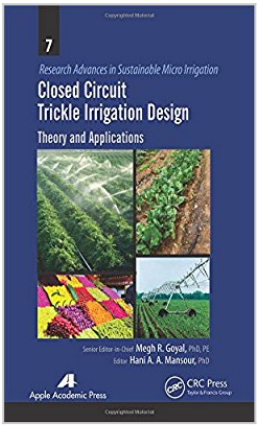


# Closed Circuit Trickle Irrigation Design: Theory and Applications (Research Advances in Sustainable Micro Irrigation)

*From Apple Academic Press*



**Closed Circuit Trickle Irrigation Design: Theory and Applications (Research Advances in Sustainable Micro Irrigation)** From Apple Academic Press

Closed circuit trickle irrigation is a form of micro irrigation that increases energy and water efficiency by using closed circuit drip irrigation systems designs. Modifications are made to traditional micro irrigation methods to reduce some of the problems and constraints, such as low compressor water at the end of irrigation lines. This approach has proved successful for the irrigation of fruit trees and some vegetable and field crops. Closed circuits of drip irrigation systems require about half of the water needed by sprinkler or surface irrigation. Lower operating pressures and flow rates result in reduced energy costs, and a higher degree of water control is attainable as well. Plants can be supplied with more precise amounts of water, and disease and insect damage is reduced because plant foliage stays dry. Fertilizers can also be applied through this type of system, which can result in a reduction of fertilizer and fertilizer costs.

This new volume in the Research Advances in Sustainable Micro Irrigation book series presents a diverse collection of research on closed circuit irrigational technology and design and provides studies of its use on such crops as wheat, maize, yellow corn, soybeans, rice, and snap peas.

The book explores:

• Soil moisture and salinity distributions under modified sprinkler irrigation

• Performance of sprinkler irrigation

• Design considerations for closed circuit drip irrigation systems

• Performance of bubbler irrigation

• Energy and water savings of drip irrigation systems

• Automation of mini-sprinkler and drip irrigation systems

• Water and fertilizer use efficiencies for drip irrigated maize

• Evaluation of emitter clogging for drip irrigated systems

This book will be valuable for those interested in irrigation planning and management, namely, researchers, scientists, educators, upper-level students, agricultural extension services, and others.

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## Editorial Review

About the Author

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He was the first agricultural engineer to receive a professional license in agricultural engineering in 1986 from College of Engineers and Surveyors of Puerto Rico. On September 16, 2005, he was proclaimed as "Father of Irrigation Engineering in Puerto Rico for the twentieth century" by the ASABE, Puerto Rico Section, for his pioneering work on micro irrigation, evapotranspiration, agroclimatology, and soil and water engineering. During his professional career of 45 years, he has received awards such as Scientist of the Year, Blue Ribbon Extension Award, Research Paper Award, Nolan Mitchell Young Extension Worker Award, Agricultural Engineer of the Year, Citations by Mayors of Juana Diaz and Ponce, Membership Grand Prize for ASAE Campaign, Felix Castro Rodriguez Academic Excellence, Rashtrya Ratan Award and Bharat Excellence Award and Gold Medal, Domingo Marrero Navarro Prize, Adopted Son of Moca, Irrigation Protagonist of UPRM, and Man of Drip Irrigation by Mayor of Municipalities of Mayaguez/Caguas/Ponce and Senate/Secretary of Agriculture of ELA, Puerto Rico.

He has authored more than 200 journal articles and textbooks, including *Elements of Agroclimatology* (Spanish) by UNISARC, Colombia, and two *Bibliographies on Drip Irrigation.* Apple Academic Press Inc. (AAP) has published his books, namely *Biofluid Dynamics of Human Body, Management of Drip/Trickle or Micro Irrigation, Evapotranspiration: Principles and Applications for Water Management, Sustainable Micro Irrigation Design Systems for Agricultural Crops: Practices and Theory, Biomechanics of Artificial Organs and Prostheses*, and *Scientific and Technical Terms in Bioengineering and Biotechnology.* During 2014–15, AAP is publishing his ten-volume set, Research Advances in Sustainable Micro Irrigation.

**Hani A. A. Mansour, PhD**, is a distinguished research engineer in soil and water engineering at the Water Relations Field Irrigation Department (Agricultural and Biological Division) at the National Research Center, Egypt. He is also now a visiting post-doc research fellow in the Agricultural & Biological Engineering Department at Purdue University, West Lafayette, Indiana (USA) until January 2015. At Purdue University, he is working on "Using models and simulation programs in irrigation management under localized and developed irrigation systems." He has been a postdoctoral student at Szent István Egyetem,

Godollo-Hungary from October 2013 to April 2014. He has worked on development, design, and management of drip irrigation systems; deficit irrigation systems; water and fertigation management; and the treated low quality water in irrigation systems. He is an expert on closed circuits of drip irrigation system.

Dr. Mansour obtained his BSc in agricultural engineering in 2000 from Monofiya University, Egypt; his MSc in agricultural engineering from Ain Shams University,Cairo, Egypt, in 2006; and his PhD in 2012 through a special scientific channel between the Plant and Soil and Agricultural System Department at Southern Illinois University at Carbondale, Illinois (USA), and the Water Relations and Field Irrigation Department at the National Research Center, Egypt, and the Agricultural Engineering Department at Ain Shams University, Cairo, Egypt.

He is a critical reader, thinker, planner, and fluent writer and has published more than 40 publications on micro irrigation technology in arid regions.

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