regular follow-up of the installation for technical improvements

-Skills in solar energy and agriculture for selection and installation.

- Basic technical knowledge training and maintenance spare parts for at local level => improve communities capacities to overcome difficulties

=> attractive for the youngest interested in those studies.



Human Resources Actors involved

If SWPS can be highly profitable economically—provided social factor of technology transfer is tackled - and environmentally, positive impacts are expandable.

Once it has been installed, a SWPS just needs to be switched on and off to be functional, farmers would no longer have to carry fuel for their pumping system.

Food supply will reduce health risks.

Farmers and their families will experience better working and living conditions.

Electricity produced by PV panels, when not used for water tank filling, can have other application such as phone charging or house lightning (in off-grid area).



Information How to spread the word?

-B2B (business to business) approach : solar companies directly ask water pumps/irrigation/agriculture sellers which of their clients might be interested in SWPS.

-Promotion events.