

**Solar-Powered Micro-Irrigation**  
**S&S Center for Sustainable Agriculture and Homestead Farm**  
Supported by NRCS Competitive EQUIP grant program

By Henning Sehmsdorf

Background: S&S Homestead Farm is a small-scale (15 acres owned, 35 leased) family farm on Lopez Island, WA that integrates the production of fruit, vegetables, beef, pork, lamb, chicken, eggs, and dairy. The farm produces its own animal feeds and fertilizers and controls weeds and pests entirely through soil health management. Farm surplus is sold to the local community.

Access to water for animals, orchard and crop irrigation is a limiting factor. The only well on the farm produces no more than 1 ½ gallons/minute, and the water is shared with 20 neighbors. Instead of drilling a second well to meet increasing water needs, the farm owners built a rain catchment system to collect water from two barn roofs.

The run-off is captured in cattle troughs in which overflow pipes have been installed to funnel excess water to a cistern. The cistern overflows into open swales that carry the water more than 800 feet to a fenced pond with a holding capacity of approximately 750,000 gallons. The grassy swales filter the water.



**Cattle trough with overflow standpipe**



**Catchment pond holds ca.  
750,000 gallons**

At the pond, a 4x8 building was erected to house a solar pumping station together with a solar shower (for use by farm interns). The south-sloping roof supports 2 Shell SM-110 Solar Modules to power a Dankoff Solar Force 3020-12 PV Water Pump, a sand media filter, and a 20 g pressure tank.



**Water Pump, sand filter, pressure tank  
Distribution valves on right**

Valves at the pumping station control the flow of the water to 3 sites: 1. the cistern at the main barn (where a shallow well pump pressurizes the water for drip irrigation use in 2 adjacent gardens and 2 greenhouses); 2. the orchard, where an electronic timer controls alternation between 3 underground drip circuits; 3. 10,000 sq. feet of row crops next to the pond, where each row is supplied by a valve-controlled underground drip line (the row crops will eventually be extended to 2 acres).

The system came on line in July, 2004, during a 3-month summer drought, saving ca. 40,000 gallons of well water per month.

It has also been noted that the plants respond favorably (increased vigor and productivity) to irrigation with soft rainwater instead of hard groundwater.

Technical assistance for the project was provided by Tom Slocum, NRCS District Engineer, and Steve Nissley, NRCS District Conservationist. The solar pumping system was installed by Eric Youngren of Rainshadow Solar, Orcas, WA.



**Solar panels on south-sloping  
roof**



**Water flow control timer**