Environmental, Health, and Business Opportunities in the New Meat Alternatives Market

It is anticipated that by 2050 we will have nine billion people to feed—how can we manage? As scarcities of agricultural land, water, forest, fishery and biodiversity resources, as well as nutrients and nonrenewable energy are foreseen, insect rearing is one solution for food and feed security in the future. In this book, we have nine chapters ranging from mushroom, insect, and earthworm farming to smart packaging and 3D printing of future foods. However, because of their biological composition, several issues should be considered, such as microbial safety, toxicity, palatability, and the presence of inorganic compounds. Specific health implications ought to be kept in mind especially if mushrooms, earthworms, or insects are reared on waste products. Allergies induced through insects' ingestion also deserve attention. A possible HACCP plan has been described considering pre-requirements in insect production and transformation.

The Perfect Meal

This volume provides historical, material, aesthetic, and philosophical explorations of plant-based and in vitro food products, including multi-disciplinary approaches from industry, academia, and food advocates.

Innovative Food Processing Technologies

Cumulative Index to the Catalog of the Food and Nutrition Information and Educational Materials Center, 1973-1975

Future Foods

In the last decade, there has been substantial research dedicated towards prospecting physiochemical, nutritional and health properties of novel protein sources. In addition to being driven by predictions of increased population and lack of a parallel increase in traditional protein sources, main drivers for the rise in novel proteins/ novel foods research activities is linked to significant changes in young consumers' attitudes toward red meat consumption and their interest in new alternative protein products. Alternative Proteins: Safety and Food Security Considerations presents up-to-date information on alternative proteins from non-meat sources and examines their nutritional and functional roles as food sources and ingredients. Emphasis is placed on the safety of these novel proteins and an evaluation of their potential contribution to food security. Motivations for novel proteins and restrictions for their use are also discussed. Key Features: Explains potential improvements to alternative proteins through the employment of novel processing techniques. Contains the first review on keratin as...
an alternative protein source. Explores first comprehensive evaluation of the religious aspects of novel proteins. Describes methods for the detection and evaluation of health hazards. Discusses guidelines, regulatory issues and recommendations for food safety. Additionally, this book covers fundamental and recent developments in the production of alternative proteins, and examines safety and consumer acceptability wherever information is available. The sources and processing options for alternative proteins and their impact on final product characteristics are also covered. A collective contribution from international researchers who are active in their field of research and have made significant contributions to the food sciences, this book is beneficial to any researcher interested in the food science and safety of alternative proteins.

Backcasting for a Sustainable Future

Functional Foods and Nutraceuticals We are in the midst of an unprecedented era of rapid scientific and technological advances that are transforming the way our foods are produced and consumed. Food architecture is being used to construct healthier, tastier, and more sustainable foods. Functional foods are being created to combat chronic diseases such as obesity, cancer, diabetes, stroke, and heart disease. These foods are fortified with nutraceuticals or probiotics to improve our mood, performance, and health. The behavior of foods inside our guts is being controlled to increase their healthiness. Precision nutrition is being used to tailor diets to our unique genetic profiles, microbiomes, and metabolisms. Gene editing, nanotechnology, and artificial intelligence are being used to address modern food challenges such as feeding the growing global population, reducing greenhouse gas emissions, reducing waste, and improving sustainability. However, the application of these technologies is facing a backlash from consumers concerned about the potential risks posed to human and environmental health. Some of the questions addressed in this book are: What is food architecture? How does sound and color impact taste? Will we all have 3D food printers in all our homes? Should nanotechnology and gene editing be used to enhance our foods? Are these new technologies safe? Would you eat bug-foods if it led to a more sustainable food supply? Should vegetarians eat themselves? Can nutraceuticals and probiotics stop cancer? What is the molecular basis of a tasty sustainable burger? David Julian McClements is a Distinguished Professor in food science who has used physics, chemistry, and biology to improve the quality, safety, and healthiness of foods for over 30 years. He has published over 900 scientific articles and 10 books in this area and is currently the most highly cited food scientist in the world. He has won numerous scientific awards for his work. The aim of this book is to highlight the many exciting advances being made in the science of foods, and to show their application for solving important problems related to the modern food supply, such as tackling chronic diseases, feeding a global population, reducing food waste, and creating healthier and tastier foods.

Decoding the World Microalgae-Based Biofuels and Bioproducts: From Feedstock Cultivation to End Products compiles contributions from authors from different areas and backgrounds who explore the cultivation and utilization of microalgae biomass for sustainable fuels and chemicals. With a strong focus in emerging industrial and large scale applications, the book summarizes the new achievements in recent years in this field by critically evaluating developments in the field of algal biotechnology, whilst taking into account sustainability issues and techno-economic parameters. It includes information on microalgae cultivation, harvesting, and conversion processes for the production of liquid and gaseous biofuels, such as biogas, bioethanol, biodiesel and biohydrogen. Microalgae biorefinery and biotechnology applications, including for pharmaceuticals, its use as food and feed, and value added bioproducts are also covered. This book’s comprehensive scope makes it an ideal reference for both early stage and consolidated researchers, engineers and graduate students in the algal field, especially in energy, chemical and environmental engineering, biotechnology, biology and agriculture. Presents the most current information on the uses and untapped potential of microalgae in the production of bio-based fuels and chemicals. Critically reviews the state-of-the-art feedstock cultivation of biofuels and bioproducts mass production from microalgae, including
intermediate stages, such as harvesting and extraction of specific compounds. Includes topics in economics and sustainability of large-scale microalgae cultivation and conversion technologies.

Tech to Table The authors of The Perfect Meal examine all of the elements that contribute to the diner's experience of a meal (primarily at a restaurant) and investigate how each of the diner's senses contributes to their overall multisensory experience. The principal focus of the book is not on flavor perception, but on all of the non-food and beverage factors that have been shown to influence the diner's overall experience. Examples are: the colour of the plate (visual) the shape of the glass (visual/tactile) the names used to describe the dishes (cognitive) the background music playing inside the restaurant (aural). Novel approaches to understanding the diner’s experience in the restaurant setting are explored from the perspectives of decision neuroscience, marketing, design, and psychology. 2015 Popular Science Prose Award Winner.

Moo’s Law Protein plays a critical role in human nutrition. Although animal-derived proteins constitute the majority of the protein we consume, plant-derived proteins can satisfy the same requirement with less environmental impact. Sustainable Protein Sources allows readers to understand how alternative proteins such as plant, fungal, algal, and insect protein can take the place of more costly and less efficient animal-based sources. Sustainable Protein Sources presents the various benefits of plant and alternative protein consumption, including those that benefit the environment, population, and consumer trends. The book presents chapter-by-chapter coverage of protein from various sources, including cereals and legumes, oilseeds, pseudocereals, fungi, algae, and insects. It assesses the nutrition, uses, functions, benefits, and challenges of each of these proteins. The book also explores opportunities to improve utilization and addresses everything from ways in which to increase consumer acceptability, to methods of improving the taste of products containing these proteins, to the ways in which policies can affect the use of plant-derived proteins. In addition, the book delves into food security and political issues which affect the type of crops that are cultivated and the sources of food proteins. The book concludes with required consumer choices such as dietary changes and future research ideas that necessitate vigorous debate for a sustainable planet. Introduces the need to shift current animal-derived protein sources to those that are more plant-based. Presents a valuable compendium on plant and alternate protein sources covering land, water, and energy uses for each type of protein source. Discusses nutritive values of each protein source and compares each alternate protein to more complete proteins. Provides an overview of production, including processing, protein isolation, use cases, and functionality. Presents solutions to challenges, along with taste modulation. Focuses on non-animal derived proteins. Identifies paths and choices that require consumer and policymaker debate and action.

Alternative Proteins Among the major challenges facing society today, seeking renewable alternatives to petroleum-based fuels and manufactured goods is critically important to reducing society’s dependency on petroleum and tackling environmental issues associated with petroleum use. In recent years there has been considerable research targeted toward the development of plant-derived bioproducts to replace petrochemical feedstocks for both fuel and manufacturing. Plants not only provide a large amount of renewable biomass, but their biochemical diversity also offers many chemical and molecular tools for the production of new products through biotechnology. Plant Bioproducts is an introduction to the production and application of plant bioproducts, including biofuels, bioplastics, and biochemicals for the manufacturing sector. Contributing authors examine various bioproducts with respect to their basic chemistry, relationship to current petrochemical-based products, and strategies for their production in plants. Chapters cover the integrated roles of agronomy, plant breeding, biotechnology, and biorefining in the context of bioproduct development. Environmental, economic, ethical, and social issues surrounding bioproducts, including the use of genetically modified crops, challenges to food security, and consumer acceptance, are also covered.

Food Technology Disruptions Future Foods: Global Trends, Opportunities, and Sustainability
Challenges highlights trends and sustainability challenges along the entire agri-food supply chain. Using an interdisciplinary approach, this book addresses innovations, technological developments, state-of-the-art based research, value chain analysis, and a summary of future sustainability challenges. The book is written for food scientists, researchers, engineers, producers, and policy makers and will be a welcomed reference. Provides practical solutions for overcoming recurring sustainability challenges along the entire agri-food supply chain. Highlights potential industrial opportunities and supports circular economy concepts. Proposes novel concepts to address various sustainability challenges that can affect and have an impact on the future generations.

Edible Insects in the Food Sector

Innovations in the Food System 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 of unsustainability, degradation of the agricultural environment, destruction of nature, short-comings 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 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 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 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’.

Edible Insects Proteins in Food Processing, Second Edition, reviews how proteins may be used to enhance the nutritional, textural and other qualities of food products. After two introductory chapters, the book discusses sources of proteins, examining the caseins, whey, muscle and soy proteins, and proteins from oil-producing plants, cereals and seaweed. Part Two illustrates the analysis and modification of proteins, with chapters on testing protein functionality, modeling protein behavior, extracting and purifying proteins and reducing their allergenicity. A final group of chapters delves into the functional value of proteins and how they are used as additives in foods. Completely revised and updated with new developments on all food protein analysis and applications, such as alternative proteins sources, proteins as emulsifiers, proteins in nanotechnology and egg proteins. Reviews the wide range of protein sources available. Examines ways of modifying protein sources. Discusses the use of proteins to enhance the nutritional, textural and other qualities of food products.
Technically Food “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

Sustainable Protein Sources Greenhouse gas emissions by the livestock sector could be cut by as much as 30 percent through the wider use of existing best practices and technologies. FAO conducted a detailed analysis of GHG emissions at multiple stages of various livestock supply chains, including the production and transport of animal feed, on-farm energy use, emissions from animal digestion and manure decay, as well as the post-slaughter transport, refrigeration and packaging of animal products. This report represents the most comprehensive estimate made to-date of livestock’s contribution to global warming as well as the sectors potential to help tackle the problem. This publication is aimed at professionals in food and agriculture as well as policy makers.

Alternative Proteins Edible insects have always been a part of human diets, but in some societies there remains a degree of disdain and disgust for their consumption. Insects offer a significant opportunity to merge traditional knowledge and modern science to improve human food security worldwide. This publication describes the contribution of insects to food security and examines future prospects for raising insects at a commercial scale to improve food and feed production, diversify diets, and support livelihoods in both developing and developed countries. Edible insects are a promising alternative to the conventional production of meat, either for direct human consumption or for indirect use as feedstock. This publication will boost awareness of the many valuable roles that insects play in sustaining nature and human life, and it will stimulate debate on the expansion of the use of insects as food and feed.

Meals to Come The Encyclopedia of Food Security and Sustainability covers the hottest topics in the science of food sustainability, providing a synopsis of the path society is on to secure food for a growing population. It investigates the focal issue of sustainable food production in relation to the effects of global change on food resources, biodiversity and global food security. This collection of methodological approaches and knowledge derived from expert authors around the world offers the research community, food industry, scientists and students with the knowledge to relate to, and report on, the novel challenges of food production and sustainability. This comprehensive encyclopedia will act as a platform to show how an interdisciplinary approach and closer collaboration between the scientific and industrial communities is necessary to strengthen our existing capacity to generate and share research data. Offers readers a ‘one-stop’ resource on the topic of food security and sustainability Contains articles split into sections based on the various dimensions of Food Security and Food Sustainability Written by academics and practitioners from various fields and regions with a “farm to fork understanding Includes concise and accessible chapters, providing an authoritative introduction for non-specialists and readers from undergraduate level upwards, as
well as up-to-date foundational content for those familiar with the field.

Tackling Climate Change Through Livestock What does it take to build startups that fundamentally change the world? And of the startups that attempt to create this change, what separates those who succeed from those who fall short? In Cultivated Abundance: How We Can Build a Better Future through Transformative Technology Entrepreneurship, serial entrepreneur Mihir Pershad challenges common Silicon Valley wisdom. Drawing on insights from The Good Food Institute, Effective Altruism, and Impossible Foods, Pershad argues that truly transformative startups need to follow a new playbook—one that takes into account the long-term effects of their decisions. In Cultivated Abundance, you'll learn how to identify a Big Intractable Problem to solve, develop a startup to maximize your impact on that problem, and increase your startup's chance of success with a tried and tested methodology. Pershad notes, "What the most ambitious people do with their lives matters." Whether you're looking to tackle climate change, food scarcity, water shortages, or any other massive problem, you can use this book as a tool to create positive change in the world through entrepreneurship.

Food Engineering Innovations Across the Food Supply Chain Human health is facing unprecedented threats from global environmental change. This book describes the challenges and opportunities to safeguard health.

Hungry for Disruption Drawing together the latest research and a range of case studies, Henry Buller and Emma Roe guide readers on a fascinating journey through animal welfare issues 'from farm to fork'. Animal welfare offers a vital lens through which to explore the economies, culture and politics of food. This is the first text to provide a much-needed overview of this strongly debated area of the food industry. Buller and Roe explore how animal welfare is defined, advocated, assessed and implemented by farmers, veterinarians, distributors, and consumers. From the practicalities and limitations of establishing a basic standard of care for livestock, to the ethics of selling welfare as a product in the supermarket, this indispensable book offers empirical insights into a key aspect of the global food system: the lives, deaths, and consumption of animals which are at the core of the food chain. It is a must-read for students and scholars of animal welfare, agro-food studies and human-animal relations in disciplines such as geography, politics, anthropology, and sociology as well as animal behaviour, psychology and veterinary science.

Cultivated Abundance There are various innovations and new technologies being produced in the energy, transportation, and building industries to combat climate change and improve environmental performance, but another way to combat this is examining the world’s food resources. Currently, there are global challenges associated with livestock and meat consumption, giving way to resource scarcity and the inability to sustain animal agriculture. Environmental, Health, and Business Opportunities in the New Meat Alternatives Market is a pivotal reference source that provides vital research on the development of plant-based foods and nutritional outcomes. Through analyzing innovative and disruptive trends in the food industry, it presents opportunities utilizing meat alternatives to create a more engaged consumer, a stronger economy, and a better environment. Highlighting topics such as meat consumption, nutrition, health, and gender perspectives, this book is ideally designed for policymakers, economists, health professionals, nutritionists, technology developers, academicians, and graduate-level students.

Future Food "Discover the positive prescription for curing sleepless nights and fussy babies. Recommended by doctors across the country." - Back cover.

Future Foods Imagine eating a burger grown in a laboratory, a strawberry picked by a robot, or a pastry created with a 3-D printer. You would never taste the difference, but these inventions might just save your health and the planet’s. Today, landmark technological advances are driving solutions to the biggest problems created by industrialized food. Tech to Table
introduces readers to twenty-five of the most creative entrepreneurs innovating these solutions. They come from various places and professions, identities and backgrounds. But they share an outsider's perspective and an idealistic, often disruptive, ambition to reinvent the food system. The pace and breadth of change is astonishing, as investors pump billions of dollars into ag-tech. Not every innovator will prosper long-term, but each marks a fundamental change in our approach to feeding a growing population--sustainably.

On Becoming Baby Wise Food Technology Disruptions covers the latest disruptions in the food industry, such as the Internet of Things, digital technologies, modern applications like 3D printing, bacterial sensors in food packaging, electronic noses for food authentication, and artificial intelligence. With additional discussions on innovative distribution and delivery of food and consumer acceptance of food disruptions, this book is an essential resource for food scientists, technologists, engineers, agriculturalists, chemists, product developers, researchers, academics and professionals working in the food industry. While innovations play an important role in food production, disruptive technologies are a revolutionary type of innovation that can displace an established technology and shake up the industry or create a completely new industry. Currently, digital technologies and smart applications lead innovations in the food sector in order to optimize the food supply chain and to develop and deliver tailor-made food products to consumers with new eating habits. Covers digital technologies in agriculture, food production and food processing, modern eating habits, personalized nutrition, and relevant innovative food products. Brings alternative protein sources, novel functional foods and artificial meat. Discusses the Internet of Things, digital technologies and modern applications like 3D printing, smart packaging and smart food distribution.

Rethinking Food and Agriculture Summary: "Backcasting: looking back from a desirable future. Since the 1990s sustainable futures have been explored in backcasting experiments, numerous stakeholders have been involved and first steps have been planned in line with the envisioned sustainable futures. But what is the impact of these so-called backcasting experiments ten years later? Backcasting for a Sustainable Future: The impact after 10 years is the first book that systematically investigates the follow-up and spin-off of backcasting experiments seven to ten years after completion. It presents three case studies about (1) Novel Protein Foods and meat alternatives; (2) Sustainable Households and Nutrition; and (3) Multiple Sustainable Land-use in rural areas. The cases show that participatory backcasting may, but does not automatically lead to substantial follow-up and spinoff. Using innovation and learning theories the factors that affect the emergence of follow-up and new networks are identified and discussed. This book will be of great value to all those who work on sustainable futures and system innovations, such as researchers in system innovations, sustainability and social change, as well as policy-makers, transition experts and backcasting professionals."--Publisher description.

Food and Animal Welfare Functional foods and nutraceuticals are food products that naturally offer or have been modified to offer additional health benefits beyond basic nutrition. As such products have surged in popularity in recent years, it is crucial that researchers and manufacturers understand the concepts underpinning functional foods and the opportunity they represent to improve human health, reduce healthcare costs, and support economic development worldwide. Functional Foods and Nutraceuticals: Bioactive Components, Formulations and Innovations presents a guide to functional foods from experienced professionals in key institutions around the world. The text provides background information on the health benefits, bioavailability, and safety measurements of functional foods and nutraceuticals. Subsequent chapters detail the bioactive components in functional foods responsible for these health benefits, as well as the different formulations of these products and recent innovations spurred by consumer demands. Authors emphasize product development for increased marketability, taking into account safety issues associated with functional food adulteration and solutions to be found in GMP adherence. Various food preservation methods...
aimed at enhancing the quality and shelf life of functional food are also highlighted. Functional Foods and Nutraceuticals: Bioactive Components, Formulations and Innovations is the first of its kind, designed to be useful to students, teachers, nutritionists, food scientists, food technologists and public health regulators alike.

Planetary Health "Alternative Proteins: Safety and Food Security Considerations presents up-to-date information on alternative proteins from non-meat sources and examines their nutritional and functional roles as food sources and ingredients. Emphasis is placed on the safety of these novel proteins and an evaluation of their potential contribution to food security. Motivations for novel proteins and restrictions for their use are also discussed. Additionally, this book covers fundamental and recent developments in the production of alternative proteins, and examines safety and consumer acceptability wherever information is available. The sources and processing options for alternative proteins and their impact on final product characteristics are also covered. A collective contribution from international researchers who are active in their field of research and have made significant contributions to the the food sciences, this book is beneficial to any researcher interested in the the food science and safety of alternative proteins"--

Microalgae-Based Biofuels and Bioproducts "Warren Belasco is a witty, wonderfully observant guide to the hopes and fears that every era projects onto its culinary future. This enlightening study reads like time-travel for foodies."--Laura Shapiro, author of Something From the Oven: Reinventing Dinner in 1950s America "In his insightful look at human imaginings about their food and its future sufficiency, Warren Belasco makes use of everything from academic papers, films, and fiction to journalism, advertising and world's fairs to trace a pattern of public concern over two centuries. His wide-ranging scholarship humbles all would-be futurists by reminding us that ours is not the first generation, nor is it likely to be the last, to argue inconclusively about whether we can best feed the world with more spoons, better manners or a larger pie. Truly painless education; a wonderful read!"--Joan Dye Gussow, author This Organic Life "Warren Belasco serves up an intellectual feast, brilliantly dissecting two centuries of expectations regarding the future of food and hunger. Meals to Come provides an essential guide to thinking clearly about the worrisome question as to whether the world can ever be adequately and equitably fed."--Joseph J. Corn, co-author of Yesterdays Tomorrows: Past Visions of the American Future "This astute, sly, warmly human critique of the basic belly issues that have absorbed and defined Americans politically, socially, and economically for the past 200 years is a knockout. Warren Belasco's important book, crammed with knowledge, is absolutely necessary for an understanding of where we are now."--Betty Fussell, author of My Kitchen Wars

The Fate of Food 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, 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.

Methodological Approaches to STEM Education Research Volume 1 Food process engineering, a branch of both food science and chemical engineering, has evolved over the years since its inception and still is a rapidly changing discipline. While traditionally the main objective of food process engineering was preservation and stabilization, the focus today has shifted to enhance health aspects, flavour and taste, nutrition, sustainable production, food security and also to ensure more diversity for the increasing demand of consumers. The food industry is becoming increasingly competitive and dynamic, and strives to develop high quality, freshly prepared food products. To achieve this objective, food manufacturers are today presented with a growing array of new technologies that have the potential to improve, or replace, conventional processing technologies, to deliver higher quality and better consumer targeted food products, which meet many, if not all, of the demands of the modern consumer. These new, or innovative, technologies are in various stages of development, including some still at the R&D stage, and others that have been commercialised as alternatives to conventional processing technologies. Food process engineering comprises a series of unit operations traditionally applied in the food industry. One major component of these operations relates to the application of heat, directly or indirectly, to provide foods free from pathogenic microorganisms, but also to enhance or intensify other processes, such as extraction, separation or modification of components. The last three decades have also witnessed the advent and adaptation of several operations, processes, and techniques aimed at producing high quality foods, with minimum alteration of sensory and nutritive properties. Some of these innovative technologies have significantly reduced the thermal component in food processing, offering alternative nonthermal methods.

Food Processing Technologies: A Comprehensive Review covers the latest advances in innovative and nonthermal processing, such as high pressure, pulsed electric fields, radiofrequency, high intensity pulsed light, ultrasound, irradiation and new hurdle technology. Each section will have an introductory article covering the basic principles and applications of each technology, and in-depth articles covering the currently available equipment (and/or the current state of development), food quality and safety, application to various sectors, food laws and regulations, consumer acceptance, advancements and future scope. It will also contain case studies and examples to illustrate state-of-the-art applications. Each section will serve as an excellent reference to food industry professionals involved in the processing of a wide range of food categories, e.g., meat, seafood, beverage, dairy, eggs, fruits and vegetable products, spices, herbs among others.

Future Foods This book explores one of the most discussed and investigated novel foods in recent years: edible insects. The increasing demand for alternative protein sources worldwide had led the Food and Agriculture Organization of the United Nations (FAO) to promote the potential of using insects both for feed and food, establishing a program called “Edible Insects.” Although several social, environmental, and nutritional benefits of the use of insects in the human diet have been identified, the majority of the population in Western countries rejects the idea of adopting insects as food, predominantly for cultural reasons. Nevertheless, international interest in promoting the consumption of insects has grown significantly, mainly in North America and Europe. This trend is mostly due to increasing attention and involvement from the scientific network and the food and feed industries, as well as governments and their constituents. The book explores the current state of entomophagy and identifies knowledge gaps to inform primary research institutions, students, members of the private sector, and
policymakers to better plan, develop, and implement future research studies on edible insects as a sustainable source of food. The case studies and issues presented in this book cover highly up-to-date topics such as aspects of safety and allergies for human consumption, final meat quality of animals fed with insects, the legislative framework for the commercialization of this novel food, and other relevant issues.

Alternative Protein Sources in Aquaculture Diets Food Engineering Innovations Across the Food Supply Chain discusses the technology advances and innovations into industrial applications to improve supply chain sustainability and food security. The book captures the highlights of the 13th International Congress of Engineering ICEF13 under selected congress themes, including Sustainable Food Systems, Food Security, Advances in Food Process Engineering, Novel Food Processing Technologies, Food Process Systems Engineering and Modeling, among others. Edited by a team of distinguished researchers affiliated to CSIRO, this book is a valuable resource to all involved with the Food Industry and Academia. Feeding the world’s population with safe, nutritious and affordable foods across the globe using finite resources is a challenge. The population of the world is increasing. There are two opposed sub-populations: those who are more affluent and want to decrease their caloric intake, and those who are malnourished and require more caloric and nutritional intake. For sustainable growth, an increasingly integrated systems approach across the whole supply chain is required. Focuses on innovation across the food supply chain beyond the traditional food engineering discipline brings the integration of on-farm with food factory operations, the inclusion of Industry 4.0 sensing technologies and Internet of Things (IoT) across the food chain to reduce food wastage, water and energy inputs makes a full intersection into other science domains (operations research, informatics, agriculture and agronomy, machine learning, artificial intelligence and robotics, intelligent packaging, among others).

Encyclopedia of Food Security and Sustainability Find out where our world is headed with this dazzling first-hand account of inventing the future from the #1 New York Times bestselling author of What Should I Do With My Life? and the founder of science accelerator IndieBio. Decoding the World is a buddy adventure about the quest to live meaningfully in a world with such uncertainty. It starts with Po Bronson coming to IndieBio. Arvind Gupta created IndieBio as a laboratory for early biotech startups trying to solve major world problems. Glaciers melting. Dying bees. Infertility. Cancer. Ocean plastic. Pandemics. Arvind is the fearless one, a radical experimentalist. Po is the studious detective, patiently synthesizing clues others have missed. Their styles mix and create a quadratic speedup of creativity. Yet and Yang crystallized. As they travel around the world, finding scientists to join their cause, the authors bring their firsthand experience to the great mysteries that haunt our future. Natural resource depletion. Job-taking robots. China's global influence. Arvind feels he needs to leave IndieBio to help startups do more than just get started. But as his departure draws near, he struggles to leave the sanctum he created. While Po has to prove he can keep the “indie” in IndieBio after Arvind is gone. After looking through their lens, you'll never see the world the same.

Eat for the Planet Moo’s Law is the latest title from successful investor Jim Mellon, to help readers understand the investment landscape in cultivated and plant-based proteins and materials. Jim has a vision that within the next couple of decades world agriculture will be radically transformed by the advent of cultivated meat technology. This book grounds the reader in why such an advancement is absolutely necessary and informs them of the investments they could make to become part of the New Agricultural Revolution themselves. The harrowing effects on our environment, animal cruelty in food and fashion, and the struggling ability to feed the world's ever-growing population gives us no choice but to grow meat in labs or derive our proteins from plant-based sources. Not only this, he outlines what he sees as the major hurdles to the industry's success in terms of scalability of production and the smart designing of regulatory frameworks to stimulate innovation in this sector. The future of food is being developed in labs across the world - it will be cleaner, safer, more ethical and, importantly soon, cheaper too! Once price parity with conventional meats is reached, there will
be no turning back -- this is Moo's Law™.

Proteins in Food Processing “In a feat of razor-sharp journalism, Zimberoff asks all the right questions about Silicon Valley’s hunger for a tech-driven food system. If you, like me, suspect they’re selling the sizzle more than the steak, read Technically Food for the real story.” — Dan Barber, the chef and co-owner of Blue Hill and Blue Hill at Stone Barns Eating a veggie burger used to mean consuming a mushy, flavorless patty that you would never confuse with a beef burger. But now products from companies like Beyond Meat, Impossible Foods, Eat Just, and others that were once fringe players in the food space are dominating the media, menus in restaurants, and the refrigerated sections of our grocery stores. With the help of scientists working in futuristic labs—making milk without cows and eggs without chickens—start-ups are creating wholly new food categories. Real food is being replaced by high-tech. Technically Food: Inside Silicon Valley’s Mission to Change What We Eat by investigative reporter Larissa Zimberoff—€is the first comprehensive survey of the food companies at the forefront of this booming business. Zimberoff pokes holes in the mania behind today’s changing food landscape to uncover the origins of these mysterious foods and demystify them. These sometimes ultraprocessed and secretly produced foods are cheered by consumers and investors because many are plant-based—often vegan—and help address societal issues like climate change, animal rights, and our planet’s dwindling natural resources. But are these products good for our personal health? Through news-breaking revelations, Technically Food examines the trade-offs of replacing real food with technology-driven approximations. Chapters go into detail about algae, fungi, pea protein, cultured milk and eggs, upcycled foods, plant-based burgers, vertical farms, cultured meat, and marketing methods. In the final chapter Zimberoff talks to industry voices—including Dan Barber, Mark Cuban, Marion Nestle, and Paul Shapiro—to learn where they see food in 20 years. As our food system leaps ahead to a sterilized lab of the future, we think we know more about our food than we ever did. But because so much is happening so rapidly, we actually know less about the food we are eating. Until now.

Future Developments in the Food Industry and Their Implications for the Federal Trade Commission A unique resource that describes the ingredients included in an aquaculture diet, species profiles, processing methods, impacts to environment and industry, and more. Aquaculture is and will remain a major food producing sector in the future. To become more efficient and successful in the aquaculture industry, operations need to provide good nutrition. Alternative Protein Sources in Aquaculture Diets is a unique source describing the ingredients included in fish and crustacean diets, their nutrient compositions, species profiles, suitability for species, processing methods, and impacts of alternative ingredients on the environment and to the aquaculture industry. World-renowned nutritionists and feed technologists explore practical ways for the aquaculture industry to expand and remain competitive, and discuss ways to develop less expensive alternative sources or protein. Diet costs take up a huge chunk of operating expenditures, with fish meal being one of the most expensive ingredients in the aquaculture diet. Alternative Protein Sources in Aquaculture Diets provides detailed knowledge on the use of alternative plant and animal protein sources, offering opportunities to either partially or completely replace fish meal. This comprehensive, up-to-date text discusses the most widely used ingredients as well as various previously under-utilized ingredients which could be of significant potential in the future. The book is extensively referenced and includes numerous helpful tables to clearly present data. Topics discussed in Alternative Protein Sources in Aquaculture Diets (for finfish and crustacean species) include: - farmed fish diet requirements - reduction of waste through diet formulation - poultry by-product meal - meat packing by-products - soybean protein foodstuffs - cottonseed meal - lupins - unconventional plant protein supplements.

Plant Bioproducts This book addresses the changing nature of the methodologies that underpin research in mathematics, science, health and environmental education. This is a constantly shifting landscape that educational researchers need to engage with in order for research to
continue to impact educational practice. The novelty of this book in the context of the existing publishing landscape is that it has a singular focus on methodology and methods, not in service of research findings but as something worth considering in itself, bringing methodology to the forefront of educational research.

The Future of Meat Without Animals On August 7–8, 2019, the National Academies of Sciences, Engineering, and Medicine hosted a public workshop in Washington, DC, to review the status of current and emerging knowledge about innovations for modern food systems and strategies for meeting future needs. The workshop addressed different perspectives on the topic of food systems and would build on a workshop on the topic of sustainable diets hosted by the Food Forum in August 2018. This publication summarizes the presentations and discussions from the workshop.

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