Micro Irrigation In Arid And Semi Arid Regions Guidelines For Planning And Design

This volume sheds new light on the immense potential of medicinal plants for human health from different technological aspects. It presents new research on bioactive compounds in medicinal plants that provide health benefits, including those that have proven especially effective in treating and managing diabetes mellitus and hypertension. It looks at the medicinal properties, antioxidant capacity, and antimicrobial activity of plants and provides scientific evidence on the use of medicinal plants in the treatment of certain diseases. Many of the plants described in the chapters are easily accessible and are believed to be effective with fewer side effects in comparison to modern drugs in the treatment of different diseases.

With a roster of international contributors, this volume offers an abundance of solutions to address agricultural water management challenges in today's water-scarce areas of the world. The authors present studies on farmer-friendly irrigation scheduling methods, model-based analysis of crop water requirements, ways to optimize surface irrigation systems, and hydraulic design and management of surface water systems. The book goes on to highlight ways to improve soil properties by taking into account spatial, temporal, and spectral variability in soil properties. The volume also covers various innovative research studies on soil and water productivity of vegetable cultivation under water-stressed areas, application of coir geotextiles, and the role of biofertilizers in controlling soil degradation and maintaining fertile topsoil. Crop management strategies to enhance the efficient use of marginal and saline lands for nonconventional crops are also discussed. The book is divided into four sections, covering: engineering interventions in irrigation management technological interventions in management of soil properties technological inventions for soil and water conservation crop management for non-conventional use This volume will serve as an invaluable resource for academicians, researchers, engineers, agronomists, extension officers, students, and farmers in the broad discipline of agricultural and biological engineering.

This new book, Sustainable Micro Irrigation Design Systems for Agricultural Crops, brings together the best research for efficient micro irrigation methods for field crops, focusing on design methods and best practices. Covering a multitude of topics, the book presents research and studies on: Indigenous alternatives for use of saline and alkaline waters Hydraulic performance Distribution of moisture Fertilization technology Buried micro irrigation laterals Drip irrigation scheduling Rainwater harvesting Adoption and economic impact of a micro irrigation model This book is a must for those interested in irrigation planning and management, namely, researchers, scientists, educators, and students.

This new book, Sustainable Micro Irrigation Design Systems for Field Crops: Practices and Theory, is unique because it is complete and simple, a one-stop manual, with worldwide applicability to irrigation management in agriculture. It brings together the best research for efficient micro irrigation methods for field crops from around the world. Its coverage of the field of micro irrigation includes: An historical review A review of the current status and potential applications of micro irrigation Basic principles and applications Research results for vegetable/row/tree crops Research results on simulation of micro irrigation and wetting patterns A discussion on the development of software for micro irrigation design Information geared specifically for micro irrigation for small farms and marginal farmers Design charts for micro irrigation methods in arid, humid, semiarid, and tropical climates Methods and techniques that can be easily applied to other locations that are not covered here This book offers basic practices and design methods of drip/trickle or micro irrigation design that are necessary to understand before designing, developing, and evaluating an agricultural drip irrigation management system. This book is a must for those interested in irrigation planning and management, namely, researchers, scientists, educators, and students.

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 irrigation 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.

Improving agricultural water use efficiency (WUE) is vitally important in many parts of the world due to the decreasing availability of water resources and the increasing competition for water between different users. Micro irrigation is an effective tool for conserving water resources. Studies have revealed a significant water savings, ranging from 40% to 70% under drip irrigation compared with surface irrigation. This new volume, Engineering Interventions in Sustainable Trickle Irrigation: Irrigation Requirements and Uniformity, Fertilization, and Crop Performance, presents valuable research that evaluates crop water and fertilization requirements, examines optimum irrigation and fertilization scheduling, and analyzes the performance of agricultural crops under micro irrigation. With an interdisciplinary perspective, this volume addresses the urgent need to explore and investigate the current shortcomings and challenges of water resources engineering, especially in micro irrigation engineering. The volume discusses crop water requirements, fertilization technology, and performance of agricultural crops under best management practices. The chapter authors present research studies on drip irrigated tomato, chilies, cucumber, eggplant, cabbage, garlic, sugarcane maize, cashew nut, sapota, banana, mango, and blueberries. Removing the research gap, this volume provides new information that will be valuable to those involved in micro irrigation and related disciplines.

Micro Irrigation Management: Technological Advances and Their Applications, the fifth book in the Innovations and Challenges in Micro Irrigation book series, is a valuable reference volume on micro irrigation and water management for professional training institutes, technical agricultural centers, irrigation centers, agricultural extension service, and other agencies who work with micro irrigation programs. With an international focus, this new book focuses on applications of solar energy in micro irrigation and other important technological advances. It includes case studies and illustrative examples on drip irrigation design. Technological Interventions in Processing of Fruits and Vegetables presents a wide selection of the latest concepts in the fast-changing field of processing of fruits and vegetables (FAV). It provides key information on many new and different techniques used for processing of fruits and vegetables while also exploring the pros and cons of the various methods. There is an urgent need to explore and investigate waste in the processing of fruits and vegetables and how different processing technologies can be used most effectively. This volume, in short, conveys the key concepts and role of different
technology in processing of fruits and vegetables, keeping mind the special processing requirements of fruits and vegetables, waste issues, nutritional value, and consumer concerns. This volume offers a wealth of information on today's technology for fruit and vegetable processing and will be a valuable resource for industry professionals, agricultural/food processing researchers, faculty and upper-level students, and others.

This new volume in the Innovations and Challenges in Micro Irrigation series covers an array of technologies to estimate evapotranspiration and to evaluate parameters that are needed in the management of micro irrigation, with worldwide applicability to irrigation management in agriculture. Topics include recent evapotranspiration research, performance evaluation of filters and emitters, evaluation of fertigation and ground water with treated wastewater effluent, performance of pulse drip irrigated potato under organic agriculture practices in sandy soils, impact of polyethylene mulch on micro irrigated cabbage, and tree injection irrigation.

This informative new book takes an interdisciplinary look at agricultural and food production and how new engineering practices can be used to enhance production. With contributions from international experts from India, Russia, China, Serbia, and USA, this book presents a selection of chapters on some of these emerging practices, focusing on soil and water conservation and management; agricultural processing engineering; water quality and management; emerging agricultural crops; renewable energy use in agriculture; and applications of nanotechnology in agriculture.

This important book—the only complete, one-stop manual on microirrigation worldwide—offers knowledge and techniques necessary to develop and manage a drip/trickle or micro irrigation system. The simplicity of the contents facilitates a technician to develop an effective micro irrigation system. Management of Drip/Trickle or Micro Irrigation includes the basic considerations relating to soil-water-plant interactions, with topics such as methods for soil moisture measurement; evapotranspiration; irrigation systems; tensiometer use and installation; principles of drip/ micro/ trickle irrigation; filtration systems; automation; chlorination; service and maintenance; design of drip irrigation and lateral lines; the evaluation of uniformity of application; and an economical analysis for selecting irrigation technology.

Abiotic stresses are known to adversely impact agricultural productivity on millions of hectares globally, and it is projected that these problems are likely to increase, primarily due to anthropogenic interventions as well as climatic changes. Understanding abiotic stresses—especially salt stress on soil—calls for an interdisciplinary approach because salt-stressed soils need hydro-technical, chemical, and agronomic interventions as well as an understanding of plant response when exposed to these stresses. This volume explores and conveys the latest information on emerging technologies in the management of abiotic salt stress and their field applications. It brings together experts from various fields (academia, technology, and engineering) to provide the latest information and knowledge on this important challenge.

Written for and by dairy and food engineers with experience in the field, this new volume provides a wealth of valuable information on dairy technology and its applications. The book covers devices, standardization, packaging, ingredients, laws and regulatory guidelines, food processing methods, and more. The coverage of each topic is comprehensive enough to serve as an overview of the most recent and relevant research and technology.

This volume covers a selection of important novel technological interventions in dairy science, from the physical properties of milk and other milk products to nonthermal processing of milk. It also discusses safety methods in dairy science, which includes cleaning-in-place and techniques to determine adulteration in milk. Milk is a perishable commodity, and being rich in nutrients, it acts as the perfect substrate for the growth of microflora (sometimes dangerous for consumption). To reduce this, different thermal and nonthermal techniques are used. Thermal treatments are common techniques used for extending the shelf life of milk, such as, for example, pasteurization, sterilization, and UHT, but loss of nutrients is a concern associated with these treatments. Nonthermal treatments like high-pressure processing, pulse electric field, ultra-sonication, and irradiation are also explored in the processing of milk to minimize the loss of nutrients as compared to thermal treatment. Post-process contamination is also a major factor that can affect the shelf life of milk, and safe packaging plays an important role when the milk and milk products are stored at refrigeration or ambient temperature. Many advances in these dairy technologies are presented in this informative volume. Technological Interventions in Dairy Science: Innovative Approaches in Processing, Preservation, and Analysis of Milk Products will prove valuable for industrial professionals, scientists, regulatory personnel, consultants, academics, students and field-related personnel. The book also attempts to bridge the gap between research and industrial application of recent techniques.

This book discusses the development of useful models and their applications in soil and water engineering. It covers various modeling methods, including groundwater recharge estimation, rainfall-runoff modeling using artificial neural networks, development and application of a water balance model and a HYDRUS-2D model for cropped fields, a multi-model approach for stream flow simulation, multi-criteria analysis for construction of groundwater structures in hard rock terrains, hydrologic modeling of watersheds using remote sensing, and GIS and AGNPS.

The reuse of wastewater in irrigation is being practiced only recently to solve water scarcity problems in agriculture. Management of water, soil, crop, and operational procedures, including precautions to protect farm workers, play an important role in the successful use of sewage effluent for irrigation. Appropriate water management practices must be followed to prevent salinization. If salt is not flushed out of the root zone by leaching and removed from the soil by effective drainage, salinity problems can build up rapidly. Leaching and drainage are, thus, two important water management practices to avoid salinization of soils. One of the options that may be available to farmers is the blending of treated sewage with conventional sources of water to obtain a blended water of acceptable salinity level. This important book focuses on the use of wastewater as a valuable
resource for agricultural micro irrigation purposes. It covers effective wastewater management practices in a variety of climates, including semi-arid regions and others; how to perform effective evaluations to gauge the quality of the water on plants, including potatoes, maize, and eggplant; and the cost–benefit of using wastewater. It addresses the sources of wastewater for irrigation and the problems along with challenges, including water quality, clogging, soil quality, and more. The mission of this compendium is to serve as a reference manual for professionals in biological and civil engineering, horticulture, soil and crop science, and agronomy, as well as for graduate and undergraduate students in related fields. It will be a valuable reference for professionals who work with micro irrigation/wastewater and water management, for technical agricultural centers, irrigation centers, agricultural extension services, and other agencies that work with micro irrigation programs.

Microirrigation has become the fastest growing segment of the irrigation industry worldwide and has the potential to increase the quality of food supply through improved water fertilizer efficiency. This book is meant to update the text "Trickle Irrigation, Design, Operation and Management". This text offers the most current understanding of the management criteria needed to obtain maximum water and fertilization efficiency. * Presents a detailed explanation of system design, operation, and management specific to various types of MI systems * Analyzes proper use of irrigation technology and its effect to increase efficiency * Provides an understanding to the basic science needed to comprehend operation and management * Over 150 figures of designs and charts of systems including, surface drip, subsurface drip, spray/microsprinkler, and more

This book focuses on best management practices for drip irrigated crops. It cover irrigation methods, scheduling of micro irrigation, and mulching and crop performance. Micro irrigation techniques with diverse crops are discussed, including sweet pepper, chili, tomatoes, cauliflower, wheat, sweet peas, sugarcane, and potatoes. The performance of the various techniques has been tested and evaluated in the field. Written by experts on micro irrigation, this valuable book is a must-have for micro irrigation professionals as well as advanced students.

This new volume presents a selection of recent advances and emerging trends in food process engineering from several disciplines. Exploring the key concepts of food engineering, Food Engineering: Emerging Issues, Modeling, and Applications presents the information in four parts: Modeling in food engineering; Research advances in food engineering; Role of food engineering in human health; Emerging issues and applications in food engineering.

The Handbook of Research on Food Processing and Preservation Technologies is a rich 5-volume collection that illustrates various design, development, and applications of novel and innovative strategies for food processing and preservation. The roles and applications of minimal processing techniques (such as ozone treatment, vacuum drying, osmotic dehydration, dense phase carbon dioxide treatment, pulsed electric field, and high-pressure assisted freezing) are discussed, along with a wide range of other applications. The handbook also explores some exciting computer-aided techniques emerging in the food processing sector, such as robotics, radio frequency identification (RFID), three-dimensional food printing, artificial intelligence, etc. Some emphasis has also been given on nondestructive quality evaluation techniques (such as image processing, terahertz spectroscopy imaging technique, near infrared, Fourier transform infrared spectroscopy technique, etc.) for food quality and safety evaluation. The significant roles of food properties in the design of specific foods and edible films have been elucidated as well. Volume 3: Computer-Aided Food Processing and Quality Evaluation Techniques of the multi-volume set reports on a number of applications of computer-aided techniques for quality evaluation and to secure food quality. The chapter authors present emerging nonthermal approaches for food processing and preservation including a detailed discussion on color measurement techniques, RFID, 3D-food printing, potential of robotics, artificial intelligence, terahertz spectroscopy imaging technique, instrumentation techniques and transducers, food labeling as marketing and quality assurance tool, detection of pesticides, mathematical simulation of moisture sorption in food products, numerical methods and modeling techniques, concept of phase change materials, and dielectric properties of animal source foods. Other volumes in the set include: Volume 1: Nonthermal and Innovative Food Processing Methods Volume 2: Nonthermal Food Preservation and Novel Processing Strategies Volume 3: Computer-Aided Food Processing and Quality Evaluation Techniques Volume 4: Design and Development of Specific Foods, Packaging Systems, and Food Safety Volume 5: Emerging Techniques for Food Processing, Quality, and Safety Assurance Along with the other volumes, Handbook of Research on Food Processing and Preservation Technologies provides an abundance of valuable information and will be an excellent reference for researchers, scientists, students, growers, traders, processors, industries, and others.

Micro irrigation, also known as trickle, drip, localized, high frequency, or pressurized irrigation, is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. It is done through narrow tubes that deliver water directly to the base of the plant. Clogging is a menace in the success of drip irrigation systems, and the situation is more complex under subsurface drip irrigation. Irrigation planners and engineers have found a variety of innovative methods to help to minimize clogging. This book emphasizes the implications of micro irrigation clogging, especially under the subsurface placement of laterals. The book offers remedies to decrease clogging and methodologies to improve the performance of micro sprinklers. This valuable resource addresses this critical problem, covering: Challenges in clogging under subsurface drip irrigation Principles, practices, and management of emitter clogging Efficiency of acidification for unclogging of emitters Performance characteristics of micro sprinklers The book will serve as a reference manual for professionals in biological and civil engineering, horticulture, soil and crop science, and agronomy, as well as for graduate and undergraduate students in related fields. It will be a valuable reference for professionals who work with micro irrigation/wastewater and water management and for technical agricultural centers, irrigation centers, agricultural extension services.
services, and other agencies that work with micro irrigation programs. This new volume discusses the multitude of possibilities for new development in nanotechnology that focuses on overcoming the problems and challenges faced by the biomedical and food industries. The volume hopes to facilitate the development of devices and materials that benefit patients and their healthcare. The book is broken into three parts that cover: nanotechnology techniques for biomedical applications nanoparticles and materials for food, health, and pharmaceutical application potential applications of nanotechnology in food safety

The Handbook of Research on Food Processing and Preservation Technologies is a valuable 5-volume collection that illustrates various design, development, and applications of novel and innovative strategies for food processing and preservation. The roles and applications of minimal processing techniques (such as ozone treatment, vacuum drying, osmotic dehydration, dense phase carbon dioxide treatment, pulsed electric field, and high-pressure assisted freezing) are discussed, along with a wide range of applications. The handbook also explores some exciting computer-aided techniques emerging in the food processing sector, such as robotics, radio frequency identification (RFID), three-dimensional food printing, artificial intelligence, etc. Some emphasis has also been given on nondestructive quality evaluation techniques (such as image processing, terahertz spectroscopy imaging technique, near infrared, Fourier transform infrared spectroscopy technique, etc.) for food quality and safety evaluation. The significant roles of food properties in the design of specific foods and edible films have been elucidated as well. Volume 4: Design and Development of Specific Foods, Packaging Systems, and Food Safety presents new research on health food formulation, advanced packaging systems, and toxicological studies for food safety. This volume covers in detail the design of functional foods for beneficial gut microflora, design of specific foods for gut microbiota, composite probiotic dairy products: concepts and design with a focus on millets, encapsulation technology for development of specific foods, prospects of edible and alternative food packaging technologies, recent advancements in edible and biodegradable materials for food packaging, potential of ozonation in surface modification of food packaging polymers, characterization applications and safety aspects of nanomaterials used in food and dairy industry, toxic effects of tinplate corrosion, and mitigation measures in canned foods. Other volumes in the set include: Volume 1: Nonthermal and Innovative Food Processing Methods Volume 2: Nonthermal Food Preservation and Novel Processing Strategies Volume 3: Computer-Aided Food Processing and Quality Evaluation Techniques Volume 5: Emerging Techniques for Food Processing, Quality, and Safety Assurance The book helps to provide an understanding of different food formulations and development of edible packaging techniques with emphasis on the assessment of food product safety and quality. The book also provides information on various methods of formulation for development of new and safe products. Together with the other volumes in the set, Handbook of Research on Food Processing and Preservation Technologies will be a valuable resource for researchers, scientists, students, growers, traders, processors, industries, and others.

Engineering Interventions in Agricultural Processing presents recent advanced research on biological engineering, bioprocessing technologies, and their applications in agricultural food processing, and their applications in agriculture science and agricultural engineering, focusing on biological science, biological engineering, and bioprocessing technology. With contributions from a broad range of leading researchers, this book presents several innovations in the areas of processing technologies in agriculture. The book is divided into three parts, covering agricultural processing: interventions in engineering technologies novel practices in agricultural processing agricultural processing: health technology. With contributions from a broad range of leading researchers, this book presents several new innovations in the areas of processing technologies in agriculture that will be helpful to researchers, scientists, students, and industry professionals in agriculture. This important volume, Soil Salinity Management in Agriculture, addresses the crucial issue of soil salinity of potential farmland and provides a comprehensive picture of the saline environment and plant interactions, along with management and reclamation methods and policies. With contributions from researchers from the fields of agricultural chemistry, soil science, biotechnology, agronomy, environmental sciences, and plant breeding and genetics, the volume emphasizes a multidisciplinary approach.

The Handbook of Research on Food Processing and Preservation Technologies covers a vast abundance of information on various design, development, and applications of novel and innovative strategies for food processing and preservation. The roles and applications of minimal processing techniques (such as ozone treatment, vacuum drying, osmotic dehydration, dense phase carbon dioxide treatment, pulsed electric field, and high-pressure assisted freezing) are discussed, along with a wide range of applications. The handbook also explores some exciting computer-aided techniques emerging in the food processing sector, such as robotics, radio frequency identification (RFID), three-dimensional food printing, artificial intelligence, etc. Some emphasis has also been given on nondestructive quality evaluation techniques (such as image processing, terahertz spectroscopy imaging technique, near infrared, Fourier transform infrared spectroscopy technique, etc.) for food quality and safety evaluation. The significant roles of food properties in the design of specific foods and edible films have been elucidated as well. Volume 5: Emerging Techniques for Food Processing, Quality, and Safety Assurance discusses various emerging techniques for food preservation, formulation, and nondestructive quality evaluation techniques. Each chapter covers major aspects pertaining to principles, design, and applications of various food processing methods, such as low temperature-based-ultrasonic drying of foods, hypobaric processing of foods, viability of high-pressure technology, application of pulsed electric fields in food preservation, green nanotechnology for food processing and preservation, advanced methods of encapsulation, basics and methods of food authentication, imaging techniques for quality inspection of spices and nuts, FTIR coupled with chemometrics for food quality and safety, and the use of robotic engineering for quality and safety. Other volumes in the 5-volume set include: Volume 1: Nonthermal and Innovative Food Processing Methods Volume 2: Nonthermal Food Preservation and Novel Processing Strategies Volume 3: Computer-Aided Food Processing and Quality Evaluation Techniques Volume 4: Design and Development of Specific Foods, Packaging Systems, and Food Safety Together with the other volumes in the set, the Handbook of Research on Food Processing and Preservation
Technologies will be a valuable resource for researchers, scientists, students, growers, traders, processors, industries, and others. Milk is nature’s perfect food (lacking only iron, copper, and vitamin C) and is highly recommended by nutritionists for building healthy bodies. New technologies have emerged in the processing of milk. This new volume focuses on the processing of milk by novel techniques, emphasizing the conservation of energy and effective methods. This book is divided four parts that cover: applications of novel processing technologies in the dairy industry novel drying techniques in the dairy industry management systems and hurdles in the dairy industry energy conservation and opportunities in the dairy industry. This book presents new information on the technology of ohmic heating for milk pasteurization. It goes on to provide an overview of the commercial thermal, non-thermal technologies, and hybrid technologies for milk pasteurization. There are non-thermal technologies such as pulse light, irradiation, ultra violet treatment, etc., that can be used in combination with other technologies for the processing of milk and milk products. This hybrid technology can provide multiple benefits, such extended shelf life, reduced energy costs, reduced heat treatment, and better organoleptic and sensory properties. The book also describes the different aspects of food safety management used in dairy processing. The book also looks at recent advances in microwave-assisted thermal processing of milk and the effects of microwaves on microbiological, physicochemical, and organoleptic properties of processed milk and milk products. Technological advances in value addition and standardization of the products have been reported, but well-established processes for mechanized production are recommended in the book for a uniform quality nutritious product produced under hygienic conditions. This new volume will be of interest to faculty, researchers, postgraduate students, researchers, as well as engineers in the dairy industry.

This book presents a variety of policy adoption methods, irrigation scheduling, and design procedures in micro irrigation engineering for horticultural crops. The chapters range from policy interventions to applications of systems for different crops and under different land conditions. Compiling valuable information and research, the book is divided into three main sections: Policy Options: Drip Irrigation Among Adopters Irrigation Scheduling of Horticultural Crops Design of Drip Irrigation Systems. The editors present valuable research and information on micro irrigation methods in an effort to focus on innovation and evolving new paradigms for efficient utilization of water resources. The adoption of micro irrigation systems can be a panacea for irrigation related problems and can help to increase the yield and area under cultivation, especially for small farmers without abundant technological resources. Micro Irrigation Engineering for Horticultural Crops: Policy Options, Scheduling, and Design will be valuable for agricultural engineering students, irrigation engineers, and scientists/professors in engineering.

Many countries around the world are struggling with the challenges of water scarcity, including water for crops. Micro irrigation methods are an effective means to make the most efficient use of available water. This volume, Micro Irrigation Scheduling and Practices, continues the efforts of the book series Innovations and Challenges in Micro Irrigation to provide informative and comprehensive knowledge on micro irrigation methods and practices. This new book presents some of the latest information and research on micro irrigation and covers the area of performance, practices, and design, focusing particularly on the performance of vegetable, fruit and row crops in conjunction with different scheduling and practices. Irrigation scheduling is an important water management strategy, and this book addresses scheduling methods and issues. Design aspects of micro irrigation systems have also been discussed in the book. The authors present their research and studies on scheduling practices and design micro irrigation systems with a variety of fruits and vegetables, including peppers, chili, watermelon, oranges, banana, litchi, rice, sugarcane, sorghum, and mangolds. Micro Irrigation Scheduling and Practices will serve as a valuable reference for researchers, water resources professionals, agricultural extension agencies, farmers, and faculty and students.

This new book, Principles and Practices of Sustainable Micro Irrigation, is the first in the new series on micro irrigation, which offers a vast amount of knowledge and techniques necessary to develop and manage a drip/trickle or micro irrigation system. Written by experienced scientists from various parts of the world, the chapters in this book offer basic principles, knowledge, and techniques of micro irrigation management, which are essential in designing, developing, and evaluating an agricultural irrigation management system. The methods and techniques have worldwide applicability to irrigation management in agriculture. The book includes coverage of many important topics in the field, including: • An historical review of micro irrigation • The current global status of the field and its potential • Basic principles and applications • New research on chemoirrigation and fertigation • Technologies for specific crops, such as sugar cane • Irrigation software for micro irrigation design • Affordable and low-cost micro irrigation solutions for small farms and farms in developing countries • Micro irrigation design using Hydrocalc software

This book is a must for those interested in irrigation planning and management, namely, researchers, scientists, educators, and students.

There has been a growing interest in the health benefits derived from fruits and vegetables and the food products based on them. Many foods contain various phytochemicals, flavonoids, fibers, macronutrients and micronutrients, minerals, etc. that are good for health and essential for keeping good health. This volume provides a global perspective of the current state of food and health research, innovation, and emerging trends. It focuses on topics of food for better health, including functional foods and nutraceutical foods. The book is divided into several sections, covering: • Foods for Human Health Promotion and Prevention of Diseases, which include fruits, vegetables, and grains: their peels and fiber for better human health, health prospects of bioactive peptides derived from seed storage proteins, mushrooms as a novel source of antihyperlipidemic agents, and emerging foodborne illnesses and their prevention. • Specific Fruits, Spices and Dairy-Based Functional Foods for Human Health, which looks at the functional medicinal values of fenugreek, fruits as functional foods, and functional fermented dairy products. • Issues, Challenges, and Specialty Topics in Food Science, which focuses mainly on the stability issues of whole wheat flour, physicochemical properties and quality of food lipids, methods for food analysis and quality control, and interventions of ohmic heating technology in foods. The volume will be of interest to health practitioners, food specialists, nutrition producers and suppliers, practicing food process engineers, food technologists, researchers, food industry professionals, and faculty and upper-level students in food science.

Modeling aspects have added a new dimension in research innovations in all branches of engineering. In the field of soil and water engineering, they are increasingly used for planning, development, and management of land and water resources, including analysis of quantity and quality parameters of surface and ground water, flood forecasting and control measures, optimum allocation and utilization of irrigation water. The application of these models saves considerable time in decision support systems and helps in conservation and optimum allocations of scarce precious natural resources.
Applications of Furrow and Micro Irrigation in Arid and Semi-Arid Regions

Management, Performance, and Applications of Micro Irrigation Systems, the fourth volume in the Research Advances in Sustainable Micro Irrigation series, emphasizes sustainable and meaningful methods of irrigation to counter rampant water scarcity. In many parts of the world, this scarcity significantly affects crop yield, crop quality, and, consequently, food production. This volume focuses on food preservation prior to distribution and sale, which is a major challenge in the tropical climates of most developing nations. In order to assure that food products are safe for human consumption, due importance must be given to the quality and safety aspects of production, processing, and distribution. This volume provides an informative overview of recent research on the therapeutic potential of various new and natural compounds along with novel technologies for enhanced shelf-life longevity and food safety. It also looks at the antimicrobial constituents of different sources and the history of their use as biopreservatives. It includes scientific evaluations of their use as alternative or potential biopreservatives. Focusing on real-life applications in consumer and food products, the book is divided into three parts, covering health and quality aspects of food preservation, applications of novel biomolecules for quality and safety of foods, and novel research techniques in food biopreservation. In this era of climate change and food/water/natural resource crises, it is important that current advancements in technology are made taking into consideration the impact on humanity and the environment. This new volume, Food Technology: Applied Research and Production Techniques, in the Innovations in Agricultural and Biological Engineering book series, looks at recent developments and innovations in food technology and sustainable technologies. Advanced topics in the volume include food processing, preservation, nutritional analysis, quality control and maintenance as well as good manufacturing practices in the food industries. The chapters are highly focused reports to help direct the development of current food- and agriculture-based knowledge into promising technologies. Features: provides information on relevant technology makes suggestions for equipment and devices looks at standardization in food technology explores new and innovative packaging technology studies antimicrobial activities in foods considers active constituents of foods and provides information about isolation, validation and characterization of major bioactive constituents discusses the effect of laws and regulatory guidelines on the infrastructure to transform technology into highly value-added products Food Technology: Applied Research and Production Techniques will be a very useful reference book for food technologists, practicing food engineers, researchers, professors, students of these fields and professionals working in food technology, food science, food processing, and nutrition.

Applications of Furrow and Micro Irrigation in Arid and Semi-Arid Regions, the fifth volume in the Research Advances in Sustainable Micro Irrigation series, addresses the ever-challenging need for irrigation systems in arid and semi-arid regions of the world, areas that are suffering from severe water shortages. These areas, such as Egypt, Tunisia, most of Africa, and parts of South America, Central America, and Australia, find it a struggle to grow crops sustainably with the water available. This important book emphasizes sustainable agriculture practices to promote increased water usage efficiency in dry areas for growing of crops. It presents a variety of research and studies on such topics as: Meteorological instruments for water management Buried micro irrigation laterals for soil water retention Water vapor flux models Performance of various crops grown under different irrigation methods Scheduling of irrigation Phyto-monitoring techniques This valuable book is a must for those finding it a challenge to maintain sustainable crop production in the midst of continuous water shortages in areas where water is not naturally plentiful. With contributions from authors with hands-on experience in the field, the book will be an invaluable reference and guide to effective micro irrigation methods.

Management Strategies for Water Use Efficiency and Micro Irrigated Crops presents new research and technologies for making better use of water resources for agricultural purposes. The chapters focus on better management to improve allocation and irrigation water efficiency and look at performance factors as well. Chapters look at irrigation technology, environmental conditions, and scheduling of water application. One section of the book focuses on water management in the cultivation of sugarcane, a very important industrial crop used in many fields. Other sections are devoted to principles and challenging technologies, water use efficiency for drip-irrigated crops, performance of fertigated rice under micro irrigation, and evaluation of performance of drip-irrigated crops. This valuable book is a must for those struggling to find ways to address the need to maintain efficient crop production in the midst of water shortages. With chapters from hands-on experts in the field, the book will be an invaluable reference and guide to effective micro irrigation methods. This book takes stock of micro irrigation systems (MIS), the technological intervention in India’s agricultural and water management sectors, over the past couple of decades. Based on empirical research from the major agriculturally dynamic states, viz., Gujarat, Rajasthan, Maharashtra, Tamil Nadu, Andhra Pradesh and Karnataka, the book provides a nuanced understanding and objective assessment of the implementation and adoption of MIS across these states. It addresses several of the questions related to adoption and impacts of MIS in India. On the adoption side, the key question that the book addresses is which segment of the farming community adopts MIS across states? The impacts analysed include those on physical, agronomic and economic aspects. At the macro level, the question being asked is about the future potential of MIS in terms of saving water from agriculture and making more water available for environment. The book also addresses the question of the positive/negative externalities and real social costs and benefits of the use of MIS, a major justification for heavy capital subsidies for its purchase by farmers. It also brings out certain critical concerns pertaining to MIS adoption, which need to be addressed through more empirical research based on longitudinal panel/cross sectional data. The book would be of great use to researchers (agricultural water management, irrigation economics), students of water resource engineering, irrigation engineering and water resources management, as well as to policy makers and agricultural water management experts – national and international.