THE NEW HARVEST
“This book presents a timely analysis of the importance of infrastructure in improving Africa’s agriculture. Leaders at national and state levels will benefit immensely from its evidence-based recommendations.”
— Goodluck Jonathan
President of the Federal Republic of Nigeria

“This book is a forceful reminder of the important role that African women play in agriculture on the continent. It is critical that they are provided with equal educational opportunity as a starting point for building a new economic future for the continent.”
— Ellen Johnson Sirleaf
President of the Republic of Liberia

“New technologies, especially biotechnology, provide African countries with additional tools for improving the welfare of farmers. I commend this book for the emphasis it places on the critical role that technological innovation plays in agriculture. The study is a timely handbook for those seeking new ways of harnessing new technologies for development, including poor farmers, many of whom are women.”
— Blaise Compaoré
President of Burkina Faso

“The New Harvest underscores the importance of global learning in Africa’s agricultural development. It offers new ideas for international cooperation on sustainable agriculture in the tropics. It will pave the way for improved collaboration between Africa and South America.”
— Laura Chinchilla
President of Costa Rica
In memory of Christopher Freeman
Father of the field of science policy and innovation studies
## CONTENTS

Acknowledgments  ix  
Introduction  xiii  
Selected Abbreviations and Acronyms  xxv  

1  The Growing Economy  1  
2  Advances in Science, Technology, and Engineering  23  
3  Agricultural Innovation Systems  50  
4  Enabling Infrastructure  84  
5  Human Capacity  114  
6  Entrepreneurship  142  
7  Governing Innovation  166  
8  Conclusions and the Way Ahead  204  

Appendix I  Regional Economic Communities  219  
Appendix II  Decisions of the 2010 COMESA Summit on Science and Technology for Development  225  
Notes  233  
Index  256
Agricultural Innovation in Africa Project

Project Director and Lead Author
Calestous Juma, Harvard Kennedy School, Harvard University, Cambridge, USA

International Advisory Panel and Contributing Authors
John Adeoti, Nigerian Institute of Social and Economic Research, Ibadan, Nigeria
Aggrey Ambali, NEPAD Planning and Coordinating Agency, Tshwane, South Africa
N’Dri Assié-Lumumba, Cornell University, Ithaca, USA
Zhangliang Chen, Guangxi Zhuang Autonomous Region, Nanning, People’s Republic of China
Mateja Dermastia, Anteja ECG, Ljubljana, Slovenia
Anil Gupta, Society for Research and Initiatives for Sustainable Technologies and Institutions, and Indian Institute of Management, Ahmedabad, India
Daniel Kammen, University of California, Berkeley, USA
Margaret Kilo, African Development Bank, Tunis, Tunisia
Hiroyuki Kubota, Japan International Cooperation Agency, Tokyo
Francis Mangeni, Common Market for Eastern and Southern Africa, Lusaka, Zambia
Magdy Madkour, Ain Shams University, Cairo, Egypt
Venkatesh Narayanamurti, School of Engineering and Applied Sciences, Harvard University, USA
Robert Paarlberg, Wellesley College and Harvard University, USA
Maria Jose Sampaio, Brazilian Agricultural Research Corporation, Brasilia, Brazil
Lindiwe Majele Sibanda, Food, Agriculture and Natural Resources Policy Analysis Network, Tshwane, South Africa
Greet Smets, Biotechnology and Regulatory Specialist, Essen, Belgium
Botlhale Tema, African Creative Connections, Johannesburg, South Africa
Jeff Waage, London International Development Centre, London
Judi Wakhungu, African Centre for Technology Studies, Nairobi, Kenya

Project Coordinator
Greg Durham, Harvard Kennedy School, Harvard University, Cambridge, USA