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Strategies

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DIY Hydroponic Gardens takes the mystery out of growing in water. With practical information aimed at home DIYers, author Tyler Baras (Farmer Tyler to his fans) shows exactly how to build, plant, and maintain more than a dozen unique hydroponic systems, some of which cost just a few dollars to make. Growing produce without soil offers a unique opportunity to have a productive garden indoors or in areas where soil is not present. An expert in hydroponics, Baras has developed many unique and easy-to-build systems for growing entirely in water. In DIY

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Hydroponic Gardens, he shows with step-by-step photos precisely how to create these systems and how to plant and maintain them. All the information you need to get started with your home hydroponic system is included, from recipes for nutrient solutions, to light and ventilation sources, to specific plant-by-plant details that explain how to grow the most popular vegetables in a self-contained, soilless system. Even if you live in an area where water is scarce, a hydroponic system is the answer you've been looking for.

Hydroponic systems are sealed and do not allow evaporation, making water loss virtually nonexistent.

Agricultural automation is the emerging technologies which

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heavily rely on computer-integrated management and advanced control systems. The tedious farming tasks had been taken over by agricultural machines in last century, in new millennium, computer-aided systems, automation, and robotics has been applied to precisely manage agricultural production system. With agricultural automation technologies, sustainable agriculture is being developed based on efficient use of land, increased conservation of water, fertilizer and energy resources. The agricultural automation technologies refer to related areas in sensing & perception, reasoning & learning, data communication, and task planning & execution. Since the literature on this diverse subject is

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widely scattered, it is necessary to review current status and capture the future challenges through a comprehensive monograph. In this book we focus on agricultural automation and provide critical reviews of advanced control technologies, their merits and limitations, application areas and research opportunities for further development. This collection thus serves as an authoritative treatise that can help researchers, engineers, educators, and students in the field of sensing, control, and automation technologies for production agriculture. Profitable cold-water fish and vegetable production. Join the aquaponic farming revolution! Built around a proven 120' greenhouse system operable by one person,

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The Aquaponic Farmer is the game changer that distills vast experience and complete step-by-step guidance for starting and running a cold-water aquaponic farming business—raising fish and vegetables together commercially. Coverage includes: A primer on cold-water aquaponics Pros and cons of different systems Complete design and construction of a Deep Water Culture system Recommended and optional equipment and tools System management, standard operating procedures, and maintenance checklists Maximizing fish and veg production Strategies for successful sales and marketing of fish and plants. As the only comprehensive commercial cold-water resource, The Aquaponic

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Farmer is essential for farmers contemplating the aquaponics market, aquaponic gardeners looking to go commercial, and anyone focused on high quality food production. Aquaponic farming is the most promising innovation for a sustainable, profitable, localized food system. Until now, systems have largely focussed on warm-water fish such as tilapia. A lack of reliable information for raising fish and vegetables in the cool climates of North America and Europe has been a major stumbling block. The Aquaponic Farmer is the toolkit you need.

The 2018 edition of The State of World Fisheries and Aquaculture emphasizes the sector's role in achieving the 2030 Agenda for

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Sustainable Development and the Sustainable Development Goals, and measurement of progress towards these goals. It notes the particular contributions of inland and small-scale fisheries, and highlights the importance of rights-based governance for equitable and inclusive development. As in past editions, the publication begins with a global analysis of trends in fisheries and aquaculture production, stocks, processing and use, trade and consumption, based on the latest official statistics, along with a review of the status of the world's fishing fleets and human engagement and governance in the sector. Topics explored in Parts 2 to 4 include aquatic biodiversity; the ecosystem approach to fisheries and to

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aquaculture; climate change impacts and responses; the sector's contribution to food security and human nutrition; and issues related to international trade, consumer protection and sustainable value chains. Global developments in combating illegal, unreported and unregulated fishing, selected ocean pollution concerns and FAO's efforts to improve capture fishery data are also discussed. The issue concludes with the outlook for the sector, including projections to 2030. As always, The State of World Fisheries and Aquaculture aims to provide objective, reliable and up-to-date information to a wide audience, including policy-makers, managers, scientists, stakeholders and indeed all those interested in

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the fisheries and aquaculture sector.

**Occupational Outlook Handbook
Protected agriculture, precision agriculture, and vertical farming: Brief reviews of issues in the literature focusing on the developing region in Asia
IoT-enabled farms and climate-adaptive agriculture technologies: Investment lessons from Singapore
Food Supply Chain Management
Rethinking Food and Agriculture
LED Lighting for Urban Agriculture
Advances in Food Security and Sustainability**

Plant Factory: An Indoor Vertical Farming System for Efficient Quality Food Production provides information on a field that is helping to offset the threats that

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unusual weather and shortages of land and natural resources bring to the food supply. As alternative options are needed to ensure adequate and efficient production of food, this book represents the only available resource to take a practical approach to the planning, design, and implementation of plant factory (PF) practices to yield food crops. The PF systems described in this book are based on a plant production system with artificial (electric) lights and include case studies providing lessons learned and best practices from both industrial and crop specific programs. With

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insights into the economics as well as the science of PF programs, this book is ideal for those in academic as well as industrial settings. Provides full-scope insight on plant farm, from economics and planning to life-cycle assessment Presents state-of-the-art plant farm science, written by global leaders in plant farm advancements Includes case-study examples to provide real-world insights

Plant Factory Basics, Applications, and Advances takes the reader from an overview of the need for and potential of plant factories with artificial lighting (PFALs) in

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enhancing food production and security to the latest advances and benefits of this agriculture environment. Edited by leading experts Toyoki Kozai, Genhua Niu, and Joseph Masabni, this book aims to provide a platform of PFAL technology and science, including ideas on its extensive business and social applications towards the next-generation PFALs. The book is presented in four parts: Introduction, Basics, Applications, and Advanced Research. Part 1 covers why PFALs are necessary for urban areas, how they can contribute to the United Nations' Sustainable Development Goals, and a

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definition of PFAL in relation to the term "indoor vertical farm." Part 2 presents SI units and radiometric, photometric, and photonmetric quantities, types, components, and performance of LED luminaires, hydroponics and aquaponics, and plant responses to the growing environment in PFALs. Part 3 describes the indexes and definition of various productivity aspects of PFAL, provides comparisons of the productivity of the past and the present operation of any given PFALs, and compares PFALs with one another from the productivity standpoint by applying the common indexes.

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Part 4 describes the advances in lighting and their effects on plant growth, breeding of indoor and outdoor crops, production of fruiting vegetables and head vegetables, and concluding with a focus on a human-centered perspective of urban agriculture. Providing real-world insights and experience, Plant Factory Basics, Applications, and Advances is the ideal resource for those seeking to take the next step in understanding and applying PFAL concepts. Provides the most in-depth assessment of PFAL available Compares PFAL to "indoor vertical farming and provides important insights into

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*selecting optimal choice Presents
insights to inspire design and
management of the next
generation of PFALs*

*Each century has its own unique
approach toward addressing the
problem of high density and the
21st century is no exception. As
cities try to cope with rapid
population growth - adding 2.5
billion dwellers by 2050 - and
grapple with destructive sprawl,
politicians, planners and
architects have become
increasingly interested in the
vertical city paradigm.*

*Unfortunately, cities all over the
world are grossly unprepared for
integrating tall buildings, as these*

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buildings may aggravate multidimensional sustainability challenges resulting in a “vertical sprawl” that could have worse consequences than “horizontal” sprawl. By using extensive data and numerous illustrations this book provides a comprehensive guide to the successful and sustainable integration of tall buildings into cities. A new crop of skyscrapers that employ passive design strategies, green technologies, energy-saving systems and innovative renewable energy offers significant architectural improvements. At the urban scale, the book argues that

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planners must integrate tall buildings with efficient mass transit, walkable neighbourhoods, cycling networks, vibrant mixed-use activities, iconic transit stations, attractive plazas, well-landscaped streets, spacious parks and engaging public art. Particularly, it proposes the Tall Building and Transit Oriented Development (TB-TOD) model as one of the sustainable options for large cities going forward. Building on the work of leaders in the fields of ecological and sustainable design, this book will open readers' eyes to a wider range of possibilities for utilizing green, resilient, smart, and

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sustainable features in architecture and urban planning projects. The 20 chapters offer comprehensive reading for all those interested in the planning, design, and construction of sustainable cities.

Advances in Food Security and Sustainability, Volume Five, takes a scientific look at the challenges, constraints and solutions necessary to maintain a healthy and accessible food supply in different communities. This ongoing series addresses a wide range of issues on food sustainability and security, exploring challenges related to protecting environmental

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*resources while also meeting
human nutritional requirements.
Contains expertise from leading
contributors on the topics Covers
a vast array of subjects relating
to food security and sustainability
Explores challenges related to
protecting environmental
resources while also meeting
human nutritional requirements
Plant Factory Basics,
Applications and Advances
A Sustainable Development
Model
Good Agricultural Practices for
Greenhouse Vegetable Crops
The Vertical City
Smart Plant Factory
New Ways Forward*

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*Climate Change, Disaster Risks,
and Human Security*

Plant Factory Using
Artificial Light: Adapting
to Environmental Disruption
and Clues to Agricultural
Innovation features
interdisciplinary scientific
advances as well as cutting-
edge technologies applicable
to plant growth in plant
factories using artificial
light. The book details the
implementation of
photocatalytic methods that
ensure the safe and
sustainable production of
vegetables at low cost and
on a commercial scale,
regardless of adverse
natural or manmade

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influences such as global warming, climate change, pollution, or other potentially damaging circumstances. Plant Factory Using Artificial Light is an essential resource for academic and industry researchers in chemistry, chemical/mechanical/materials engineering, chemistry, agriculture, and life/environmental/food sciences concerned with plant factories. Presents an interdisciplinary approach to advanced plant growth technologies Features methods for reducing electric energy costs in plant factories and increasing LED efficiency

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Considers commercial scale operation

"The vertical farm is a world-changing innovation whose time has come. Dickson Despommier's visionary book provides a blueprint for securing the world's food supply and at the same time solving one of the gravest environmental crises facing us today."--Sting Imagine a world where every town has their own local food source, grown in the safest way possible, where no drop of water or particle of light is wasted, and where a simple elevator ride can transport you to nature's grocery store - imagine the world of the vertical farm.

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When Columbia professor Dickson Despommier set out to solve America's food, water, and energy crises, he didn't just think big - he thought up. Despommier's stroke of genius, the vertical farm, has excited scientists, architects, and politicians around the globe. Now, in this groundbreaking book, Despommier explains how the vertical farm will have an incredible impact on changing the face of this planet for future generations. Despommier takes readers on an incredible journey inside the vertical farm, buildings filled with fruits and

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vegetables that will provide local food sources for entire cities. Vertical farms will allow us to: - Grow food 24 hours a day, 365 days a year - Protect crops from unpredictable and harmful weather - Re-use water collected from the indoor environment - Provide jobs for residents - Eliminate use of pesticides, fertilizers, or herbicides - Drastically reduce dependence on fossil fuels - Prevent crop loss due to shipping or storage - Stop agricultural runoff Vertical farms can be built in abandoned buildings and on deserted lots, transforming our cities into urban

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landscapes which will provide fresh food grown and harvested just around the corner. Possibly the most important aspect of vertical farms is that they can be built by nations with little or no arable land, transforming nations which are currently unable to farm into top food producers. In the tradition of the bestselling *The World Without Us*, *The Vertical Farm* is a completely original landmark work destined to become an instant classic. This fully updated new edition of a respected text retains the original's comprehensive and practical approach to food supply

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chain management, and introduces a global perspective and a wide range of new material. More than ever, this is the food supply chain management textbook. With an introduction that speaks to academic and non-academic audiences alike, the second edition of Food Supply Chain Management covers all-new topics such as cold chain management, "last mile" logistics, blockchain and traceability in the food supply chain, and the implications of global trade and climate change. Case studies examine the farm-to-table movement, sustainable co-ops, and more, with

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“quick facts” and mini-cases that are engaging and thought-provoking. This textbook is appropriate for upper-level undergraduate and postgraduate students of agricultural business, natural resources, and food science, as well as supply chain management students. Supporting online materials include lecture slides, test banks, and instructor manuals.

Farm animals have been disappearing from our fields as the production of food has become a global industry. We no longer know for certain what is entering the food chain and what we are eating - as the UK

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horsemeat scandal

demonstrated. We are reaching a tipping point as the farming revolution threatens our countryside, health and the quality of our food wherever we live in the world. Farmageddon is a fascinating and terrifying investigative journey behind the closed doors of a runaway industry across the world - from the UK, Europe and the USA, to China, Argentina, Peru and Mexico. It is both a wake-up call to change our current food production and eating practices and an attempt to find a way to a better farming future.

How to Design and Build an

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**Inexpensive System for
Growing Plants in Water
Meeting the sustainable
development goals**

**Sustainable Food and
Agriculture**

**Exergetic Aspects of
Renewable Energy Systems**

**Intelligent and Fuzzy
Systems**

**Plant Factory Using
Artificial Light**

**Sensing, Data Managing, and
Control Technologies for
Agricultural Systems**

*Plant Factory: An Indoor
Vertical Farming System
for Efficient Quality Food
Production, Second Edition
presents a comprehensive
look at the implementation*

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of plant factory (PF) practices to yield food crops for both improved food security and environmental sustainability. Edited and authored by leading experts in PF and controlled environment agriculture (CEA), the book is divided into five sections, including an Overview and the Concept of Closed Plant Production Systems (CPPS), the Basics of Physics and Physiology - Environments and Their Effects, System Design, Construction, Cultivation and Management and Plant

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Factories in Operation. In addition to new coverage on the rapid advancement of LED technology and its application in indoor vertical farming, other revisions to the new edition include updated information on the status of business R&D and selected commercial PFALs (plant factory with artificial lighting). Additional updates include those focused on micro and mini-PFALs for improving the quality of life in urban areas, the physics and physiology of light, the impact of PFAL on the

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medicinal components of plants, and the system design, construction, cultivation and management issues related to transplant production within closed systems, photoautotrophic micro-propagation and education, training and intensive business forums on PFs. Includes coverage of LED technology Presents case-studies for real-world insights and application Addresses PF from economics and planning, to operation and lifecycle assessment This publication

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capitalizes on the experience of scientists from the North Africa and Near East countries, in collaboration with experts from around the world, specialized in the different aspects of greenhouse crop production. It provides a comprehensive description and assessment of the greenhouse production practices in use in Mediterranean climate areas that have helped diversify vegetable production and increase productivity. The publication is also meant

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to be used as a reference and tool for trainers and growers as well as other actors in the greenhouse vegetables value chain in this region.

Aquaponics is the integration of aquaculture and soilless culture in a closed production system. This manual details aquaponics for small-scale production--predominantly for home use. It is divided into nine chapters and seven annexes, with each chapter dedicated to an individual module of aquaponics. The target audience for this manual

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is agriculture extension agents, regional fisheries officers, non-governmental organizations, community organizers, government ministers, companies and singles worldwide. The intention is to bring a general understanding of aquaponics to people who previously may have only known about one aspect. Biocontrol Systems and Plant Physiology in Modern Agriculture: Processes, Strategies, Innovations focuses on new production alternatives that do not include pesticides, herbicides, or chemicals

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for primary food production and instead rely on biologically controlled systems of production. The book also relates a number of advances and innovations in the use of agricultural technologies that employ the study of the physiology of plants to know their resistance to different environments in modern agriculture. The book presents research offering viable alternatives for the control of pests for safe food production that are environmentally friendly

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and that facilitate the reduction of production costs and improve the quality and yield of produce. The volume addresses innovative biocontrol systems to reduce or eliminate the use of agrochemicals by controlling plant diseases by minimizing environmental damage through the use of antagonistic organisms. It also presents new strategies of cultivation that maximize production by optimizing light, temperature, humidity, nutrients and humidity in

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a controlled environment. The diverse topics in the volume include botanical compounds as adjuvants as an alternative to reduce the pesticide use, on-site production of bio-control agents, plant factory systems that offer controlled safe environments for plant cultivation, promising bio-nematicides for sustainable agriculture, wastewater reclamation for agricultural purposes, the recovery of phytochemicals from plants, using LED lights on plants and microgreens production,

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and much more. Covering the new trends in biological control, plant factories, and plant metabolism for application in modern agriculture, this volume provides important research and knowledge that facilitates environmentally friendly plant systems, advances the reduction of production costs, and improves the quality and yield of produce.

*Principles for
Mediterranean Climate
Areas*

*Light Management in
Controlled Environments*

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*Asian Experience and
Perspectives*

Farmageddon

Necessity of the Future

What We'll Eat in a

*Bigger, Hotter, Smarter
World*

Hydroponic Food Production

*Much has changed and improved
in lighting technology over the*

*past 10 years since industry-
leading experts on lighting, in*

collaboration with Greenhouse

Grower(r) magazine and Meister

Media Worldwide, brought you

*Lighting Up Profits (Fisher and
Runkle, 2004). This updated and*

substantially expanded book

*presents the underlying biology of
how light influences plant growth*

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and development of specialty crops, especially those grown in greenhouses and controlled-environment growth rooms.

Authors Dr. Erik Runkle of Michigan State University and Dr. Roberto Lopez of Michigan State University, along with 19 other leading plant scientists from around the globe, discuss technology options for shade and lighting, including the latest developments in greenhouse and sole-source lighting.

This book explores how climate change and disaster risks threaten human security in Asia. Climate change and disaster risks have emerged as major human security challenges in the twenty-first

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century, and are an imminent “threat multiplier” with the potential to harm the vital core of human life and curtail people’s freedom and ability to live with dignity. Climate change and disaster risks undermine the security of individuals, communities, nations, and the world, considering the increasing trend in the frequency and magnitude of hydro-meteorological disasters and the projections on their future adverse impacts. Despite recent advances in the literature, there is still a major gap in understanding the relationship and linkages between climate change, disaster risks, and human security,

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particularly as gleaned from the Asian experience. Asia is the world's most vulnerable region in terms of the quantity and magnitude of impacts from various forms of disaster. At the same time, it has developed a number of innovative responses to address those risks, offering a wealth of experience. Exploring and capitalizing on the Asian perspective, this book provides valuable resource material for students, academics, researchers, policymakers, and development practitioners working in these areas.

This book describes the concept, characteristics, methodology, design, management, business,

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recent advances and future technologies of plant factories with artificial lighting (PFAL) and indoor vertical farms. The third wave of PFAL business started in around 2010 in Japan and Taiwan, and in USA and Europe it began in about 2013 after the rapid advances in LED technology. The book discusses the basic and advanced developments in recent PFALs and future smart PFALs that emerged in 2016. There is an emerging interest around the globe in smart PFAL R&D and business, which are expected to play an important role in urban agriculture in the coming decades. It is also expected that they will contribute to solving the

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trilemma of food, environment and natural resources with increasing urban populations and decreasing agricultural populations and arable land area. Current obstacles to successful PFAL R&D and business are: 1) no well-accepted concepts and methodology for PFAL design and management, 2) lack of understanding of the environmental effects on plant growth and development and hydroponics among engineers; 3) lack of understanding of the technical and engineering aspects of PFAL among horticulturists; 4) lack of knowledge of the technical challenges and opportunities in future PFAL businesses among

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business professionals, policy makers, and investors and 5) lack of a suitable textbook on the recent advances in PFAL technologies and business for graduate students and young researchers. This book covers all the aspects of successful smart PFAL R & D and business.

Energy is essential to all human activities as well as critical to social and economic development. Sustainable energy planning encompassing the concept of smart cities has a high potential to significantly contribute to climate change mitigation. For improved energy efficiency, it is essential to find low carbon solutions for the urban environment. The

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integration and management of energy supply with predominant exploitation of local resources is examined through the fundamental concept of exergy. This book can assist in decision making, with regard to sustainable energy design both at a national and local level.

Feeding the World in the 21st Century

Plant Factory

How to Combine Business with Environmental Awareness

Advances in Solid Oxide Fuel Cells X

The Urban Farmer

The Vertical Farm

Scaling up inclusive innovations in agrifood chains in Asia and the

Aeroponics: Growing Vertical covers aspects of the emerging technology, aeroponics, which is a sister to hydroponics, involving state-of-the-art controlled environment agriculture. The book begins with an introduction of aeroponics followed by a summary of peer-reviewed technical literature conducted over 50 years involving various aspects of aeroponics. It covers the science and all the patent literature since 2001 to give the reader a comprehensive view of the

***innovations related to
aeroponics. This book is a
useful reference for people
interested in learning about
how aeroponics works. This
book is for novices as well
as scientists interested in
research activities
conducted in countries
around the world as well as
work in using aeroponics in
outer space. Designed for
the user interested in
research conducted in the
past, this a helpful resource
for those in the next
generation of profitable
agricultural endeavors.
Features: • Comprehensive***

resource presenting key aspects of aeroponics · Focus on areas of aeroponics including its history, science, innovations, business, and practice · Provides a complete overview of the intellectual property associated with aeroponics · Presents a broad overview of research using aeroponic systems across the globe · Features information on key start-up businesses and activities that drive this technology Thomas Gurley earned a BA in chemistry from Houghton College and

a PhD in analytical chemistry from Case Western Reserve University and has 40 years industrial chemistry experience with companies including Goodyear, Abbott Labs, and his consulting company, Manning Wood LLC. He holds two Fulbright scholarships to Ukraine and Uganda. He is currently R&D Director for Aero Development Corporation, a manufacturer of aeroponic commercial growing systems. He conducts research in aeroponics as an adjunct professor at Charleston

Southern University in South Carolina.

How we produce and consume food has a bigger impact on Americans' well-being than any other human activity. The food industry is the largest sector of our economy; food touches everything from our health to the environment, climate change, economic inequality, and the federal budget. From the earliest developments of agriculture, a major goal has been to attain sufficient foods that provide the energy and the nutrients needed for a

healthy, active life. Over time, food production, processing, marketing, and consumption have evolved and become highly complex. The challenges of improving the food system in the 21st century will require systemic approaches that take full account of social, economic, ecological, and evolutionary factors. Policy or business interventions involving a segment of the food system often have consequences beyond the original issue the intervention was meant to address. A Framework for Assessing Effects of the

Food System develops an analytical framework for assessing effects associated with the ways in which food is grown, processed, distributed, marketed, retailed, and consumed in the United States. The framework will allow users to recognize effects across the full food system, consider all domains and dimensions of effects, account for systems dynamics and complexities, and choose appropriate methods for analysis. This report provides example applications of the

framework based on complex questions that are currently under debate: consumption of a healthy and safe diet, food security, animal welfare, and preserving the environment and its resources. A Framework for Assessing Effects of the Food System describes the U.S. food system and provides a brief history of its evolution into the current system. This report identifies some of the real and potential implications of the current system in terms of its health, environmental, and

socioeconomic effects along with a sense for the complexities of the system, potential metrics, and some of the data needs that are required to assess the effects. The overview of the food system and the framework described in this report will be an essential resource for decision makers, researchers, and others to examine the possible impacts of alternative policies or agricultural or food processing practices. Sustainable Food and Agriculture: An Integrated

Approach is the first book to look at the imminent threats to sustainable food security through a cross-sectoral lens. As the world faces food supply challenges posed by the declining growth rate of agricultural productivity, accelerated deterioration of quantity and quality of natural resources that underpin agricultural production, climate change, and hunger, poverty and malnutrition, a multi-faced understanding is key to identifying practical solutions. This book gives stakeholders a common

vision, concept and methods that are based on proven and widely agreed strategies for continuous improvement in sustainability at different scales. While information on policies and technologies that would enhance productivity and sustainability of individual agricultural sectors is available to some extent, literature is practically devoid of information and experiences for countries and communities considering a comprehensive approach

(cross-sectoral policies, strategies and technologies) to SFA. This book is the first effort to fill this gap, providing information on proven options for enhancing productivity, profitability, equity and environmental sustainability of individual sectors and, in addition, how to identify opportunities and actions for exploiting cross-sectoral synergies. Provides proven options of integrated technologies and policies, helping new programs identify appropriate existing programs Presents

***mechanisms/tools for
balancing trade-offs and
proposes indicators to
facilitate decision-making
and progress measurement
Positions a comprehensive
and informed review of
issues in one place for
effective education,
comparison and evaluation
Bringing The Farm To Live In
Another World summary:
Bringing the Farm to Live in
Another World is composed
of a series of chapters
where a man awakens in an
unfamiliar place. He quickly
notices that his life is not as
it should be, and his main***

mission is to change the behavior and try to rebuild broken things. However, his body does not function normally, so he encounters different problems on his way. That can be truly challenging but very rewarding at the same time because he has a chance to fulfill life while discovering the real purpose of existence. At first, the man starts re-developing his family, and he also personally grows together with that effort. That's a very good chance for the entire place where he found

himself at the beginning of the book. The family has better chances to make something valuable and significant on the land, while the single man is quite limited in different aspects of life. His mission slowly becomes an epic journey and a very interesting story. The new place, however, seems strange to him so he struggles a lot to adapt to the new environment. To overcome various problems with his body, he is taking different types of drugs on a regular basis. The drugs provide some benefits

because he can operate with his body better while on the treatment. However, such medication also has negative sides, so the situation is not ideal at all. The man still has one supernatural power despite all the problems he faces in the new places. He is capable to enter another world, which is, in fact, a farming simulation game. It does not seem useful at first. However, he can find normal food in that strange world. And it can be used elsewhere, even in the regular world. That still does

not seem like a big deal, but he is stuck in an unfamiliar place, and the food is of precious value to him. He can survive without problems thanks to that supernatural ability because he always has enough food to eat well. That's why this cheat is so valuable to him. He also finds out about other happenings in strange places. There are other inhabitants near him, and their communities are full of different intrigues, businesses, fights, farming and other events. The man has the possibility to slowly

discovers the new places, but various problems are inevitable in his case. He will also have a chance to get involved in those happenings of other inhabitants, and you can find out many other details if you decide to read this novel. Like many other online books on this website, Bringing the Farm to Live in Another World is constantly growing and the updates arrive almost on a daily basis. So there is always something new even for the most faithful readers. So if you are a fan

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***of such mixed genres, you
should not miss the
opportunity to read this
great book
Encyclopedia of Food and
Agricultural Ethics
Instant Insights: Vertical
Farming in Horticulture***

***Growing Food for Profit on
Leased and Borrowed Land
Vertical Farming***

The Aquaponic Farmer

The Fate of Food

***As the world realises
the benefits of
education, more and more
people move to cities;
in search of a better***

future. A future which includes affordable housing, health-care, quality education and inexpensive food.

However, while the other options are possible, the pressing question here is: if so many people relocate to the cities, who will work on the farms

then?Historically, the farms; built in rural areas, have provided the city-dwellers with cheap food. However, times are changing now. Modern agriculturists believe

that cities too can produce ample amounts of food. In this gripping book, we introduce you to modern agricultural technology, "Vertical Farms." A state-of-the-art farm, built inside a skyscraper, which grows enough fruits and vegetables to feed the entire town. This book leads you on an adventure inside a vertical farm; explaining how they can be built inside an abandoned building, and produce enough fresh

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fruits and vegetables to feed every person in the city. In fact, not just the city dwellers, but vertical farms can actually feed the astronauts who live on the International Space Station, with produce grown on-site. Small countries like Singapore are already taking advantage of vertical farming. With little land, water and sunlight, they have managed to produce tons of food for its fast growing population. If

the Singaporeans can do it, anyone can do it. This book provides an integrated approach to crop growth and development and the technical aspects of greenhouse cultivation and climate management. It combines an analysis of the relationship between crop production and ambient climate with an explanation of the processes that determine the climate in a protected environment. With the ability to modify the environment

comes the need for growers to strike a balance between the costs and benefits of technology. This book outlines the methods and gives several examples of how to make 'optimal' choices about technology. Sustainable management of shoot and root environment is discussed, as well as the pros and cons of vertical farming. The processes addressed in this book, like crop growth, energy balance and mass exchange, apply

to any kind of greenhouse. Therefore, in spite of the word 'technology', this is not a book about high-tech greenhouses only. 'Greenhouse horticulture' is an easy-to-read textbook for all those interested in protected cultivation, from university students and teachers to professional advisers in the field and managers of horticultural companies. In this fascinating look at the race to secure

the global food supply, environmental journalist and professor Amanda Little tells the defining story of the sustainable food revolution as she weaves together stories from the world's most creative and controversial innovators on the front lines of food science, agriculture, and climate change. Climate models show that global crop production will decline every decade for the rest of this century due

to drought, heat, and flooding. Water supplies are in jeopardy.

Meanwhile, the world's population is expected to grow another 30 percent by midcentury. So how, really, will we feed nine billion people sustainably in the coming decades? Amanda Little, a professor at Vanderbilt University and an award-winning journalist, spent three years traveling through a dozen countries and as many U.S. states in search of answers to

this question. Her journey took her from an apple orchard in Wisconsin to a remote control organic farm in Shanghai, from Norwegian fish farms to famine-stricken regions of Ethiopia. The raise to reinvent the global food system is on, and the challenge is twofold: We must solve the existing problems of industrial agriculture while also preparing for the pressures ahead. Through her interviews and adventures with farmers,

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***scientists, activists,
and engineers, Little
tells the fascinating
story of human
innovation and explores
new and old approaches
to food production while
charting the growth of a
movement that could
redefine sustainable
food on a grand scale.
She meets small
permaculture farmers and
"Big Food" executives,
botanists studying
ancient superfoods and
Kenyan farmers growing
the country's first GMO
corn. She travels to***

places that might seem irrelevant to the future of food yet surprisingly play a critical role--a California sewage plant, a U.S. Army research lab, even the inside of a monsoon cloud above Mumbai. Little asks tough questions: Can GMOs actually be good for the environment--and for us? Are we facing the end of animal meat? What will it take to eliminate harmful chemicals from farming? How can a clean, climate-resilient food supply

become accessible to all? Throughout her journey, Little finds and shares a deeper understanding of the threats of climate change and encounters a sense of awe and optimism about the lessons of our past and the scope of human ingenuity.

Urban horticulture is a means of utilizing every little space available in cities amidst buildings and other constructions for growing plants. It

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utilizes this space to raise gardens that can be economically productive while contributing to environmental greening. It can boost food and ornamental plants production, provide job opportunities, promote green space development, waste recycling, and urban landscaping, and result in improved environment. This book covers a wide array of topics on this subject and constitutes a valuable reference guide

***for students,
professors, researchers,
builders, and
horticulturists
concerned with urban
horticulture, city
planning, biodiversity,
and the sustainable
development of
horticultural resources.
Digital Acceleration and
The New Normal -
Proceedings of the INFUS
2022 Conference, Volume
1
A Complete Guide to
Building and Operating a
Commercial Aquaponic
System***

**Aeroponics: Growing
Vertical
2018 The State of World
Fisheries and
Aquaculture
Urban Horticulture
Greenhouse Horticulture
The True Cost of Cheap
Meat**

The frontiers of technologies have been constantly expanded in many industries around the world, including the agricultural sector. Among many “frontier technologies” in agriculture, are protected agriculture,

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precision agriculture, and vertical farming, all of which depart substantially from many conventional agricultural production methods. It is not yet clear how these technologies can become adoptable in developing countries, including, for example, South Asian countries like India. This paper briefly reviews the issues associated with these three types of frontier technologies. We do so by systematically

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checking the academic articles listed in Google Scholar, which primarily focus on these technologies in developing countries in Asia. Where appropriate, a few widely-cited overview articles for each technology were also reviewed. The findings generally reveal where performances of these technologies can be raised potentially, based on the general trends in the literature. Where

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evidence is rich, some generalizable economic insights about these technologies are provided. For protected agriculture, recent research has focused significantly on various features of protective structures (tunnel heights, covering materials, shading structures, frames and sizes) indicating that there are potentials for adaptive research on such structures to raise the productivity of

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*protected agriculture.
The research on
protected agriculture
also focuses on types of
climate parameters
controlled, and energy
structures, among
others. For precision
agriculture, recent
research has focused on
the spatial variability
of production
environments,
development of efficient
and suitable data
management systems,
efficiency of various
types of image analyses
and optical sensing,*

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efficiency of sensors and related technologies, designs of precision agriculture equipment, optimal inputs and service uses, and their spatial allocations, potentials of unmanned aerial vehicles (UAVs) and nanotechnologies. For vertical farming, research has often highlighted the variations in technologies based on out-door / indoor systems, ways to improve plants' access to light

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(natural or artificial), growing medium and nutrient / water supply, advanced features like electricity generation and integration of production space into an office / residential space, and water treatment. For India, issues listed above may be some of the key areas that the country can draw on from other more advanced countries in Asia, or can focus in its adaptive research to improve the relevance and applicability of

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these technologies to the country.

There are twenty million acres of lawns in North America. In their current form, these unproductive expanses of grass represent a significant financial and environmental cost. However, viewed through a different lens, they can also be seen as a tremendous source of opportunity. Access to land is a major barrier for many people who want to enter the agricultural sector, and

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urban and suburban yards have huge potential for would-be farmers wanting to become part of this growing movement. The *Urban Farmer* is a comprehensive, hands-on, practical manual to help you learn the techniques and business strategies you need to make a good living growing high-yield, high-value crops right in your own backyard (or someone else's). Major benefits include: Low capital investment and overhead costs Reduced need for

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*expensive infrastructure
Easy access to markets
Growing food in the city
means that fresh crops
may travel only a few
blocks from field to
table, making this
innovative approach the
next logical step in the
local food movement.
Based on a scalable,
easily reproduced
business model, The
Urban Farmer is your
complete guide to
minimizing risk and
maximizing profit by
using intensive
production in small*

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leased or borrowed spaces. Curtis Stone is the owner/operator of Green City Acres, a commercial urban farm growing vegetables for farmers markets, restaurants, and retail outlets. During his slower months, Curtis works as a public speaker, teacher, and consultant, sharing his story to inspire a new generation of farmers. This specially curated collection features five reviews of current and key research on vertical

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farming in horticulture. The first chapter describes and evaluates technologies and methods for growing edible plants indoors and presents a survey of selected commercial vertical farms currently operating that employ them. The second chapter explores the benefits of plant factories with artificial lighting (PFALs). The chapter assesses resource consumption, costs and performance of current PFALs, as well as

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methods for reducing resource consumption and production costs. The third chapter explores recent advances in the ornamentals industry, such as vertical propagation systems and LED technology, and how these can be implemented to meet the challenges of a changing marketplace and societal demands. The fourth chapter describes the advantages and disadvantages of hydroponics, along with the equipment and

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substrates used, and also examines soilless/hydroponic growing systems for vegetables. The final chapter describes the most recent innovation in hydroponic technologies for plant cultivation within cities and their adaptability to the urban fabric. This book presents recent research in intelligent and fuzzy techniques on digital transformation and the new normal, the state to

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which economies, societies, etc. settle following a crisis bringing us to a new environment. Digital transformation and the new normal-appearing in many areas such as digital economy, digital finance, digital government, digital health, and digital education are the main scope of this book. The readers can benefit from this book for preparing for a digital “new normal” and maintaining a leadership position

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among competitors in both manufacturing and service companies.

Digitizing an industrial company is a challenging process, which involves rethinking established structures, processes, and steering mechanisms presented in this book.

The intended readers are intelligent and fuzzy systems researchers, lecturers, M.Sc., and Ph.D. students studying digital transformation and new normal. The book covers fuzzy logic theory and applications,

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*heuristics, and
metaheuristics from
optimization to machine
learning, from quality
management to risk
management, making the
book an excellent source
for researchers.*

*Bringing the Farm to
Live in Another World
A Definitive Guidebook
of Soilless Food Growing
Methods for the
Professional and
Commercial Grower and
the Advanced Home
Hydroponics Gardener
DIY Hydroponic Gardens
A Framework for*

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*Assessing Effects of the
Food System*

*Biocontrol Systems and
Plant Physiology in
Modern Agriculture*

*Building a Sustainable
Future*

*Adapting to
Environmental Disruption
and Clues to*

Agricultural Innovation

This Encyclopedia offers a definitive source on issues pertaining to the full range of topics in the important new area of food and agricultural ethics. It includes summaries of historical approaches, current scholarship, social movements, and new trends

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from the standpoint of the ethical notions that have shaped them. It combines detailed analyses of specific topics such as the role of antibiotics in animal production, the Green Revolution, and alternative methods of organic farming, with longer entries that summarize general areas of scholarship and explore ways that they are related. Renewed debate, discussion and inquiry into food and agricultural topics have become a hallmark of the turn toward more sustainable policies and lifestyles in the 21st century. Attention has turned to the goals and ethical rationale behind production, distribution and consumption of food, as well as to

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non-food uses of cultivated biomass and the products of animal husbandry. These wide-ranging debates encompass questions in human nutrition, animal rights and the environmental impacts of aquaculture and agricultural production. Each of these and related topics is both technically complex and involves an – often implicit – ethical dimension. Other topics include methods for integrating ethics into scientific and technical research programs or development projects, the role of intensive agriculture and biotechnology in addressing persistent world hunger and the role of crops, forests and

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engineered organisms in making a transition to renewable, carbon-neutral sources of energy. The Encyclopedia of Food and Agricultural Ethics proves an indispensable reference point for future research and writing on topics in agriculture and food ethics for decades to come.

The publication looks at innovations happening at all stages of the food value chain: from production to manufacturing and retailing. This also includes the extended value chain, for example input supply, financial services and agribusiness support services. Yields are improving and primary production is becoming more resilient as a result of digital

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technologies such as precision agriculture, agricultural drones, and digital farming services and marketplaces; and novel business models such as plant factories, crowdsourcing for farmers. Data and robotics help lift productivity and food safety in the manufacturing process. Online grocery commerce and food delivery services are revolutionizing the way consumers purchase food. Distributed ledger technology, such as blockchain, allows making payments and tracing back food products along the chain in order to increase transparency and trust. New business models are springing up to shorten the chain by removing

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or shifting stages and to make it fairer and greener, stimulated by enabling technologies and changing customer behaviours. Innovations such as these are discussed and illustrated by almost 200 practical examples from 21 countries in the Asia-Pacific region, across various types of firms and commodities. By observing emerging trends and providing concrete examples, the book discusses the nature of these innovations, how they are affecting food systems and value chains, positively or negatively, and how to deal with trade-offs. It concludes with a reflection on the impacts of these innovations, the policy solutions identified, and

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lessons learned to future-proof the region's food systems, particularly in the wake of the COVID-19 pandemic.

Given the central role of the food and agriculture system in driving so many of the connected ecological, social and economic threats and challenges we currently face, *Rethinking Food and Agriculture* reviews, reassesses and reimagines the current food and agriculture system and the narrow paradigm in which it operates. *Rethinking Food and Agriculture* explores and uncovers some of the key historical, ethical, economic, social, cultural, political, and structural drivers and root causes

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of unsustainability, degradation of the agricultural environment, destruction of nature, shortcomings in science and knowledge systems, inequality, hunger and food insecurity, and disharmony. It reviews efforts towards 'sustainable development', and reassesses whether these efforts have been implemented with adequate responsibility, acceptable societal and environmental costs and optimal engagement to secure sustainability, equity and justice. The book highlights the many ways that farmers and their communities, civil society groups, social movements, development experts, scientists and others have

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been raising awareness of these issues, implementing solutions and forging 'new ways forward', for example towards paradigms of agriculture, natural resource management and human nutrition which are more sustainable and just. Rethinking Food and Agriculture proposes ways to move beyond the current limited view of agro-ecological sustainability towards overall sustainability of the food and agriculture system based on the principle of 'inclusive responsibility'. Inclusive responsibility encourages ecosystem sustainability based on agro-ecological and planetary limits to sustainable resource use

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for production and livelihoods. Inclusive responsibility also places importance on quality of life, pluralism, equity and justice for all and emphasises the health, well-being, sovereignty, dignity and rights of producers, consumers and other stakeholders, as well as of nonhuman animals and the natural world. Explores some of the key drivers and root causes of unsustainability , degradation of the agricultural environment and destruction of nature Highlights the many ways that different stakeholders have been forging 'new ways forward' towards alternative paradigms of agriculture, human nutrition and political economy, which are more

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sustainable and just Proposes ways to move beyond the current unsustainable exploitation of natural resources towards agroecological sustainability and overall sustainability of the food and agriculture system based on 'inclusive responsibility'

This book focuses on light-emitting diode (LED) lighting, mainly for the commercial production of horticultural crops in plant factories and greenhouses with controlled environments, giving special attention to: 1) plant growth and development as affected by the light environment; and 2) business and technological opportunities and challenges with regard to LEDs. The book contains

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more than 30 chapters grouped into seven parts: 1) overview of controlled-environment agriculture and its significance; 2) the effects of ambient light on plant growth and development; 3) optical and physiological characteristics of plant leaves and canopies; 4) greenhouse crop production with supplemental LED lighting; 5) effects of light quality on plant physiology and morphology; 6) current status of commercial plant factories under LED lighting; and 7) basics of LEDs and LED lighting for plant cultivation. LED lighting for urban agriculture in the forthcoming decades will not be just an advanced form of current urban agriculture. It will be largely

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based on two fields: One is a new paradigm and rapidly advancing concepts, global technologies for LEDs, information and communication technology, renewable energy, and related expertise and their methodologies; the other is basic science and technology that should not change for the next several decades. Consideration should be given now to future urban agriculture based on those two fields. The tremendous potentials of LED lighting for urban agriculture are stimulating many people in various fields including researchers, businesspeople, policy makers, educators, students, community developers, architects, designers,

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and entrepreneurs. Readers of this book will understand the principle, concept, design, operation, social roles, pros and cons, costs and benefits of LED lighting for urban agriculture, and its possibilities and challenges for solving local as well as global agricultural, environmental, and social issues.

An Integrated Approach

The Next Generation Indoor

Vertical Farms

Processes, Strategies, Innovations

Small-Scale Aquaponic Food

Production

Technology for Optimal Crop

Production

An Indoor Vertical Farming System

for Efficient Quality Food

Production

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Insights to Transportation and
Energy Sector for Intelligent
Communities

The adoption of climate-adaptive agricultural technologies (CAATs) for extensive (outdoor) agriculture is stalled by funding gaps experienced by governments in the Mekong countries, with negative implications on the rural farming industry, on income and job security among smallholder farmers, and on food sufficiency and access across the population. We argue that one way of helping bridge these gaps is for providers and users of CAATs for extensive agriculture

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to learn from the practices of those in CAATs for intensive (indoor) agriculture. Indoor CAATs are already receiving significant private-sector investment, a key reason being their ability to leverage the complementary nature of these technologies within farms that are integrated and enabled to use the so-called Internet of things (IoT). Seamlessly linking different CAATs (sensors, crop analytics, and automation) can allow for synergies that significantly boost crop yields and, in turn, the viability of investing in CAATs. We demonstrate these synergies

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through two case studies, one that looks at the increasing global investment in indoor CAATs and another that describes a financial viability assessment for an indoor farm in Singapore. We conclude with lessons on how these insights can be transferred to the Mekong countries, including a prototype IoT-enabled extensive farm that integrates multiple CAATs, and an investment assessment tool for translating the yield benefits into terms that investors can appreciate.

This issue contains 13 papers from The American Ceramic Society 's 38th

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Strategies

International Conference on
Advanced Ceramics and
Composites, held in Daytona
Beach, Florida, January 26-31,
2014 presented in Symposium 3 -
12th International Symposium on
Solid Oxide Fuel Cells: Materials,
Science, and Technology.

Plant Factory An Indoor Vertical
Farming System for Efficient
Quality Food
Production Academic Press