Mpunzungulu Huzi Solar Powered Drip Irrigation Mango Scheme

Why to choose this solution?
Increases in population along with rising demands for water and energy have caused stress to water and energy resources. Replacement of conventional sources of energy with renewables, and of conventional methods of irrigation with highly efficient irrigation techniques, will increase global water and energy security as well as benefit the environment. Mpunzungulu Agriculture Marketing Cooperative Society (AMCOs) is involved in small-scale commercial farming and processing of mangoes. The farm comprises 200 acres and is expected to expand to 500 acres. Diesel is the main source of energy used for pumping water from the borehole for irrigation of the mango farm. Replacement of the diesel pump with solar and use of drip irrigation will minimize water use while contributing to increased farm productivity and environmental conservation.

Savings per day or production:
Solar is an abundant source of energy and available for free. Drip irrigation uses less water without affecting the crop yield. A solar-powered water system is cost-effective over years, as it requires minimal operational and maintenance costs, unlike a diesel-powered system.

Cost in money and in own time to construct:
Cost involved in installation of the system to cover 20 acres amounts to TSh. 78,600 million equivalent to USD 34,000 (solar water pump with capacity of 18 m3/hour costs TSh. 48,300 million equivalent to USD 20,900 and the drip irrigation system costs TSh. 30,300 million equivalent to USD 13,100).

Lifetime:
The system is expected to last for a period of 3 to 5 years.

Maintenance needed:
Requires regular cleaning of the water pump. Drip plumbing requires at least annual testing, adjustment, and repairs of leaks.

Resources needed in use:
Solar radiation.

Problems and limits:
No solar power at night so there is a need for a large battery bank. High initial costs for material and installation and long return of investment.

Where and how can you get it or make it?
Sold by companies in Tanzania e.g. by Merry Water Company Limited https://www.merrywater.co.tz/, Ensol Tanzania Ltd, Davis & Shirtliff https://www.davisandshirtliff.com/tanzania-branches.

Skills needed to produce, install. maintenance, use:
It requires special skills to manufacture solar and water pump. Simple training is all that is required to maintain and use it.

How to use it:

How to maintain it:
Requires regular cleaning of the water pump. Drip plumbing requires at least annual testing, adjustment, and repairs of leaks.

Climate effect (if any):
Solar power is pollution free and causes no greenhouse gases emitted after installation. It reduced dependence on foreign oil and fossil fuels. Eliminates burning of diesel fuel to power pumps; and reduces water use.

Where it is used and how many users are there?
Used in many regions in the country including Arusha, Dodoma, Morogoro, Iringa, etc.

Why is it successful?
The agricultural sector is the largest employer in Tanzania, sustaining the livelihoods of more than 70% of the population. Increasing agricultural productivity is recognised as one of the most effective ways to fight poverty and to stimulate socio-economic development. Irrigation is among the measures that can improve yields and reduce vulnerability to changing rainfall patterns, and drip irrigation delivers water specifically to plantsâ€™ root zones, resulting in vastly reduced water losses to evaporation, runoff, and off-target spray and overall lower use of water. Solar water pump has provided reliable, cost-effective and environmentally sustainable energy for the Mango farm.

If you can make it, a short description, typical problems, materials needed:
Equipment required includes solar panels and other accessories, water pump, special pipe for drip irrigation, small replacement parts such as emitters, etc.

How to make it (if possible):

How is it delivered and by whom?
Main actors include Chamwino District Council (is a government authority of the area, where the farm is located. It is responsible in provision of extension services, and assisting AMCOS to attract different investors), Mpunzungulu AMCOs (is an association of mango farmers and owners of the farm), University of Sokoine (suppliers of mango seedlings), World Resource Institute (financier of the solar powered drip irrigation system), TaTEDO (involved in installation of the system), Solar pumps companies (suppliers of solar pump and drip irrigation system).

Successful financial model
Public private Partnership and Special Purpose Vehicle.

What policies and strategies helped the success?
Tax exemption for solar panels.

More info:
Contact: Chamwino District Council, Dodoma, Tanzania.

Sources:
TaTEDO, MbeziJuu, Mpakani Road, Goba, House No GOB/KZD/883, P. O. Box 32794, Dar es Salaam, Tanzania. Tel: +255 738-201498, E-mail: energy@tatedo.or.tz, http://www.tatedo.or.tz

When was the case uploaded?
2021-03-19