


Keijiro Otsuka
Donald F. Larson *Editors*

An African Green Revolution

Finding Ways to Boost Productivity
on Small Farms

 Springer

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Keijiro Otsuka
National Graduate Institute
for Policy Studies
7-2 2-1 Roppongi
Minato, Tokyo 106-8677
Japan

Donald F. Larson
The World Bank
Research Group
1818 H Street Northwest
Washington, DC 20433
USA

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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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Contributors

Ibrahim Bamba Programme Management Department, International Fund for Agricultural Development, Rome, Italy

Derek Byerlee Washington, DC, USA

Aliou Diagne Policy and Impact Assessment, Africa Rice, Cotonou, Benin

Jonna P. Estudillo National Graduate Institute for Policy Studies, Tokyo, Japan

Daniel Zerfu Gurara African Development Bank, Tunis-Belvédère, Tunisia

Peter B.R. Hazell Imperial College, London, UK

Centre for Development, Environment and Policy, School of Oriental and African Studies, University of London, Ashford, Kent, UK

Thom Jayne Department of Agricultural Food, and Resource Economics, Michigan State University, East Lansing, MI, USA

Kei Kajisa School of International Politics, Economics, and Communication, Aoyama Gakuin University, Tokyo, Japan

Yoko Kijima Graduate School of Systems and Engineering, University of Tsukuba, Tsukuba, Ibaraki, Japan

Florent M. Kinkingninhoun-Medagbe Africa Rice Center (AfricaRice), Cotonou, Benin

Donald F. Larson World Bank, Washington, DC, USA

Tomoya Matsumoto National Graduate Institute for Policy Studies, Tokyo, Japan

Soul-Kifouly Gnonna Midingoyi Institut National pour la Recherche Agricole du Benin (INRAB), Porto-Novo, Benin

Yuko Nakano Faculty of Humanities and Social Sciences, University of Tsukuba, Tsukuba-shi, Ibaraki, Japan

Keijiro Otsuka National Graduate Institute for Policy Studies, Tokyo, Japan

N. Venkatesa Palanichamy Department of Agricultural and Rural Management, Centre for Agricultural and Rural Development Studies, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Melinda Smale Department of Agricultural, Food and Resource Economics, Michigan State University, East Lansing, MI, USA

Dick Sserunkuuma Department of Agricultural Economics & Agribusiness, Makerere University, Kampala, Uganda

Takuji Tsusaka International Rice Research Institute, Makati City, Philippines

Takashi Yamano International Rice Research Institute, New Delhi, India

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Chapter 1

An Overview

Keijiro Otsuka, Donald F. Larson, and Peter B.R. Hazell

Abstract On average, agriculture accounts for 70% of full-time employment in Africa, 33% of national income, and 40% of total export earnings, and its importance is even greater in the poorest countries. Yet its performance in recent decades has been one of the worst in the world. Africa has some of the lowest levels of land and labor productivity and these have barely changed in 30 years. And, while it might appear obvious that accelerating agricultural growth should figure prominently in any strategy to reverse Africa's decline, agriculture virtually fell off the development agenda for Africa until recently. Now that agriculture is back in the spotlight, important differences about the nature of the effective agricultural development strategy have emerged around four key issues; whether to prioritize small or large farms; whether to focus on food staples or high value products; whether to promote technologies and farming practices that require fertilizers and modern seeds; and the degree to which governments should intervene in markets. By reviewing the existing studies in these areas, this chapter sets the stage for detailed empirical studies conducted in subsequent chapters.

K. Otsuka
National Graduate Institute for Policy Studies,
7-22-1 Roppongi, Minato-ku, Tokyo 106-8677, Japan
e-mail: otsuka@grips.ac.jp

D.F. Larson (✉)
Development Research Group, World Bank, 1818 H Street NW,
Washington, DC 20433, USA
e-mail: dlarson@worldbank.org

P.B.R. Hazell
Imperial College, London, UK

Centre for Development, Environment and Policy,
School of Oriental and African Studies (SOAS), University of London,
Fallowfield, Westwell, Ashford, Kent, TN25 4LQ, UK
e-mail: p.hazell@cgiar.org