

Agriculture and Rural Development in a Globalizing World

Challenges and Opportunities

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1 Introduction

Prabhu Pingali and Gershon Feder

Over the past 50 years, we have seen tremendous progress in poverty reduction and overall economic development across much of the developing world. The incidence of poverty in nonmember countries of the Organisation for Economic Co-operation and Development (OECD), as measured by the proportion of the population living under \$1.25 a day, has dropped from 47 percent in 1990 to 14 percent in 2015 (World Bank 2016). The United Nations reports that developing countries, in aggregate, have achieved the Millennium Development Goal (MDG) poverty reduction target. However, there are significant regional differences, with sub-Saharan Africa and South Asia lagging behind on poverty, hunger, and other welfare indicators.

Several dozen countries in Asia and Latin America have graduated to middle-income status, some well on their way to becoming developed countries. In most of these countries, agricultural growth has played an important role in “jumpstarting” overall economic development and in moving countries along the structural transformation pathway (Timmer 2010). Agricultural growth, often associated with the Green Revolution, focused on enhancing smallholder staple food crop productivity, has been associated with high rates of poverty reduction (Hazell 2010). These emerging economies are well on their way toward agricultural modernization and structural transformation. The challenge for agriculture in the emerging economies is to maintain competitiveness in the face of global integration of food markets and to close the interregional income gap (Pingali 2010).

In the low-income countries of sub-Saharan Africa, continued high levels of food deficits and the reliance on food aid and food imports have reintroduced agriculture as an engine of growth on the policy agenda (Pingali 2012). There is also an increasing awareness of the detrimental impacts of climate change on food security, especially for tropical agriculture systems in low-income countries (Byerlee, de Janvry, and Sadoulet 2009). These countries continue to be plagued by the age-old constraints to enhancing productivity growth, such as the lack of technology, poor market infrastructure, insufficient institutions, and absence of an enabling policy environment (Binswanger and McCalla 2010).

In sub-Saharan Africa, the demand for intensification, and hence the need for land productivity-enhancing Green Revolution technology, was low in the 1960s (Pingali 2012). Also, in the decades of the 1960s and 1970s, agricultural research was not focused on crops important to African smallholders, such as sorghum, millet, cassava, and tropical maize (Evenson and Gollin 2003). In the last decade there has been a significant rise in the introduction and adoption of improved varieties of these crops (Walker and Alwang 2015). At the same time in Asia, lower potential rice lands are witnessing the rapid spread of improved drought- and flood-tolerant varieties (Pandey, Velasco, and Yamano 2015).

In the emerging economies, growing private sector interest in investing in the agricultural sector has created an agricultural renaissance (Pingali 2010). Supermarkets are spreading rapidly across urban areas in emerging economies and are encouraging national and multinational agribusiness investments along the fresh produce value chains in these countries (Reardon and Minten 2011). Consequently, staple crop monoculture systems, popularized by the Green Revolution, are diversifying into high-value horticulture and livestock production. Despite these positive developments, interregional differences in productivity and poverty persist in many emerging economies.

Many of the recently adopted Sustainable Development Goals (SDGs) focus on themes in which agricultural progress plays an important role in bringing the world closer to the internationally agreed-upon objectives. In particular, the goals of eliminating poverty and hunger depend significantly on the ability of agricultural systems to produce affordable food. At the same time, the objectives of improving health, education, gender equality, and access to clean water and sanitation – themes for which rural populations are not as well served as urban populations – are conducive, directly or indirectly, to better agricultural performance.

Guide to the book

This book addresses the challenges of reorienting agriculture and rural development in a world that is going through rapid structural transformation, globalization, and urbanization. It provides a comprehensive assessment with a “state-of-the-art” review of the literature on each of the facets of the transformation process and a policy agenda for tackling the challenges ahead. It is designed around five thematic parts: Agricultural Intensification and Technical Change, Political Economy of Agricultural Policies; Community and Rural Institutions; Agriculture, Nutrition, and Health; and Future Relevance of International Institutions. This book honors Hans Binswanger’s outstanding contributions to the agricultural and developmental economics profession. His research work, as well as his hands-on involvement in agricultural development and poverty alleviation programs in the course of his World Bank tenure, contributed enormously to academic research and development practice in all of the thematic areas. The chapters of this book touch on many of the themes that Hans focused on during his distinguished career.

Agricultural intensification and technical change

The first set of chapters deals with agricultural intensification and technical change, with emphasis on the challenges faced by smallholder farmers. In Chapter 2, authors Gershon Feder and Sara Savastano analyze farm-level data from four low-income sub-Saharan African countries to gain insight into possible reasons for the low adoption of modern productivity-enhancing inputs, such as inorganic fertilizers and improved seeds, by Africa's mostly smallholder farmers. The results indicate that distance to markets, illiteracy, and discriminatory policies and practices that disadvantage female farmers are associated with lower adoption of modern inputs. Policies to improve farmers' access to markets, expand rural education, and eliminate discrimination against female farmers should therefore be promoted.

In Chapter 3, authors Pasquale Lucio Scandizzo and Sara Savastano use data from five sub-Saharan African countries to examine the robustness of the negative relation between farm size and productivity that is often observed in empirical studies. The authors conclude that once proper account is taken of the impacts of soil quality, proximity to markets, and other agroecological and climatic factors, the relation between farm size and productivity is nonlinear and not unidirectional. Farms in the lower tail of the land productivity distribution experience an inverse relationship between productivity and farm size only beyond a certain critical size. On the other hand, farms at the upper end of the productivity distribution experience an inverse relationship between size and productivity only below a critical size.

In Chapter 4, authors Derek Byerlee, William A. Masters, and Daniel S. Robinson examine the options for enabling smallholders to gain access to yet unexploited lands, where they will have a potential for high productivity only if the infrastructure (e.g., roads, irrigation, and energy) of such regions is developed. Governments of many low-income countries lack the financial resources needed to undertake such investments on a large scale. The authors show through analyses of historical and current case studies that allowing private, large-scale investors to undertake the infrastructure development for subsequent sale or lease to smallholders, along with appropriate government regulatory supervision to avoid abuses, can yield beneficial results for all involved.

In Chapter 5, the author Michael Lipton points out that subsistence farmers, who satisfy most of their staple food needs from their own production, are efficient given the constraints they face. They should therefore not be viewed as an obstacle to development, as some policymakers and development practitioners tend to do. Accordingly, agricultural policies should be designed so as not to harm their welfare.

Political economy of agricultural policies

The second part of the book focuses on agricultural policies and investments, and how they are related to observed patterns of agricultural and economic development. Chapter 6 examines the sectoral structure of African economies.

The authors Johann Kirsten and Frikkie Liebenberg observe that the evolution of the structure over time does not follow the classical pattern whereby the share of agriculture declines with the growth of per capita income, while the share of manufacturing grows, and eventually the service sector grows while the share of agriculture declines further. Rather, the authors note that there is growth of the service sector with very modest change in manufacturing. They hypothesize that this is the outcome of a failure to significantly raise agricultural productivity through appropriate agricultural policies and investments, and a failure to provide sufficient inducement to private sector investment in manufacturing through adequate public investment in human capital and physical infrastructure.

Chapter 7 reviews the predictions and policy relevance of agricultural evolution theory, a key area of Hans Binswanger's research contributions. This body of theoretical work consists of two strands: (1) the Boserup/Ruthenberg model of agricultural change in response to population growth and market access, focusing on the tropics; and (2) the production relations synthesis that explains rural markets by reference to individual behavior and to the physical characteristics of farming. In this chapter, the author John Murray McIntire demonstrates how the theory's predictions were validated by empirical analyses of themes such as the evolution and adoption of farming techniques, land management, the emergence of land and credit markets, the survival of family farming, and the effects of population and markets on agricultural intensification. He further attributes the design of a number of key policies and agricultural development strategies to the insights gained from agricultural evolution theory. Chief among these is the elimination of the bias against family farming.

In Chapter 8, Klaus Deininger discusses another important focus of Hans Binswanger's research – namely, policies to enhance land tenure security and to improve the efficiency of land markets. He highlights the fact that land policies with potential to enhance efficiency and equity are often not implemented. The chapter then provides examples to show that advances in IT and geospatial technology facilitate the effective implementation of needed policies and public investments by reducing informational imperfections, enhancing benefits from land information and facilitating participation by farmers of all strata.

In Chapter 9, the authors Kym Anderson, William J. Martin, and Maros Ivanic review recent work on governments' policy responses to global food price volatility and efforts at domestic price insulation. The authors point out that countries tended to insulate strongly against shocks to international prices of staple foods. However, within a couple of years, the countries had fully passed the more sustained increases in prices into domestic markets. Further analysis reported in the chapter leads to the conclusion that this is part of a systematic pattern of response by which policymakers resist sharp changes in prices, causing the rate of protection to deviate from its steady-state political equilibrium. Policymakers subsequently reduce this disequilibrium by raising domestic prices to return them closer to their desired rates of protection. The authors argue that while these policies are successful in preventing significantly adverse impacts on

poverty rates in the short term, these benefits are eliminated in the aggregate due to the price increases that result from countries collectively insulating their markets.

In Chapter 10, the author Greg Traxler looks at institutional constraints with respect to technology research, development, and dissemination, with specific reference to biotechnology. He assesses the institutional capacity and incentives to deliver GMO technology to farmers, and the metrics that are used to trace the institutional sources of available GMOs. Scientific progress and commercial delivery of GMOs in the United States are compared to that of developing countries, drawing on the experience of the first two decades of what was once called “the biotechnology revolution.” The assessment attempts to shed light on the question of whether GMOs are likely to be a significant source of technological progress in developing country agriculture in the future.

Community and rural institutions

The third part of the book assesses the application of the community and rural institutions in agricultural development. Chapter 11 focuses on index-based insurance – an innovation whose utility for smallholder farmers had been questioned by Hans Binswanger in his much cited 2012 article in the *Journal of Development Studies*. The authors Peter Hazell and Ulrich Hess note that while such insurance schemes’ coverage has grown in recent years, their uptake is still constrained by weak farmer demand and has been scaled up only with the aid of subsidies. It is argued that governments have been willing to subsidize index-based insurance schemes as part of broader political and social agendas. Indeed, in some cases such programs may be a cost-effective and less distorting way to address social needs. The authors point out that in the case of nature-related calamities, such as droughts, post-disaster assistance programs are already fully funded. Therefore, diverting part of the funds to subsidized index insurance products might lead to better and more cost-effective outcomes.

Chapter 12 assesses the efficiency and productivity of voluntary water trading, as compared to mandatory quotas, in allocating irrigation water resources – the latter being a fairly common approach to assigning water use rights. The authors Mark W. Rosegrant, Man Li, and Wenchao Xu note that, typically, real-life situations entail production uncertainty and information asymmetry between the water agency and individual farmers. The analysis in the chapter demonstrates that for the normally prevailing shape of irrigation water production and cost functions, a voluntary water-trading scheme generates higher benefits than a quota allocation system.

In Chapter 13, the author Jacomina de Regt reviews the experience and lessons learned from the implementation of one of Hans Binswanger’s key areas of development practice – the community-driven development approach, whereby communities are allowed to have much greater control over the design and implementation of development activities intended to benefit members of the community. The author notes that the actual record

of community-based development schemes is mixed, with some programs encountering problems such as “elite capture” and lack of sustainability. One of the factors hindering successful outcomes is the failure to recognize that just as there are “market failures” and “government failures,” there are also “civil society failures” that need to be detected before resources are committed, so that mechanisms to overcome the constraints are built into the design of programs. The chapter then summarizes the key lessons to guide the formulation of successful programs.

Agriculture, nutrition, and health

The fourth part of the book focuses on the interactions between agriculture, nutrition, and health. Chapter 14 highlights the complexity of linkages between agricultural change and health and nutrition, noting that indirect links are underrated, especially the food and agriculture linkages related to water and sanitation. The chapter's author Joachim von Braun emphasizes the importance of recognizing that there are dynamic relationships driven by market volatilities and by a broader set of technical and institutional innovations. He outlines a new framework that focuses on positive linkages and avoidance of adverse linkages between agriculture and health.

In Chapter 15, the authors Prabhu Pingali and Tanvi Rao focus on India's puzzling experience, whereby impressive agricultural and economic development, although leading to a significant decline in the incidence of hunger, has not significantly reduced the high levels of stunting, underweight, and wasting among children. The authors note that significant nutrition deficiency is also widespread among adults. The chapter provides a detailed review of the existing empirical studies on the multidimensional factors that explain malnutrition in India. The review assesses the rigor of the different analyses, so as to throw light on the relative strength of different nutritional determinants and interventions. Furthermore, it also highlights conceptual and methodological gaps in the literature, to set the stage for further research.

Future relevance of international institutions

The last part of the book discusses the developmental impact and future prospects of two important global institutions in which Hans Binswanger spent most of his outstanding career: CGIAR, formerly the Consultative Group for International Agricultural Research, and the World Bank. In Chapter 16, the authors Uma Lele, Sambuddha Goswami, and Gianluigi Nico analyze the record of the structural transformation process of a large set of countries over the past quarter century, noting that economic growth has not always achieved shared prosperity nor led to structural transformation. The authors present evidence on the performance of agriculture, manufacturing, and services, and their roles in transformation. They then review the World Bank's policy concerning “graduation” of countries from receiving highly subsidized credits when they have low

per capita income to loans with closer to market interest, once the countries reach middle-income levels. The chapter explores the extent to which the “graduated” member countries and other top recipients of World Bank assistance have achieved transformation, as distinct from simply economic growth. Finally, an attempt is made to assess the contribution of the World Bank to the transformation process. The authors note that while the World Bank’s assistance is still needed by many countries, the challenges of climate change, conflict, and violence will not be easy to tackle, and the World Bank will need to devise new ways of operating that would be different from past approaches.

The last chapter of the book, Chapter 17, reviews the evolution of CGIAR since its inception in 1971. Its author, Alex F McCalla, notes that it was created when there were grave concerns about the ability of global agriculture to feed the world. He describes how the system has grown from a small group of four research centers (two of which had produced Green Revolution semi-dwarf rice and wheat cultivars) to a consortium of 15 centers, spending jointly over US\$1 billion annually. The author highlights the shift over time in the CGIAR’s agenda away from cutting-edge, applied agricultural research toward more downstream adaptation and implementation, and discusses the relatively frequent donor-induced disruptive changes in its governance and management structure, as well as in its strategic agendas. The author questions the ability of the CGIAR to effectively meet the challenges of feeding 9.7 billion people by 2050 with fairly fixed water and land resources, unless it reduces and restructures its research platforms (centers) and refocuses on high-priority research critical to global food security.

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