

PREFACE

Imagine a world where every person enjoys a healthy diet derived from sustainable food systems. Seriously. Take a moment to visualize a genuinely food-secure world—where everyone gets to consume the right quantity and quality of food to live a healthy, active, and productive life. No hunger. No obesity. No malnutrition. Or in the words of Donella Meadows and her colleagues from their ground-breaking report *The Limits to Growth* (1972), imagine a world where “each person has an equal opportunity to realize [their] individual human potential.”¹ Because of what they eat!

Now, take a further step to imagine a world where the food needed for those healthy diets is produced, managed, and distributed in ways that do not harm the environment. From production to consumption, let us contemplate the possibility of food systems that halt environmental degradation and even begin to repair the damage that has been done in our desperate efforts to feed humanity.

Healthy diets for all, from sustainable food systems.² I call this *universal food security*.

I have chosen the term *universal* over the more commonly used *global* to establish the aspiration to reach every person on Earth. After all, food security is a human right, embodied in the Universal Declaration of Human Rights in 1948 and elaborated in 1966 in the International Covenant on Economic, Social, and Cultural Rights.³ In arriving at this concept of universal food security, I am indebted to the visionaries who crafted the Rome Declaration on World Food Security that emerged from the World Food Summit of 1996. They established the ambition of universal food security in stressing access to food for “all people, at all times.”⁴

Nine years earlier the World Commission on Environment and Development, chaired by Norwegian prime minister Gro Harlem Brundtland, highlighted the issue of intergenerational equity by defining sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”⁵ These ambitious global declarations provided the moral foundation for the 2030 Agenda for Sustainable Development, a collective pledge made by the world’s governments in September 2015 that “no one will be left behind.”⁶ Six years later, in synthesizing the outcomes of the Food Systems Summit of 2021, United Nations (UN) secretary-general António Guterres reiterated the commitments embodied in the 2030 Agenda and the Sustainable Development Goals, declaring, “We do not need new goals; we need to move boldly—now—to implement the transformative actions needed to achieve the goals we have.”⁷

This book shows that we have the *know-how* and the *do-how* to achieve universal food security. My objective is to introduce readers to the science, policies, and practices that will need to be understood, contextualized, adapted, and—most important—*applied* across our hungry and damaged planet. It is a shameful fact that about half of the world’s more than eight billion people are malnourished. At least two billion people are experiencing undernutrition—deficiencies of one kind or another that adversely affect the human body’s growth and development. There are also more than two and a half billion people who consume low-quality diets or too much food, leading to excessive weight gain and a raft of chronic ailments like diabetes and heart disease.⁸ The United Nations food agencies estimated that three billion people could not afford a healthy diet in 2019.⁹ And that was prior to the COVID-19 pandemic and its impacts. Unhealthy diets come at great cost to society by curtailing the realization of human potential.

By 2050 the world population will be close to ten billion. With current trajectories of prevalence in malnutrition—a combination of slow progress in lowering undernutrition and essentially no progress in reversing overweight and obesity trends—coupled with land degradation, water resource depletion, biodiversity loss, and climate change, we are headed toward a food systems apocalypse. With that grim outlook, why would I have the audacity to suggest that an alternative future is possible?

First, to quote Isaac Newton, “If I have seen further it is by standing on the shoulders of Giants.”¹⁰ I have had the privilege to access literature, expertise, and experience from food systems “giants” of the past and present. This book is my interpretation of the science and practice from hundreds of leading authorities from diverse disciplines in the related fields of agriculture, food, and nutrition.

Second, I am now and always have been *a practitioner*. In all my professional roles over four decades, I have focused on putting good ideas into practice. With the support of colleagues and perhaps more than my fair share of serendipity, I have had enough positive experiences (and learned sufficiently from my disappointments) to believe that the future is, to a large extent, what we decide to create. I consider myself a pragmatic optimist.

Third, over the past thirteen years or so, I have also been a teacher: a professor of practice. As founding director of Columbia University's Master of Public Administration in Development Practice (MPA-DP), I have been given the opportunity to teach, mentor, and learn from more than five hundred young professionals from eighty countries; 70 percent of my students are women. Much more than hope, this experience has given me confidence—a genuine belief that transformation of our food systems is urgently needed, that universal food security is a moral imperative, and that both are attainable by 2050.

With these three factors working to my advantage, I decided to write this book. In exploring the rather messy and sometimes divisive worlds of science and practice, I have sought the truth. On matters of science, I have relied heavily on the peer-reviewed literature in agriculture and food systems. In recent years, there has been a plethora of high-level reports and scientific journal publications emerging from prominent commissions, task forces, and institutions. On matters of both science and practice, I have also sought expert opinion, drawing on colleagues, mentors, and other professionals with real-world experience in global, national, and local food systems. From these sources and hundreds of peer-reviewed research papers, I have attempted to interpret and synthesize the state of science and practice in most areas of relevance to food systems transformation and food security.

In assembling the case for universal food security, I have also drawn extensively on my personal experiences. I started out as an inexperienced twenty-two-year-old undertaking field research on the island of Bali for my master's degree with the University of Queensland. From there, I spent three years in conflict-affected Mindanao in the southern Philippines, working as an agronomist on a large rural development project. Then followed eighteen years with the International Rice Research Institute (IRRI), also in the Philippines, where the Asian Green Revolution had been launched more than a decade earlier. While at IRRI, I carved out time for a PhD degree from the University of Reading and an MPA degree from the Harvard Kennedy School. After IRRI, I moved to Africa, serving for six years with the World Agroforestry Centre in Kenya, followed by a further five years in Kenya, establishing and leading the Millennium Development Goals

Centre for East and Southern Africa. Finally (perhaps), in 2009 I joined Columbia University in New York City. It has been an exciting, often challenging, and mostly rewarding journey in food systems transformation, with a strong focus on agriculture and rural development.

Throughout the book, I share experience and perspectives gained from the many programs and projects in which I played a significant role or that I observed at close range. I have met with many thousands of farmers and hundreds of scientists and practitioners from governments, businesses, and international organizations in more than fifty countries across all regions of the world, though mainly in Asia and Africa. You will find anecdotes from my travels, events, and conversations. I use these vignettes to help introduce, contextualize, personalize, and illustrate the challenges and opportunities for achieving food systems transformation.

My opinions and biases will occasionally surface. I make every effort to ensure a balanced, transparent, evidence-based presentation of the issues. I am not one for the false dichotomies that emerge from being either for or against a particular policy or practice. In most cases, I have been drawn to a middle ground or a blended solution. Science, context, needs, and rights—not ideology—must shape our decisions on policies and practices. But ultimately, I accept that this book is *my* take on what is required to achieve a food-secure world.

The book is organized into four sections: context, knowledge, strategy, and implementation.

In part I, I present the historical context of today's global food system. From Malthus's essay on population in 1798 to the Food Systems Summit of 2021, there have been regular calls to anticipate and confront the challenges of food insecurity, hunger, and malnutrition. *Prophets of doom* (chapter 1), prompted by recurring food crises, have served an important purpose: they have challenged us to take action on population, food supply, and the environment. In response, there have been periods of success and subsequent optimism, like the Asian Green Revolution (chapter 2). The agricultural productivity and food security gains in Asia during the second half of the twentieth century provided a forceful rebuttal to the Malthusian hypothesis. Poverty, hunger, and land conversion to agriculture were all reduced. But a balanced assessment of the Asian Green Revolution reveals some important limitations and caveats and has spawned efforts to learn and adapt from our experience. In chapter 2 I also present the largely unrecognized progress of the more recent *African* Green Revolution where, contrary to popular narratives, cereal production growth modestly outperformed that in Asia during the fifteen years following their respective launch dates.

To bring meaningful improvements to our food systems, it is necessary to grasp the underlying science, policies, and practices of agriculture, food, and nutrition.

For readers without formal training in these areas, it can be a challenge to navigate the language of food systems. Personally, as an agronomist, I had to work especially hard to build basic competency in the field of human nutrition, and it remains work in progress. I may have understood the nutritional needs of rice plants, but I knew little of what constituted a healthy, nutritious diet. We all need to fill gaps in our knowledge to be effective *food systems* practitioners.

To that end, part II introduces the fundamental components of most terrestrial food systems: soil and land (chapter 3), water (chapter 4), seeds (chapter 5), climate (chapter 6), and human nutrition (chapter 7). In chapter 8 I provide a holistic framework for integrating these diverse but interrelated topics into a food systems transformation strategy, including an overview of structural transformation—the ubiquitous reallocation of economic activity across agriculture, industry, and services. Inevitably, there is no escaping jargon and acronyms as you venture into these areas of technical knowledge and field practice. I try to keep these insider terms to the minimum necessary to communicate effectively in a diversity of professional settings. Becoming familiar with the language and concepts of food systems will be greatly beneficial when it comes to designing and executing policies and programs.

Part III lays out my strategy for transforming food systems to achieve the goal of universal food security. I have been refining this strategy in earnest since early 2014, when I was invited to make a presentation on sustainable agriculture, food security, and nutrition to the Open Working Group of the United Nations General Assembly in the lead-up to the Sustainable Development Summit of 2015.¹¹ The strategy I present here, incorporating feedback gained from numerous public lectures and panels, consists of five interrelated, mutually reinforcing themes of food systems investment: sustainable intensification (chapter 9), market infrastructure (chapter 10), postharvest stewardship (chapter 11), healthy diets (chapter 12), and social protection (chapter 13). In each of these themes, I describe policies and programs to incentivize and support positive change. I call these investment areas the *Big Five*.

These five investment clusters are not meant to exclude other important and complementary areas for food systems transformation. I know many colleagues who will bristle at the absence of water, sanitation, and hygiene (known by the acronym WASH) from my Big Five, considering the importance of these elements in effective food utilization and overall health. Others would like to see women's empowerment or good governance or urban development take their place among the highest-priority investment areas.

There is no question that these additional themes (and others) are important, even critical, components of a comprehensive strategy to attain universal food

security. I have addressed these complementary issues at different points throughout the book. After much deliberation, however, I concluded that, if I was forced to name just five priority areas of investment, my Big Five are a sound, strategic, and practical place to start.

In addition to discussing the Big Five individually, I have included—in part III—a chapter on COVID-19 and food security (chapter 14). The fragilities and inequalities of our food systems have been exposed by the pandemic and most recently by the Russian invasion of Ukraine. We must all learn from these experiences to be better prepared to withstand the next pandemic and other shocks that can disrupt our strategies for achieving universal food security.

In part IV I ask the all-important question: So what? How will we implement the Big Five strategy? In chapter 15 I reiterate the value of beginning with a clear vision of success, namely, universal food security. I reinforce the importance of a context-determined strategy of transformative investments: the Big Five. And I highlight the role of *agents of transformation* and call for a *whole-of-society approach*, emphasizing the importance of coherent contributions from the public, private, and third (not-for-profit) sectors, as well as from universities and the public at large. I propose institutional innovations and reforms in the way we address food security at the international, national, and local levels.

In the final chapter I focus on the pivotal role of transformative leadership (chapter 16). Inspired by what I have seen at Columbia's MPA-DP program over more than a decade, I suggest that universities and other higher education institutions can and should step up and help ignite food systems transformations. They can do so by investing in the education and development of *practitioner-leaders*: a cadre of professionals who will directly and indirectly influence the actions and impacts of the Big Five investment areas.

To write a book invites scrutiny and criticism. I welcome the feedback and advice of readers, especially those agents of transformation on the front lines of science, policy, and practice. We can all make a commitment to learn, reflect, share, collaborate, act, and move constructively toward a common goal of universal food security.