



SLECI - Self-regulating, low energy, clay-based irrigation system

Description

SLECI is the acronym for *Self-regulating, Low Energy, Clay-based Irrigation*. As its name implies, it is a gravity-fed subsurface irrigation technique that uses the actual suction force of the surrounding soil for regulation of the system's water release. Water is transported from a tank to the soil and plant roots via clay tubes, which by having suction tension greater than the applied hydraulic pressure, causes the surface of the clay tubes to stay damp, eventually wetting the surrounding soil. Its concept, production, and installation are simple and thus adapted to rural environments, saving water and energy. Further ecological gains and improved sustainability are possible when bio-based materials and products are used in the production of SLECI pipes and tanks rather than the petrochemical-based materials used for conventional irrigation systems.



Benefits of SLECI

SLECI irrigation ensures:

- Timely operation of field activities
- Improves transition to circular agriculture and bioeconomy
- Energy and labour saving
- Cost savings on irrigation infrastructure
- Establishment of healthy and resilient farming systems
- Significant water and time savings

Challenges of SLECI

- Time consuming to install
- Can block in clay soil
- Needs to be placed directly at the root of plants

Country Example: Ghana

Pilot research trials with the DIVAGRI bio-based technologies are occurring in a dozen sites in four DIVAGRI target countries. As elsewhere, the site in Kumasi, Ghana, led by the *CSIR - Crops Research Institute* seeks to evaluate the SLECI technology against already existing irrigation technologies in terms of cost-benefits such as productivity, production costs, and ecological benefits.

With respect to the ecological benefits, the research trial is recycling three different waste-water sources for the irrigation of maize. The water sources include:



- Untreated waste water from a recirculating aquaculture pond
- Treated waste water from a recirculating aquaculture pond; and
- Grey water from kitchen activities

Knowledge Sharing Centres

Below are the contact persons for country specific questions. Please refer to them or the Coordinator from Hochschule Wismar, for details about the technologies that have been piloted or project research, training, and dissemination activities that are being planned in your region or country. The project runs until May 2025, with Knowledge Sharing Centres established to continue the work beyond that date. More details available on the website <https://www.divagri.org>

GHANA

University of Cape Coast

Dr Francis Kumi
Department of Agricultural Engineering
Email: francis.kumi@ucc.edu.gh
Telephone: +233 [03321] 32440

NAMIBIA

Namibian University of Science and Technology




Dr Veikko Shalimba
School of Engineering
Email: vshalimba@nust.na
Telephone: +264 61 207 2261

MOZAMBIQUE

Centre for Research and Transfer of Technologies for Community Development




Dr Ivonne Muocha
Email: muochaivone@gmail.com
Telephone: +258 21 328616

SOUTH AFRICA

Agricultural Research Council




Dr Aart-Jan Verschoor
Email: aartjan@arc.agric.za
Telephone: +27 12 4279866

BOTSWANA

National Agricultural Research and Development Institute




Dr Pharoah Mosupi
Email: pharoah@nardi.org.bw
Telephone: +267 391 4997

GERMANY

Hochschule Wismar




Mr Sébastien Clerc-Renaud
Email: sebastien.clerc-renaud@hs-wismar.de
Telephone: +49 3841 753 7881

This fact sheet serves as a general overview of the above bio-based technology (BBT). It is one of seven BBT factsheets. It describes one prototype of this technology that was developed prior to 2023. Adaptations of it have been made for the various country and local contexts. Please contact the country Knowledge Sharing Centre for more details. The EU-funded DIVAGRI project (2021-2025), 'Revenue diversification pathways in Africa through bio-based and circular agricultural innovations' seeks to provide African subsistence and smallholder farmers with tools to sustainably improve farm productivity, profitability and resilience through improved management of farming resources, output diversification and creation of high-value circular bioproducts. For more, visit [divagri.org](https://www.divagri.org)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000348.