

# Preface

During the last 40 years, improved technologies have fueled an on-going revolution in agriculture in most developing countries, but not in Africa. Since the 1970s, grain yields have more than doubled in China, India, many other Asian countries, and all of South America, while yields in Africa grew by a third. Still, it would be wrong to believe that agriculture in Africa did not grow. Turning to a different metric, cereal production more than doubled in Africa and, decade over decade, grew slightly faster in Africa than in Asia and just slightly slower than in South America. Even so, how African agriculture grew – by bringing more land under cultivation and introducing slow improvements in yields – has had consequences. Low and stagnant productivity has brought with it low income growth for those whose livelihood depends on agriculture. And this is especially significant for Sub-Saharan Africa, where agriculture accounts for nearly 70% of employment and more than a third of the population lives on less than a dollar a day.

There are urgent reasons to find a different way for agriculture to grow in Africa. Over the next 40 years, Africa's population will likely grow by 93% – nearly triple the rate of increase for the world as a whole. Moreover, while rural populations are expected to decline significantly in Asia and South America, rural populations are expected to grow in Africa. Already, land for expanding agricultural production has become scarce and land frontiers are closing across much of the continent. What's more, disease and poor infrastructure prevent some potentially productive lands in Africa from being farmed while overuse and poor land management practices have led to declining soil fertility in others places. In addition, should productivity continue to stall and Africa be unable to contribute more to global food supplies, there is risk that food prices will rise internationally and hinder global efforts to reduce poverty.

At the same time, the current situation in Africa is not so different from conditions in Asia before a Green Revolution began there. In Asia then as in Africa now, large portions of the population lived in rural areas and depended on agriculture for their livelihoods; many farmed small parcels of land and were poor; grain yields were low and stagnant; and famine was a lingering reality. Today, after decades of sustained growth in agricultural productivity, rural poverty has been greatly reduced

and food security greatly improved. For this reason, many African leaders have modeled their own efforts to improve agricultural productivity on lessons from Asia.

What lessons then can we draw from the Asian experience that are relevant for contemporary Africa? In the chapters of this volume, authors explore how Asia's Green Revolution began and how initial conditions then compare to Africa now. They explore various aspects of the Asian model, with its focus on smallholder agriculture, its emphasis on modern seed varieties and input-intensive methods, and its reliance on private markets. Some chapters examine in detail important institutions, including fertilizer markets, extension systems, and irrigation schemes, and key crops, maize and rice. Collectively, the chapters suggest that the Asian policy approach is well suited for Africa as a general framework.

However, the studies also point to key modifications needed to account for the great heterogeneity of conditions across Africa. In Asia, the dominant roles played by rice and wheat in farming systems and in the diets of the poor meant that a narrow set of technological breakthroughs had an outsized impact on farm productivity and incomes. In a related way, agro-climatic conditions within and across countries were often similar, which meant that a given technology that worked well in one place could work well in many places, thereby lowering the cost of achieving overall productivity growth. This is not to imply that productivity gains came easily or that country-based research did not play a role in adapting proven technologies to local conditions. Yet advancing increased productivity for staple grains was and remains a priority for many countries in Asia and gains there have been hard earned.

Still, Africa faces additional challenges. In Africa, diets are diverse, agro-climatic conditions vary greatly, and there are significant differences in population and infrastructure densities and the strength and efficacy of public and private institutions. Consequently, a mosaic of initial conditions prevails for the continent as a whole. Because of this, a portfolio of technologies is required to get the same impact as breakthroughs in rice and wheat brought to Asia. Differences in local conditions also imply greater experimentation and greater risks, even for technologies that are proven successful at field stations. It also put greater demands on extension services and farmers, who must sort out the effects of these differences on the economic viability of competing approaches to farming. And it puts a premium on markets for outputs, labor, land, and fertilizers, which must work across a larger set of core commodities.

So then, will all of these handicaps forestall an African Green Revolution? The chapters of this volume provide several reasons to believe they will not. To start, there are places in Africa today where productivity gains have been significant and where farmers obtain yields that rival their most productive counterparts in Asia. Moreover, the chapters' authors list new advances and find scope for transferring and adapting what has proved successful for smallholders in Asia and in Africa across the continent. And importantly, the twenty-first century has seen a recommitment by African governments and the development community to bring about a Green Revolution in African agriculture. It is our sincere hope that, by putting into perspective key aspects of both the Asian and African experiences, this volume contributes to that purpose and contributes to the design of an effective strategy to realize a Green Revolution in Africa.

This book is collaboration and there are many people to thank. It was Gershon Feder, the respected former economist at the World Bank, who first suggested a volume to explore the relevance of Asia's Green Revolution for Africa, while learning from the Asian experience, during the International Conference of Agricultural Economists in 2006 on the Australian Gold Coast. We would like to thank him for turning our attention to the exceedingly important issue. We owe much to his insights and advice. No less important were Peter Hazell and Derek Byerlee, two leading agricultural economists with rich experience in agricultural development in Asia and Africa, both of whom have served as economists at the research centers of the Consultative Group of International Agricultural Research and the World Bank. They directly contributed to the project leading to this book publication as authors and as advisers. Without their dedicated contributions, this project would not have been completed so successfully. We would like to express our sincerest appreciation to them.

To promote common understanding of the key issues and exchange the views among the contributors and with other researchers and policymakers, we organized a series of workshops: in Washington, April 2008, in Tokyo December 2008 and again in December 2009, as a Mini-Symposium at the International Conference of Agricultural Economics in Beijing in August 2009, in Nairobi in April 2010, at the Annual Bank Conference on Development Economics in Stockholm, June 2010, and in Washington, DC in January and March 2012. We have benefited greatly from the participants in these workshops. In particular, we would like to thank Karen Brooks, Nobumitsu Hayashi, Will Martin, Robert Mendelsohn, Michael Morris, Niggol Seo, and Jinxia Wang. We also thank Paul Kandasamy for editorial insights, Polly Means for improving the graphical presentations, and Mayuko Tanaka and Kazuko Yamamura for their patient preparation of the manuscript.

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An African Green Revolution

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