



Solar Desalination Greenhouse (SDGH)

The MED-WET project aims to improve irrigation efficiency in agriculture for small-holder farmers in the Mediterranean region using nature-based technologies. One such technology being investigated is the Solar Desalination Greenhouse (SDGH). Developed by Alchemia Nova (Austria), the SDGH is a unique greenhouse system designed to transform brackish water into freshwater for irrigation. The SDGH is currently being further tested in Gozo, Malta, by the Ministry for Gozo and Planning as part of the MED-WET project, aiming to enhance its overall effectiveness.

The SDGH is a three-compartment greenhouse:

Vertical farming/hydroponic system: This compartment houses halophytic plants, specifically chosen for their ability to tolerate saline environments. As these plants grow, they humidify the air within the greenhouse.

Traditional soil system: This section is dedicated to growing crops irrigated with the desalinated water produced by the SDGH itself. A drip irrigation system ensures efficient water delivery.

Anteroom: Separating these two sections is an anteroom, which contains the PLC that controls the sensors that constantly collect data on temperature, humidity, water quality, and energy consumption. This real-time data provides valuable insights that allow operators to make informed decisions and adjustments for optimal performance.

Roll-up sides and fans in the vertical farming/hydroponic and traditional soil systems allow for effective ventilation control, optimising temperature and humidity levels.

Desalination methods

The SDGH utilises a combination of desalination methods to create freshwater from brackish water:

Evaporation: Achieved through wet walls with constantly flowing brackish water.

Evapotranspiration: Facilitated by the halophytic plants in the vertical farming system, which release water vapor through their natural processes.

Condensation: Passive condensation on plastic foil sheets collects condensate in a gutter, while dehumidifiers actively extract condensate from the humid air within the greenhouse.

Benefits of the SDGH technology

Freshwater production: Produces freshwater for irrigation from brackish water sources, reducing reliance on freshwater resources.

Reduced water extraction: By creating its own freshwater supply, the SDGH helps to minimise freshwater extraction for irrigation purposes.

Crop production: Enables the cultivation of both halophytic crops and salt-tolerant crops, expanding agricultural options in saline environments.

Water recycling: Utilises innovative water recycling methods within the closed-loop system, significantly increasing overall production efficiency.

