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Southern African Agriculture and Climate Change
A Comprehensive Analysis

Edited by Sepo Hachigonta, Gerald C. Nelson, Timothy S. Thomas, and Lindiwe Majele Sibanda

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The world’s population is projected to grow from 7 billion in 2012 to around 9 billion by 2050. In Africa south of the Sahara, the population is likely to surge from around 850 million today to around 1.7 billion in 2050. Southern Africa alone will make up almost 14 percent of the population of Africa south of the Sahara and almost 3 percent of the world’s population in 2050. Most of the people comprising this population increase are expected to live in urban areas and to have higher incomes than currently is the case, which will result in increased demand for food. The challenge of meeting this food demand in a sustainable manner will be enormous. When one takes into account the effects of climate change (higher temperatures, shifting seasons, more frequent and extreme weather events, flooding, and drought) on food production, that challenge grows even more daunting. The global food price spikes of 2008, 2010, and 2012 are harbingers of a troubled future for global food security.

At the end of 2010, IFPRI published *Food Security, Farming, and Climate Change to 2050: Scenarios, Results, Policy Options*, a research monograph by Gerald Nelson and a team of IFPRI researchers that quantitatively assessed the additional challenges to sustainable food security that climate change would bring, focusing on global outcomes but also including national and subnational results. Three years later, Nelson and a group of leading agriculturists and climate change researchers have written this monograph, which draws out those national results based on a detailed global model and enhances them with country-specific analysis and insights for southern Africa.

This is one of three publications (covering West, East, and southern Africa) that make up IFPRI’s *Climate Change in Africa* series. It provides the most comprehensive analysis to date of the scope of climate change as it relates to
food security in southern Africa, including who will be most affected and what policymakers can do to facilitate adaptation. Augmenting the text are dozens of detailed maps that provide graphical representations of the range of food security challenges and the special threats from climate change.

Using a comprehensive integrated empirical analysis, the authors generated information to better guide national development agendas on climate change and have suggested that policymakers should (1) incorporate climate change adaptation strategies in short- and long-term national development planning; (2) develop national capacity in the skills and tools needed for technical assessments, planning, and policy development in the context of climate change; (3) promote sustainable agriculture initiatives that target vulnerable communities; and (4) enhance investments in relevant economic sectors, in particular the agricultural sector. *Southern African Agriculture and Climate Change* will be indispensable to a wide range of readers, including the policymakers, development workers, and researchers who tackle these inextricably linked issues.

Shenggen Fan
Director General, International Food Policy Research Institute
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>A1B</strong></td>
<td>greenhouse gas emissions scenario that assumes fast economic growth, a population that peaks midcentury, and the development of new and efficient technologies, along with a balanced use of energy sources</td>
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<tr>
<td><strong>A2</strong></td>
<td>greenhouse gas emissions scenario that assumes a very heterogeneous world with continuously increasing global population and regionally oriented economic growth that is more fragmented and slower than in other storylines</td>
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<tr>
<td><strong>AGOA</strong></td>
<td>African Growth and Opportunity Act</td>
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<tr>
<td><strong>AIACC</strong></td>
<td>Assessment of Impacts and Adaptation to Climate Change</td>
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<tr>
<td><strong>AR4</strong></td>
<td>Fourth Assessment Report of the Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td><strong>B1</strong></td>
<td>greenhouse gas emissions scenario that assumes a population that peaks midcentury (like A1B) but with rapid changes toward a service and information economy and the introduction of clean and resource-efficient technologies</td>
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<tr>
<td><strong>CAADP</strong></td>
<td>Comprehensive African Agricultural Development Program</td>
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<td><strong>CANGO</strong></td>
<td>Coordinating Assembly of Non Governmental Organizations</td>
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<tr>
<td><strong>CCAA</strong></td>
<td>Climate Change Adaptation in Africa</td>
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<td><strong>CCAFS</strong></td>
<td>The Climate Change, Agriculture, and Food Security Research Program of the CGIAR</td>
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CNR National Meteorological Research Center, France
CNRM-CM3 National Meteorological Research Center–Climate Model 3
CSIRO Commonwealth Scientific and Industrial Research Organisation, Australia
CSIRO MARK 3 Climate model developed at the Australia Commonwealth Scientific and Industrial Research Organization
DFID Department for International Development
DM Disaster Management
DSSAT Decision Support Software for Agrotechnology Transfer
ECHAM 5 fifth-generation climate model developed at the Max Planck Institute for Meteorology (Hamburg)
FANRPAN Food, Agriculture, and Natural Resources Policy Analysis Network
FAO Food and Agriculture Organization of the United Nations
FMD foot and mouth disease
FPU food production unit
GCM general circulation model
GDP gross domestic product
IAM integrated assessment model
IDRC International Development Research Centre
IFPRI International Food Policy Research Institute
IFRC International Federation of Red Cross and Red Crescent Societies
IMPACT International Model for Policy Analysis of Agricultural Commodities and Trade
IPCC Intergovernmental Panel on Climate Change
IUCN International Union for Conservation of Nature
KDDP Komati Downstream Development Project
LHWP Lesotho Highlands Water Project
LIMID Livestock Management and Infrastructure Development Program
LUSIP  Lower Usuthu Smallholder Irrigation Project
MDG   Millennium Development Goal
MIROC 3.2  Model for Interdisciplinary Research on Climate, developed at the University of Tokyo Center for Climate System Research
MOA   Ministry of Agriculture
NAMBOARD National Agricultural Marketing Board
NAMPAADD National Master Plan for Arable Agriculture and Dairy Development
NAPA  National Adaptation Programme of Action [on Climate Change]
NDP   National Development Plan
NGO   nongovernmental organization
NMC   National Maize Corporation
OVCS  orphaned and vulnerable children
R     South African rand
SACU  South African Customs Union
SADC  Southern Africa Development Community
SADP  Swaziland Agricultural Development Program
SARDC Southern African Research and Documentation Centre
SCCP  Swaziland Climate Change Programme
SCF   seasonal climate forecast
SNL   Swazi Nation land
SPAM  Spatial Production Allocation Model
SRES Special Report on Emissions Scenarios, a report by the Intergovernmental Panel on Climate Change that was published in 2000
SSA   Swaziland Sugar Association
SWADE Swaziland Water and Agricultural Development Enterprise
TDL   title deed land
UN    United Nations
<table>
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<tr>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>UNPOP</td>
<td>United Nations Department of Economic and Social Affairs–Population Division</td>
</tr>
<tr>
<td>US$</td>
<td>US dollars</td>
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<tr>
<td>UZ</td>
<td>University of Zimbabwe</td>
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