



SuLaMo – New approaches to sustainable land management, using Morocco as an example

CLIENT II – International Partnerships for Sustainable Innovation

The SuLaMo project takes an integrated approach to strengthening agriculture under arid and semi-arid conditions as a major contribution to sustainable land management in the agricultural sector, using Morocco as an example. SuLaMo specifically addresses the improvement of crop productivity through novel, water-saving soil and irrigation techniques such as mulching and subsurface drip irrigation, as well as autonomous energy supply and capacitive deionisation as an innovative desalination process.

Project goals

Morocco is being significantly affected by climate change and suffers from severe water scarcity. In the future, existing freshwater sources will be insufficient for meeting agricultural irrigation needs. Therefore, in addition to water-efficient irrigation technologies, non-conventional water sources such as brackish and seawater will have to be used. The goal in SuLaMo is to enable the use of brackish water for irrigation by applying novel energy-saving and cost-effective desalination and irrigation technologies. In this, the combination of subsurface drip irrigation (SDI) with real-time monitoring of soil water balance, well water level, and weather data is to be used to optimise irrigation.

The objectives of SuLaMo can be divided into two fields of activity, 1) technological solutions and farm management; and 2) improving the implementation of innovative farm practices and technologies alongside capacity building and marketing strategies. The concept is being tested on a pilot scale at three sites under arid and semi-arid conditions in rural Morocco.



Agriculture in the Ouarzazate region, arid region.

Methodology and innovation

The technological innovation of the project is the use of novel desalination technology, capacitive deionisation (CDI), and the coupling of subsurface drip irrigation with real-time intelligent sensor systems for system monitoring. CDI is a new electrochemical desalination process that uses porous carbon electrodes to adsorb ions. Ion exchange membranes are also placed in front of the electrodes to increase desalination efficiency (MCDI). The main advantage of the MCDI is the lower specific energy requirement for desalination compared to the state of the art.

The project is divided into two main phases. Year 1 will focus on the design and installation phase of the pilot facilities, while Phase 2 (2 years) will be dedicated to commissioning and piloting. Field studies will be conducted at three agricultural sites in Morocco under arid and semi-arid conditions in Meknes, Ouarzazate and Errachidia. A socio-economic study will also be carried out for the development of approaches aimed at promoting the implementation and exploitation of the concept by the participating companies.

Outlook

The three demonstration sites will show the extent to which arable and crop production can be optimised under difficult agricultural conditions (small farms with low levels of mechanisation) in arid areas using PV-powered subsurface drip irrigation (SDI) and simple control using a weather station and soil sensors, and how new land can be sustainably developed for arable and crop use.

On-site piloting is to be supported by Moroccan institutions: Ecole Nationale d'Agriculture de Meknes,

Institut National de la Recherche Agronomique, of the Universite Moulay Ismail and the Association Oasis Ferkla pour l'Environment et le Patrimoine in Errachidia as well as the Office Regional de Mise en Valeur Agricole in Ouarzazate.

The project results will be used to derive scale-up guidance for Moroccan agriculture in line with the „Génération Green 2020-2030“ development programme, which addresses the creation of a new generation of innovative farms.

The project will have direct and indirect impacts on several SDG targets, especially Goal 2 „Sustainable agriculture“, e. g. 2.3 and 2.4 increase agricultural productivity and implementation of resilient agricultural practices, but also Goal 15, among others, „Protect, restore and promote sustainable use of terrestrial ecosystems“, Goal 13 „Take action to combat climate change“, Goal 7 „Access to sustainable energy“.



PV powered irrigation and weather station in Errachidia.

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SuLaMo – New approaches to strengthening agriculture under arid and semi-arid conditions as an important contribution to sustainable land management, using Morocco as an example.

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