



MED-WET

SLECI Technology: Transforming Irrigation Efficiency

The MED-WET project focuses on enhancing irrigation efficiency in agriculture, with a particular emphasis on supporting smallholder farmers in the Mediterranean region. One technology under exploration is the SLECI (Self-regulating, Low Energy, Clay based Irrigation) technology. Its simple concept, production, and installation make it adaptable to rural environments, effectively conserving water and energy resources.

Key Features:

Development: SLECI was designed by the Robert-Schmidt-Institut der Hochschule Wismar (HSW) University of Applied Sciences, Technology, Business, and Design (Germany). The technology is undergoing further refinement and improvement as part of the MED-WET project.

Pilot Testing: As part of the MED-WET project, SLECI is currently undergoing rigorous testing across nine pilot sites situated in three different countries. These sites include four locations in Morocco, two in Portugal, and three in Gozo, Malta and feature citrus, date, olive, vine, cherry, and peach trees.

Mechanism: Operating at low hydraulic pressure, the SLECI system dynamically adjusts water release based on soil type and moisture levels. As the surrounding soil dries, the suction effect on the elements intensifies, resulting in a higher water delivery rate to sustain crop growth.

Advantages of the SLECI technology compared with conventional drip irrigation systems:

Direct irrigation to root zone: SLECI drippers deliver water directly to the root zone, reducing water loss through surface evaporation.

Reduced weed growth: SLECI drippers help decrease weed growth, reducing the need for frequent weeding and maintenance.

Autonomous operation: Water release is based on soil moisture content, operating autonomously to ensure efficient water usage without over-irrigation.

Minimized mineral leaching: SLECI technology minimizes mineral leaching, preserving soil nutrients and promoting sustainable farming practices.

Technical Specifications:

SLECI elements: The SLECI elements consist of a clay/sand mixture shaped in the form of a rod featuring pores that release water directly into the soil at the root zone under a positive pressure of less than 0.2 bar. The depth at which the drippers are installed varies depending on factors such as crop type and soil composition.

Water Delivery: Different types of SLECI elements are utilized based on the water needs of specific crop types. High-water demand crops receive 2-3 Liters of water daily, while low-water demand crops receive 0.5 Liters per day.

Installation: A hole measuring 6-8 cm in diameter and 30-60 cm deep is made at the SLECI installation site. The SLECI element is positioned vertically, suspended from a 6mm connection pipe. Sand is poured to cover the element, and the rest of the hole is filled with soil. The 6mm pipe is connected to a DN 16 main line, which is in turn linked to a Vertical Control Assembly (VCA). The VCA, comprising a float valve compartment fixed to a pole, maintains a consistent pressure on the clay pipe drippers. A smart flow meter and a pressure gauge are also connected. If the water source is an open reservoir, a UV-C filter is installed. A prefiltering system with a 50-micron filter and a 1-micron filter, and optionally a sand filter depending on the water source, are used to minimise insoluble solids that may block the pores. An overhead water tank is required to supply the VCA SLECI system, with a minimum height of 20 cm from the tank base to the VCA float valve. The water also has a prefiltering system, which may include a sand filter, a 50-micron and a 1-micron filter.

