

Preface

I agreed to put this book together because it helps me grapple with a concern I have had over much of my career. How can we better engage the policy and technological dimensions of our efforts to assure global food security? Since the late 1970s I have been engaged in some kind of agricultural research in developing countries. My research in Asia, Latin America and Africa focused on understanding and managing cereal diseases, mostly in rice. But very early on I began managing multidisciplinary research teams covering crop improvement, crop management, economics and the social sciences. Development economists and agricultural scientists view the world very differently, are prone to lively discussions when they are on speaking terms and sometimes forget that they are looking at the same world through different lenses.

It is my hope that students, early career scientists and policy makers will use this book as a resource for understanding the relationship between policy and technology. Scientists need to be aware from the beginning of their careers that their findings will play out within a policy environment. Appreciating that, perhaps some will be credible voices in the inevitable science policy debates. Likewise, policy makers should be aware of the incredible rate of scientific progress we are seeing today. More importantly, they should appreciate how available technologies – or their shortcomings – can determine the outcome of well-intentioned policies.

I was very fortunate throughout my career to have known and worked with those who played a major role in creating a world where food security has become almost a given. I was recruited into rice science by Peter Jennings, one of the creators of semi-dwarf rice varieties that were the foundation of the ‘Green Revolution’ in Asia and Latin America. I also enjoyed many conversations with Norman Borlaug, Nobel Peace Prize laureate in wheat breeding, near the end of his life. Both men trained as plant pathologists and made their marks through plant breeding, but they instilled in me a healthy respect for policy. They helped create modern rice and wheat varieties with much greater yield potential, but they recognised that without adequate water, fertiliser and markets to absorb additional production, this potential would not be realised. Major public policy measures were required to make the necessary investments in irrigation and transportation infrastructure, and credit and subsidy programs were developed to enable farmers to purchase improved seed and fertilisers. This exposure explains my first foray into the policy–technology arena that convened a dialogue between senior agricultural policy makers and research leaders in Asia.¹

To keep the book manageable it was necessary to impose some pretty strict boundaries. I opted to limit the focus to crops. These are the primary level of food production and account for most human food, either directly or indirectly as animal feed. Since the underlying justification of the book is to contribute to global food security, emphasis is given to those crops that provide most human calories (rice and wheat). They provide

abundant examples of technology–policy interactions. Geographically, the book concentrates on areas where food insecurity is, or has been, particularly severe, populations are largest and agricultural is undergoing the most rapid transformation: Asia and Africa. North and South America, Europe and Australia, for example, have already transformed their agriculture and have relatively mature agricultural economies.

The book aims to assemble topic areas and examples from both the technological and policy sides to illustrate their interdependency. Topics are arranged in a natural hierarchy from the genetic resources through production systems to overarching global trade issues. There is no attempt to cover comprehensively the latest scientific advances. This would be impossible to cover in any one volume and anyway would be out of date by the time the book was published. However, authors were asked to write chapters that do report the latest in their fields and illustrate potential policy-relevant opportunities and bottlenecks. I also invited several leaders in their fields to take the readers on a ‘deep dive’ into some emblematic areas of particularly exciting scientific advances: genomics, photosynthesis, nutrition and remote sensing. These serve as anchors to real-world discussions of what policy–technological feedback systems are needed to meet global food needs in the coming decades.

I am certainly no historian, but I do have a weakness for history so I have tried to weave in a historical context whenever possible. To my publisher’s discomfort I also included footnotes that can lead students down what I think are some pretty interesting avenues of relevant inquiry that I could not figure out how to squeeze into the main text. I have also liberally sprinkled my various contributions with personal opinions. These are mine alone and do not reflect the opinions of the publisher or contributors.

I would like to thank those who helped make this book possible. First, my wife Crissan endured seemingly endless stretches of my mental absence as I tried to assemble a diverse set of contributions into some meaningful whole. I am indebted to my many friends and colleagues in the social sciences for patiently tutoring me in their respective fields over the years. The authors of course have been extremely generous with their time and knowledge and without exception cheerfully responded to my many inquiries and sometimes-heavy editing pen. Their only compensation for writing such excellent chapters is the knowledge that they are making a contribution to the broader community. Nicki Dennis and Lauren Webb from CSIRO held my hand through much of the process. While Nicki is responsible for convincing me to undertake this project, I alone am responsible for any errors that may have slipped through.

Endnote

- 1 Zeigler RS (Ed.) (1996) *Rice Research and Development Policy: A First Encounter*. International Rice Research Institute, Manila. <http://books.irri.org/9712200841_content.pdf>.