Solar-powered sprayers are pumps running on power generated using energy collected by photovoltaic panels. They are mainly used for spraying pesticides. For Small Holder Farmers (SHF), using solar-powered pumps is more efficient than manual ones and cheaper than diesel-powered sprayers due to their low operation and maintenance costs.

### Case for Solar Powered Sprayers

- **Agriculture is the main economic activity in Uganda, accounting for the bulk of employment (70%) and export revenues of goods (near 50%), but the use of pesticide is amongst the lowest in the world (17kg/ha).**
- **The annual crop loss due to pests and diseases in Uganda is very high. It is estimated at US$35-200 Mn for Bananas, US$60-80 Mn for cassavas, and US$58 Mn for coffee.**
- **Only 18% of the population in rural parts of Uganda has access to electricity.** Electric-powered sprayers are hence inaccessible for most Ugandans.

### Technology Specifications

A typical solar-powered sprayer consists of a solar panel of 20W capacity, a 12V DC battery charged by solar energy through a solar panel, a DC motor operated by the battery, a pump to spray the pesticide, and a tank to hold the pesticide (in the form of solution/liquid). The cost of a solar sprayer can range between 50 and 105 USD.

### Cost Comparison

Solar-powered sprayers are more economical than the diesel alternative due to their low operation costs.

<table>
<thead>
<tr>
<th>Sprayer Type</th>
<th>Unit Cost</th>
<th>Operating Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Powered Sprayer</td>
<td>US$50-105</td>
<td>US$0</td>
</tr>
<tr>
<td>Diesel Powered Sprayer</td>
<td>US$60</td>
<td>US$0.5/hr</td>
</tr>
</tbody>
</table>

### Technology Benefits

- Solar-powered sprayers reduce crop loss resulting from plant pests and diseases, hence contributing to higher income earnings and improved livelihoods.
- Solar-powered sprayers have less environmental impact compared to diesel-powered sprayers.
- Solar powered sprayers reduce drudgery compared to hand-operated spray pumps. The latter cause user fatigue due to continuous hand lever operation and thus result in lower productivity.
- The surplus power generated by a solar-powered sprayer can be used for other applications such as charging the mobile battery, operating a radio, and lighting a bulb.

---

**Sources:**
3. SE4All, 2018.