

## The Vertical Farm Feeding World In 21st Century Dickson D Despommier

“An urgent and at times terrifying dispatch from a distinguished reporter who has given heart and soul to his subject.”—Hampton Sides In *The End of Plenty*, award-winning environmental journalist Joel K. Bourne Jr. puts our fight against devastating world hunger in dramatic perspective. He travels the globe to introduce a new generation of farmers and scientists on the front lines of the next green revolution. He visits corporate farmers trying to restore Ukraine as Europe's breadbasket, a Canadian aquaculturist, the agronomist behind the world's largest organic sugarcane plantation, and many other extraordinary farmers, large and small, who are racing to stave off catastrophe as climate change disrupts food production worldwide. A *Financial Times* Best Book of the Year and a Finalist for the PEN / E. O. Wilson Literary Science Writing Award.

This specially curated collection features five reviews of current and key research on vertical 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 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 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.

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 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 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 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.

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, 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 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 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 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, 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 nano-technologies. For vertical farming, research has often highlighted the variations in technologies based on out-door / indoor systems, ways to improve plants' access to light (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 these technologies to the country.

The Aeroponic Tower described is user-friendly, but the most important, "because you start with germination and you'll not need to touch the plant again until harvest." It is also very important to note that, as "each section has its own water, and drainage in the tower, you can control the humidity, temperature and nutrient." The tower uses 97% of all the water and nutrient and just 3% is evaporated. Because it is a closed system, it reduces the risk of disease. Also, as a result of the water temperature being regulated, the towers, which act as radiators, and the temperature is about 10 degrees different than inside, which is the growing conditions.

We can create more nourishment in a little space with less assets, handling area and water asset shortage, environmental change and contamination. One source reports that yields could be multiple times higher than that developed ashore utilizing one tenth of the water. It could likewise empower nations with practically no arable land to develop crops. In short vertical or indoor homesteads can enable us to: -Grow nourishment throughout the day, consistently-Protect crops from capricious and unsafe climate occasions-Re-use water gathered from the indoor

condition-Eliminate the requirement for pesticides, composts, or herbicides-Reduce our reliance on petroleum derivatives-Prevent crop misfortune because of transportation or capacity-Stop farming overflow

This volume reviews research on building urban and peri-urban agricultural networks, the use of technologies such as rooftop and vertical farming systems, as well as providing case studies of particular products from urban farming.

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 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.

A global movement to take back our food is growing. The future of farming is in our hands—and in our cities. This book examines alternative food systems in cities around the globe that are shortening their food chains, growing food within their city limits, and taking their "food security" into their own hands. The author, an award-winning food journalist, sought out leaders in the urban-agriculture movement and visited cities successfully dealing with "food deserts." What she found was not just a niche concern of activists but a global movement that cuts across the private and public spheres, economic classes, and cultures. She describes a global movement happening from London and Paris to Vancouver and New York to establish alternatives to the monolithic globally integrated supermarket model. A cadre of forward-looking, innovative people has created growing spaces in cities: on rooftops, backyards, vacant lots, along roadways, and even in "vertical farms." Whether it's a community public orchard supplying the needs of local residents or an urban farm that has reclaimed a derelict inner city lot to grow and sell premium market veggies to restaurant chefs, the urban food revolution is clearly underway and working. This book is an exciting, fascinating chronicle of a game-changing movement, a rebellion against the industrial food behemoth, and a reclaiming of communities to grow, distribute, and eat locally.

In *Cows Save the Planet*, journalist Judith D. Schwartz looks at soil as a crucible for our many overlapping environmental, economic, and social crises. Schwartz reveals that for many of these problems—climate change, desertification, biodiversity loss, droughts, floods, wildfires, rural poverty, malnutrition, and obesity—there are positive, alternative scenarios to the degradation and devastation we face. In each case, our ability to turn these crises into opportunities depends on how we treat the soil. Drawing on the work of thinkers and doers, renegade scientists and institutional whistleblowers from around the world, Schwartz challenges much of the conventional thinking about global warming and other problems. For example, land can suffer from undergrazing as well as overgrazing, since certain landscapes, such as grasslands, require the disturbance from livestock to thrive. Regarding climate, when we focus on carbon dioxide, we neglect the central role of water in soil—"green water"—in temperature regulation. And much of the carbon dioxide that burdens the atmosphere is not the result of fuel emissions, but from agriculture; returning carbon to the soil not only reduces carbon dioxide levels but also enhances soil fertility. *Cows Save the Planet* is at once a primer on soil's pivotal role in our ecology and economy, a call to action, and an antidote to the despair that environmental news so often leaves us with.

By the year 2050, Earth's population will double. If we continue with current farming practices, vast amounts of wilderness will be lost, millions of birds and billions of insects will die, and the public will lose billions of dollars as a consequence of environmental degradation. Clearly, there must be a better way to meet the need for increased food production. Written as part memoir, part instruction, and part contemplation, *Tomorrow's Table* argues that a judicious blend of two important strands of agriculture--genetic engineering and organic farming--is key to helping feed the world's growing population in an ecologically balanced manner. Pamela Ronald, a geneticist, and her husband, Raoul Adamchak, an organic farmer, take the reader inside their lives for roughly a year, allowing us to look over their shoulders so that we can see what geneticists and organic farmers actually do. The reader sees the problems that farmers face, trying to provide larger yields without resorting to expensive or environmentally hazardous chemicals, a problem that will loom larger and larger as the century progresses. They learn how organic farmers and geneticists address these problems. This book is for consumers, farmers, and policy decision makers who want to make food choices and policy that will support ecologically responsible farming practices. It is also for anyone who wants accurate information about organic farming, genetic engineering, and their potential impacts on human health and the environment.

"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. 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 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 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. With a Foreword by Majora Carter

In Tom Clancy's *Op-Center: God of War*, after the devastating outbreak of a killer super virus, the Black Wasp Team must prevent America's enemies from gaining access to the most dangerous weapon the world has ever seen. The passengers and crew on an Airbus en route to Australia suddenly begin coughing up blood and hemorrhaging violently as the plane plunges to the ground. There are no survivors. A luxury yacht in the South Indian Sea blows up, and a lone woman escapes the contagion that has inexplicably killed everyone else on the boat. A helicopter whose occupants have been stricken by an unknown illness crashes into a bridge in South Africa, killing motorists and pedestrians. The world is facing a devastating bio-terror event, and a game of brinkmanship gets underway as the major powers jockey for position: China sends a naval flotilla to seek the source of the plague and find a way to weaponize it, while Russia maneuvers quietly on the sidelines to seize the deadly prize in its quest to regain an empire. Back in Washington D.C., Chase Williams and his top-secret Black Wasp special ops team must find out who is behind these deadly attacks before war is unleashed—and millions of innocent lives are lost.

*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 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 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

*Mini Farming* describes a holistic approach to small-area farming that will show you how to produce 85 percent of an average family's food on just a quarter acre—and earn \$10,000 in cash annually while spending less than half the time that an ordinary job would require. Even if you have never been a farmer or a gardener, this book covers everything you need to know to get started: buying and saving seeds, starting seedlings, establishing raised beds, soil fertility practices, composting, dealing with pest and disease problems, crop rotation, farm planning, and much more. Because self-sufficiency is the objective, subjects such as raising backyard chickens and home canning are also covered along with numerous methods for keeping costs down and production high. Materials, tools, and techniques are detailed with photographs, tables, diagrams, and illustrations.

"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. 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 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 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

*The Vertical Farm Feeding the World in the 21st Century* Macmillan

*A Fast Food Nation* for the foods we grow and depend on The bananas we eat today aren't your parents' bananas: We eat a recognizable, consistent breakfast fruit that was standardized in the 1960s from dozens into one basic banana. But because of that, the banana we love is dangerously susceptible to a pathogen that might wipe them out. That's the story of our food today: Modern science has brought us produce in perpetual abundance—once-rare fruits are seemingly never out of season, and we breed and clone the hardiest, best-tasting varieties of the crops we rely on most. As a result, a smaller proportion of people on earth go hungry today than at any other moment in the last thousand years, and the streamlining of our food supply guarantees that the food we buy, from bananas to coffee to wheat, tastes the same every single time. Our corporate food system has nearly perfected the process of turning sunlight, water and nutrients into food. But our crops themselves remain susceptible to the nature's fury. And nature always wins. Authoritative, urgent, and filled with fascinating heroes and villains from around the world, *Never Out of Season* is the story of the crops we depend on most and the scientists racing to preserve the diversity of life, in order to save our food supply, and us.

This book offers a transdisciplinary perspective on the concept of "smart villages" Written by an authoritative group of scholars, it discusses various aspects that are essential to fostering the development of successful smart villages. Presenting cutting-edge technologies, such as big data and the Internet-of-Things, and showing how they have been successfully applied to promote rural development, it also addresses important policy and sustainability issues. As such, this book offers a timely snapshot of the state-of-the-art in smart village research and practice.

USA Today bestselling author Ward Larsen's globe-trotting, hard-hitting assassin, David Slaton, returns for another breathless adventure in *Assassin's Strike!* In a Syrian palace,

the presidents of Russia and Iran undertake a clandestine meeting. No staff or advisors are permitted in the room. No records are kept. By necessity, however, there are two witnesses: the interpreters. The Russian, Ludmilla Kravchuk, returns to her hotel room burdened by what she has heard. When her Iranian counterpart is murdered before her eyes, Kravchuk fears she is next and goes into hiding in Syria. The CIA gets word of the defection. Desperate to uncover the purpose of the meeting, they task their newest off-the-books operator—legendary assassin David Slaton—to undertake a daring rescue. Deep inside Syria’s war-torn borders, what Slaton finds is a plot that will tear the Middle East apart. And one that only he can stop. “Highly reminiscent of Robert Ludlum’s Jason Bourne series.” —David Hagberg, New York Times bestselling author At the Publisher's request, this title is being sold without Digital Rights Management Software (DRM) applied.

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 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.

Lays out a picture of impending planetary crisis - a global food shortage that threatens to hit by mid-century - that would dwarf any in our previous experience. This book describes a dangerous confluence of shortages - of water, land, energy, technology, and knowledge - combined with the increased demand created by population and economic growth

"Holistic Management is a systems-thinking approach developed by biologist Allan Savory to restore the world's grassland soils and minimize the damaging effects of climate change and desertification on humans and the natural world. This long-awaited third edition of this title is comprehensively updated with reorganized, streamlined chapters and new color photos featuring before-and-after examples of land restored through livestock manipulation designed to mimic wildlife migrations of the past. Written for new generations of ranchers, farmers, pastoralists, social entrepreneurs, government agencies, and NGOs working to address global environmental degradation, it offers new hope for a sustainable future."--Page [4] of cover.

A recovering Mad Man throws down the ultimate challenge to his profession: Innovate or die. The ad apocalypse is upon us. Today millions are downloading ad-blocking software, and still more are paying subscription premiums to avoid ads. This \$600 billion industry is now careening toward outright extinction, after having taken for granted a captive audience for too long, leading to lazy, overabundant, and frankly annoying ads. Make no mistake, Madison Avenue: Traditional advertising, as we know it, is over. In this short, controversial manifesto, Andrew Essex offers both a wake-up call and a road map to the future. In *The End of Advertising*, Essex gives a brief and pungent history of the rise and fall of Adland—a story populated by snake-oil salesmen, slicksters, and search-engine optimizers. But his book is no eulogy. Instead, he boldly challenges global marketers to innovate their way to a better ad-free future. With trenchant wit and razor-sharp insights, he presents an essential new vision of where the smart businesses could be headed—a broad playing field where ambitious marketing campaigns provide utility, services, gifts, patronage of the arts, and even blockbuster entertainment. In this utopian landscape, ads could become so enticing that people would pay—yes, pay—to see them. Praise for *The End of Advertising* “New York media types aren’t quick to pass up a party, even one celebrating a book that predicts their demise. . . . The future of marketing will need to rely on creative, innovative models, Mr. Essex wrote, pointing to *The Lego Movie* and New York’s Citi Bike bicycle-share program as promising examples.”—*The New York Times* “A rabble-rousing indictment of the ad industry from one of its own. Essex predicts that success will depend less on the ability to annoy and more on the capacity to create and entertain.”—Adam Grant, New York Times bestselling author of *Originals* and *Give and Take* “Fresh and timely, *The End of Advertising* is an eye-opening take on the current media landscape. And along with it, Essex provides a road map for how brands can reinvent themselves and navigate this new world.”—Arianna Huffington “In this dynamic little book, Essex challenges brands—even those of us who pride ourselves on thinking outside the box—to think bigger still. He’s got me thinking.”—Neil Blumenthal, co-founder of Warby Parker “Mandatory reading for anyone who wants to get a message across in this age of authenticity.”—Alexis Ohanian, co-founder, Reddit

In compelling Q & A format, the leading independent environmental periodical gathers together a bevy of essential tips, guides, and resources for the best ways to live green and create ecological harmony with the planet. Original.

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

Shares methods of growing vegetables, flowers, and fruits vertically with tips on choosing a site, composting, and controlling weeds, pests, and disease.

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.

“An indispensable guide for anyone who wants to live to age 100—by making sure there’s a livable world when you get there.” —Dan Buettner, New York Times–bestselling author of *The Blue Zones* Do you consider yourself an environmental ally? Maybe you recycle your household goods, ride a bike, and avoid too much air travel. But did you know that the primary driver of climate change isn’t plastics, or cars, or airplanes? Did you know that it’s actually our industrialized food system? In this fascinating new book, authors Nil Zacharias and Gene Stone share new research, intriguing infographics, and compelling arguments that support what scientists across the world are beginning to affirm and uphold: By making even minimal dietary changes, anyone can have a positive, lasting impact on our planet. If you love the planet, the only way to save it is by switching out meat for plant-based meals, one bite at a time. “This fascinating, easy-to-read book will give you still another reason to eat plants and not animals: you will be doing a world of good—literally!” —Rip Esselstyn, #1 New York Times–bestselling author of *Plant-Strong* “Eating plants is not just good for your own health, it’s imperative for the health of the planet. This well-argued, well-written book makes it clear why everyone should consider a plant-based diet today.” —Michael Greger, MD, New York Times–bestselling author of *How Not to Die* “Possibly the single most important environmental book I’ve read in years. A must for everyone.” —Kathy Freston, New York Times–bestselling author of *The Lean*

"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. 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 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 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. *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.

"A MacArthur ""Genius Award"" recipient and co-launcher of First Lady Michelle Obama's Let's Move! program describes his early experiences as a sharecropper's son and a KFC executive before building a preeminent urban farm to feed, educate and employ thousands of at-risk youths."

The Bec Hellouin model for growing food, sequestering carbon, creating jobs, and increasing biodiversity without using fossil fuels When Charles and Perrine Hervé-Gruyer set out to create their farm in an historic Normandy village, they had no idea just how much their lives would change. Neither one had ever farmed before. Charles had been circumnavigating the globe by sail, operating a floating school that taught students about ecology and indigenous cultures. Perrine had been an international lawyer in Japan. Each had returned to France to start a new life. Eventually, Perrine joined Charles in Normandy, and Le Ferme du Bec Hellouin was born. Bec Hellouin has since become a celebrated model of innovative, ecological agriculture in Europe, connected to national and international organizations addressing food security, heralded by celebrity chefs as well as the Slow Food movement, and featured in the inspiring César and COLCOA award-winning documentary film, *Demain* ("Tomorrow"). *Miraculous Abundance* is the eloquent tale of the couple’s evolution from creating a farm to sustain their family to delving into an experiment in how to grow the most food possible, in the most ecological way possible, and create a farm model that can carry us into a post-carbon future—when oil is no longer moving goods and services, energy is scarcer, and localization is a must. Today, the farm produces a variety of vegetables using a mix of permaculture, bio-intensive, four-season, and natural farming techniques--as well as techniques gleaned from native cultures around the world. It has some animals for eggs and milk, horses for farming, a welcome center, a farm store, a permaculture school, a bread oven for artisan breads, greenhouses, a cidery, and a forge. It has also become the site of research focusing on how

small organic farms like theirs might confront Europe's (and the world's) projected food crisis. But in this honest and engaging account of the trials and joys of their uncompromising effort, readers meet two people who are farming the future as much as they are farming their land. They envision farms like theirs someday being the hub for a host of other businesses that can drive rural communities—from bread makers and grain millers to animal care givers and other tradespeople. Market farmers and home gardeners alike will find much in these pages, but so will those who've never picked up a hoe. The couple's account of their quest to design an almost Edenlike farm, hone their practices, and find new ways to feed the world is an inspiring tale. It is also a love letter to a future in which people increasingly live in rural communities that rely on traditional skills, locally created and purveyed goods and services, renewable energy, and greater local governance, but are also connected to the larger world.

By 2050, we will have ten billion mouths to feed in a world profoundly altered by environmental change. How will we meet this challenge? In *How to Feed the World*, a diverse group of experts from Purdue University break down this crucial question by tackling big issues one-by-one. Covering population, water, land, climate change, technology, food systems, trade, food waste and loss, health, social buy-in, communication, and equal access to food, the book reveals a complex web of challenges. Contributors unite from different perspectives and disciplines, ranging from agronomy and hydrology to economics. The resulting collection is an accessible but wide-ranging look at the modern food system.

Urban and rural collide in this wry, inspiring memoir of a woman who turned a vacant lot in downtown Oakland into a thriving farm. Novella Carpenter loves cities—the culture, the crowds, the energy. At the same time, she can't shake the fact that she is the daughter of two back-to-the-land hippies who taught her to love nature and eat vegetables. Ambivalent about repeating her parents' disastrous mistakes, yet drawn to the idea of backyard self-sufficiency, Carpenter decided that it might be possible to have it both ways: a homegrown vegetable plot as well as museums, bars, concerts, and a twenty-four-hour convenience mart mere minutes away. Especially when she moved to a ramshackle house in inner city Oakland and discovered a weed-choked, garbage-strewn abandoned lot next door. She closed her eyes and pictured heirloom tomatoes, a beehive, and a chicken coop. What started out as a few egg-laying chickens led to turkeys, geese, and ducks. Soon, some rabbits joined the fun, then two three-hundred-pound pigs. And no, these charming and eccentric animals weren't pets; she was a farmer, not a zookeeper. Novella was raising these animals for dinner. Novella Carpenter's corner of downtown Oakland is populated by unforgettable characters. Lana (anal spelled backward, she reminds us) runs a speakeasy across the street and refuses to hurt even a fly, let alone condone raising turkeys for Thanksgiving. Bobby, the homeless man who collects cars and car parts just outside the farm, is an invaluable neighborhood concierge. The turkeys, Harold and Maude, tend to escape on a daily basis to cavort with the prostitutes hanging around just off the highway nearby. Every day on this strange and beautiful farm, urban meets rural in the most surprising ways. For anyone who has ever grown herbs on their windowsill, tomatoes on their fire escape, or obsessed over the offerings at the local farmers' market, Carpenter's story will capture your heart. And if you've ever considered leaving it all behind to become a farmer outside the city limits, or looked at the abandoned lot next door with a gleam in your eye, consider this both a cautionary tale and a full-throated call to action. *Farm City* is an unforgettably charming memoir, full of hilarious moments, fascinating farmers' tips, and a great deal of heart. It is also a moving meditation on urban life versus the natural world and what we have given up to live the way we do.

When the author, a Columbia professor, set out to solve America's food, water, and energy crises, he didn't just think big, he thought up. His stroke of genius, the vertical farm, has excited scientists, architects, and politicians around the globe. These multi-story intensely managed indoor farms, grown inside skyscrapers, are capable of producing traditional greenhouse crops, as well as pigs and fowl, year-round. They would provide solutions to many of the serious problems the world is facing.

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

[Copyright: deb36ecf12e41c094f06109fc46558be](https://doi.org/10.1007/978-1-4939-9888-8)