

Soil Water Technology for Solar Farming in Arid Regions

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Large regions of the Middle East contain marginal soils receiving little rainfall. Energy required for adequate desalinization and irrigation often limit production and food value chain distribution. New highly efficient Pozzolan desalination technologies are being developed to provide abundant water supplies for expanding irrigation of solar agriculture in deserts. Although large pores within sand and Oxisolic soils absorb large quantities of rainfall and/or irrigation, less than 20% of this soil water remains in plant root zones to depths of 60 cm. The remaining water drains more deeply, leaching plant nutrients, bacteria, pesticides, and endocrine disruptive compounds, into groundwater well below roots of most annual fruit and vegetable crops. Spatially installed double layered U-shaped water retention troughs directly below plant root zones retain nearly 100% of irrigation water in plant root zones for longer periods of time. These Soil Water Retaining Technology (SWRT) membranes double soil water contents in plant root zones providing optimal soil water, nutrient and oxygen, empowering crop production to achieve their maximum genetic potential. Therefore, we believe combining solar agriculture (SA) with SWRT membranes, a new SAWRT hybrid will be established to deliver longer crop drought-free periods than achievable by irrigated control sands, transforming millions of marginal sandy landscapes into long-term sustainable agriculture technologies, overcoming food shortages while conserving water, energy, and protecting the environment. Growing populations are requiring nearly all countries to transform sands into long-term sustainable food production regions on billions of improved sustainable hectares of arid sands.

Biography:

Professor Dr. Smucker is an internationally awarded soil biophysics specialist at Michigan State University, a Visiting Professor at University of Wisconsin, University of Western Australia, The Scottish Agricultural College, Alexander von Humboldt Research Award, and China Agricultural University. He has multiple patents for quantifying soil dynamics used by scientists worldwide. His soil water retention and irrigation specializations established world record production of flooded rice, sugarcane, food grains, horticultural and commercial crops on highly permeable soils in the USA, China, Iraq, Iran, Taiwan and Turkey. His research has been conferred by four fellow awards by the AAAS, ASA, SSSA, ISRR.