TECHNOLOGY SPOTLIGHT

POWER FOR ALL

APPLICATION OF SOLAR POWERED SPRAYERS IN UGANDA

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

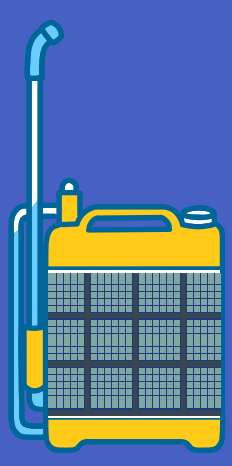
Agriculture is the main economic activity in Uganda, accounting for the **bulk of employment (70%)** and **export revenues of goods (near 50%)**, but the use of pesticide is amongst the lowest in the world (17kg/ha).[1]

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$8 Mn for coffee**.[2]

Only **18% of the population in rural parts of Uganda** has access to electricity.[3] 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.[4]



Cost Comparison

Solar-powered sprayers are more economical than the diesel alternative due to their low operation costs.[5]

Solar Powered Sprayer

- Unit cost: US$50-105
- Operating cost: US$0

Diesel Powered Sprayer

- Unit cost: US$60
- Operating Cost: US$0.5/hr

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:
1. Health and Environmental Benefits of Reduced Pesticide Use in Uganda: An Experimental Economics Analysis, 2008
2. PARM, 2017. Crop pests and disease management in Uganda: status and investment needs.
3. SE4All, 2018.
4. Development and evaluation of solar-powered sprayers with multi-purpose applications, 2017
5. International Journal of Current Microbiology and Applied Sciences, 2020