



Evaluative Lessons for Agriculture and Agribusiness

ECG Paper #3



ABOUT ECG

The Evaluation Cooperation Group (ECG) is a network of evaluators of multilateral financial institutions (MFIs) established in 1996 to strengthen the use of evaluation for greater MFI effectiveness and accountability; share lessons; harmonize performance indicators and evaluation methodologies and approaches; enhance evaluation professionalism within the MFIs and collaboration with the heads of evaluation units of bilateral and multilateral development organizations; and facilitate the involvement of borrowing member countries in evaluation and build their evaluation capacity.

ECG members include the African Development Bank Operations Evaluation Department, Asian Development Bank Independent Evaluation Department, European Bank for Reconstruction and Development Evaluation Department, European Investment Bank Operations Evaluation, Inter-American Development Bank Office of Evaluation and Oversight, International Fund for Agricultural Development Office of Evaluation, International Monetary Fund Independent Evaluation Office, Islamic Development Bank Group Operations Evaluation Department, and the World Bank Group Independent Evaluation Group.

The United Nations Development Programme Evaluation Group and the Evaluation Network of the Development Assistance Committee of the Organisation for Economic Co-operation and Development are observers. Black Sea Trade and Development Bank Independent Evaluation Office and Council of Europe Development Bank Ex Post Evaluation Department are aspiring members.

Other evaluations and more information about the ECG can be found at: <http://www.ecgnet.org>.

Evaluative Lessons for Agriculture and Agribusiness

ECG Paper 3



©2011 Independent Evaluation Group
Communications, Learning, and Strategy
The World Bank
1818 H Street, NW
Washington, DC 20433
E-mail: ieg@worldbank.org
Telephone: 202-458-4487
Fax: 202-522-3125
<http://www.worldbank.org/ieg>

All rights reserved

This publication is a product of the Evaluation Cooperation Group. The findings, interpretations, and conclusions expressed here do not necessarily reflect the views of the Executive Directors of The World Bank or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of the World Bank or IEG concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Rights and Permissions

The material in this publication is copyrighted. Copying and/or transmitting portions or all of this work without permission may be a violation of applicable law. IEG encourages the dissemination of its work and will normally grant permission to reproduce portions of the work promptly.

For permission to photocopy or reprint any part of this work, please send a request with complete information to ieg@worldbank.org.

Cover: **Top:** Crops from a farm in Colombia. Photo by Edwin Huffman, courtesy of the World Bank Photo Library. **Left:** Milk production in South America. Photo by Edwin Huffman, courtesy of the World Bank Photo Library. **Center:** Farm work in Ghana. Photo by Curt Carnemark, courtesy of the World Bank Photo Library. **Far right:** Cotton crop in Sudan. Photo by Arne Hoel, courtesy of the World Bank Photo Library. **Bottom left:** Madagascar market. Photo by Yosef Hadar, courtesy of the World Bank Photo Library.

ISBN-13: 978-1-60244-165-1
ISBN-10: 1-60244-165-0

The lead author for this paper is Xubei Luo. Input was received from James Oehmke and Dave Weatherspoon.

Contents

v	Abbreviations
vii	Preface
2	Agriculture and Agribusiness in Perspective
3	Decline in Focus and Renewed Challenges
6	The Critical Role of Productivity
9	Regional Differences
	9 Agriculture-Based Economies
	11 Transforming Economies
	12 Urbanized Economies
	12 Differentiation of Rural Households and Development Strategies
13	Six Action Areas
	14 Research and Extension
	18 Access to Water
	20 Access to Credit
	21 Access to Land and Formalization of Land Rights
	22 Transport and Marketing
	23 Policies, Markets, and Agribusiness
25	Institutional Factors
	25 Coordination within Organizations
	26 Coordination among Donors
27	Monitoring and Evaluation
28	Conclusion
31	References

Abbreviations

ADB	Asian Development Bank
AfDB	African Development Bank
CGIAR	Consultative Group on International Agricultural Research
CURE	Consortium for Unfavorable Rice Environments
EBRD	European Bank for Reconstruction and Development
ECG	Evaluation Cooperation Group
FAO	Food and Agriculture Organization
GDP	Gross domestic product
IDB	Inter-American Development Bank
IEG	Independent Evaluation Group
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFI	International financial institution
IFPRI	International Food Policy Research Institute
MDB	Multilateral Development Bank
M&E	Monitoring and evaluation
NARS	National Agricultural Research System
R&D	Research and development
WBG	World Bank Group

Preface

This paper represents a collaborative effort of the Evaluation Cooperation Group (ECG) of a number of multilateral development banks and international financial institutions.

This paper synthesizes recent work by the independent evaluation agencies of the ECG and incorporates lessons from related research by multilateral development banks and from the academic literature on agriculture and agribusiness. Evaluative findings indicate that increasing productivity—through attention to research and extension, access to water, access to credit, land issues, transport, policy, markets, and institutional development—is vital for improving agricultural performance. Functional monitoring and evaluation systems, lacking in most settings, are needed to help ensure project performance and to draw lessons from experience. The paper suggests that, to ensure better outcomes from the recent substantial increase in agriculture and agribusiness investment, four dimensions of efforts should be emphasized: fostering public-private partnership, drawing on cross-sector synergies and complementarities, strengthening intra- and interinstitutional coordination, and improving environmental sustainability.

The synthesis was undertaken at the request of ECG members. Encouragement to the study team has been provided by Colin Kirk, Fredrik Korfker, H. Stephen A. Quick, H. Satish Rao, and Vinod Thomas. Overall guidance and oversight have been provided by Vinod Thomas. The steering committee consisted of Patrick Grasso, Monika Huppi, and Stoyan Tenev (the World Bank

Group). The main author was Xubei Luo (World Bank Group); input was provided by James Oehmke and Dave Weatherspoon (consultants). The report team benefited from consultations with colleagues from the evaluation team and agriculture and agribusiness teams of the African Development Bank, Asian Development Bank, Inter-American Development Bank, International Fund for Agricultural Development, International Food Policy Research Institute, and the World Bank Group. Valuable comments and contributions were provided by Mohamed H. Manai and Detlev Puetz, African Development Bank; Ramesh B. Adhikari, Asian Development Bank; Horst Wattenbach, Council of Europe Development Bank; Tom Bartos, European Bank for Reconstruction and Development; Andrew David Brubaker and Luciano Lavizzari, International Fund for Agricultural Development; and Miguel Angel Rebolledo Dellepiane, Ade Freeman, Nalini Kumar, and Jiro Tominaga, the World Bank Group. Editorial support was provided by William B. Hurlbut and Heather Dittbrenner of the Independent Evaluation Group of the World Bank Group.

The synthesis team greatly appreciates the efforts of all of these people in helping complete this report. The successful coordination among the members of the ECG in producing it is an important step toward achieving the ECG's mission of fostering collaboration and harmonization of evaluation work among the evaluation units of its members and disseminating evaluation findings to help maximize the relevance and effectiveness of development assistance.

H. Satish Rao

Chair, Evaluation Cooperation Group and
Director General, Independent Evaluation Department,
Asian Development Bank
January 2011

Evaluative Lessons for Agriculture and Agribusiness

Agricultural investments made by developing countries and multilateral development banks (MDBs) have declined in recent decades. This decline is associated with a slowdown in the growth of agriculture productivity. Most development institutions have recognized the damage caused by this past neglect—in part evident in rising food prices—and renewed attention to agriculture and agribusiness is emerging. But this renewed interest will need to deliver results, especially in Sub-Saharan Africa, where the MDBs have had the least success but where the needs and opportunities are enormous.

This paper synthesizes recent work by the independent evaluation agency members of the Evaluation Cooperation Group (ECG) and incorporates lessons from related research by MDBs and from the academic literature on agriculture and agribusiness. The objectives of the paper, in addition to distilling evaluative lessons for agriculture and agribusiness, are to examine the key constraints on the sector and to provide evaluators, operational staff, and policy makers with an evaluative perspective on interventions in countries at different stages of development.

Evaluative findings indicate that increasing productivity—through attention to research and extension, access to water, access to credit, land issues, transport, markets, institutional development, and policy—is vital for improving agricultural performance. In addition, functional monitoring and evaluation (M&E) systems, lacking in most settings, are needed to help ensure project performance and to draw lessons from experience.

To ensure better outcomes from the recent and substantial increase in agriculture and agribusiness investment, this synthesis suggests that four dimensions should be emphasized: foster-

ing public-private partnership, drawing on cross-sector synergies and complementarities, strengthening intra- and interinstitutional coordination, and improving environmental sustainability.

- The extent to which interventions have used linkages between government and private producers makes a difference in performance. The public goods nature of agricultural services, such as research or infrastructure, obliges governments and international institutions to intervene, but the impact of their interventions will only be as good as the links made with private producers.
- Synergies and complementarities across sectors—such as infrastructure, education, and health—influence the effectiveness of interventions. The strong interdependence between agriculture and various other sectors indicates that a cross-sectoral approach would be appropriate.
- Committed leadership that sees the priority need for sustained agricultural improvement to ensure growth and poverty reduction is important. The involvement of donor organizations brings benefits, but greater coordination within and among them to get positive interactions is a prerequisite for adding value.

- Climate change increasingly affects agricultural production. The success of agriculture and agribusiness depends on addressing environmental and climate change issues in an integrated manner.

Agriculture and Agribusiness in Perspective

Agriculture is the main source of livelihood for 2.5 billion people, including 1.3 billion smallholders and landless workers.

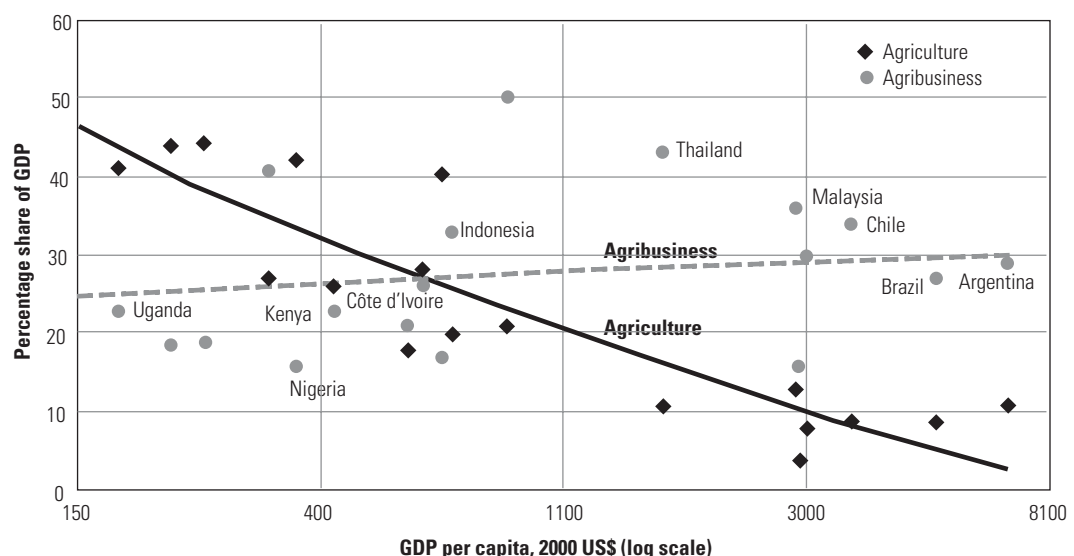
Seventy-five percent of all poor people live in rural areas, 86 percent of whom rely on agriculture for a livelihood. Hence, enhancing agricultural growth and productivity is essential to meeting the worldwide demand for food and to reducing poverty, particularly in the poorest countries. Gross domestic product (GDP) growth originating in agriculture is about four times more effective in raising incomes of the very poor than GDP growth originating outside the sector (World Bank 2007). The demand for food is expected to continue to grow as a result of both population growth and rising incomes. Demand for cereals (for food and animal feed) is projected to reach some 3 billion tons by 2050. To meet that demand, annual cereal production

will have to grow by almost a billion tons (from 2.1 billion tons today; meat production must grow by more than 200 million tons to reach a total of 470 million tons in 2050. Seventy-two percent of the additional production will be consumed in developing countries, up from 58 percent today (FAO 2009a). The demand for biofuels could further increase the demand for agricultural commodities (for example, corn), depending on energy prices and government policies.

Agribusiness projects have widespread impacts on private sector and rural development.

The contribution of agribusiness to GDP increases as an economy grows (Figure 1). For example, from a low GDP per capita level of \$150 to a higher level of \$8,000, the share of GDP attributable to agriculture declines from 40 percent to 10 percent. But agribusiness, comprising production, marketing, logistics, processing, and distribution, has a large and rising share of GDP. The share of agribusiness to GDP typically rises from about 20 percent to 30 percent before declining as economies become industrialized. The development of competitive agribusinesses and agro-industries is crucial for creating employment and income opportuni-

Figure 1: Share of Agriculture and Agribusiness in GDP Change as Incomes Rise



Source: World Bank 2007.

ties, as well as for enhancing the demand for farm products.

Decline in Focus and Renewed Challenges

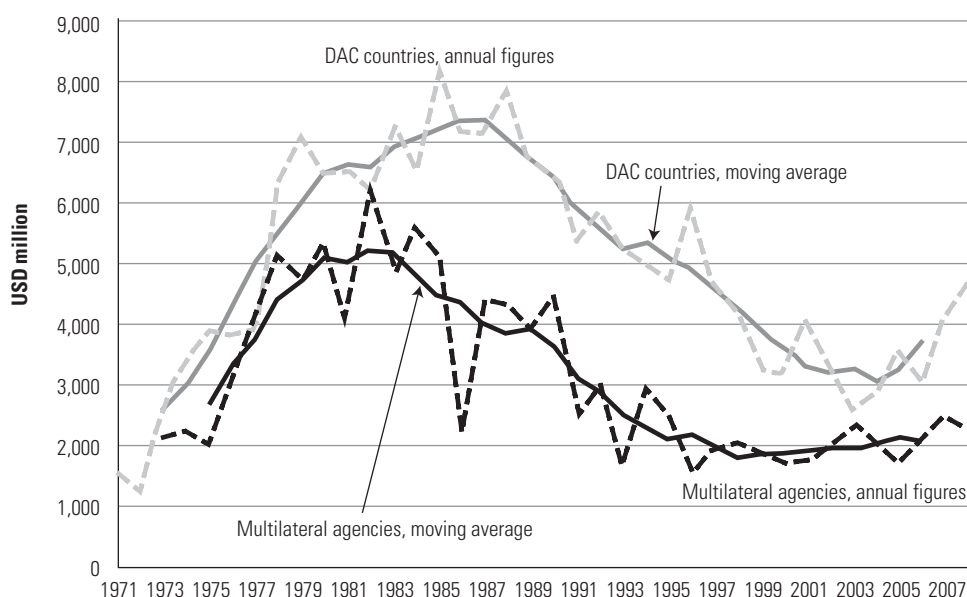
Public investment in agriculture decreased gradually for two decades from the 1980s. In part because of the impression that food shortages were a thing of the past and in part because of some less-than-satisfactory outcomes of previous interventions, support from governments and donors declined. This relative neglect also was rationalized by views that associated agriculture with underdevelopment and industrialization with development.

Agricultural expenditure in the developing world as a proportion of total government spending also declined over a long period (Fan and Saukar 2006). Although in real terms, public expenditure for agriculture increased from \$111.8 billion in 1980 to \$225.6 billion in 2002 (constant 2000 dollars), expenditure for agriculture as a share of agricultural GDP fell from 10.8 percent in 1980 to 8 percent in 1990; that share increased to 10.3 percent in 2002.

Public investment in agriculture has been low, particularly in Africa. In many countries, governments operate under tight fiscal constraints and tend to spend less of their own resources on agriculture (Foster, Brown, and Naschold 2000). In aggregate, African public spending on agriculture accounted for 5–7 percent of the total national budget from 1980 to 2005, compared with 6–15 percent in Asia (Fan, Mogues, and Benin 2009). As a percent of agricultural GDP, African agricultural spending was only half that of Asia in 2005 (Fan and Saukar 2008). Nearly half of African countries reduced budget shares in the sector during this period. Only a few African countries—Burkina Faso, Ethiopia, Malawi, and Mali—have surpassed the Comprehensive Africa Agriculture Development Programme threshold of 10 percent of budgetary spending on agriculture in recent years (Fan, Mogues, and Benin 2009).

After an increase in the 1970s and 1980s, bilateral and multilateral assistance to agriculture fell after the mid-1980s (Figure 2). From its peak at that point, aid to agriculture

Figure 2: Trends in Aid to Agriculture



Source: OECD 2010.

Note: Commitments, 1973–2008, five-year moving averages and annual figures, constant 2007 prices.

fell by 43 percent.¹ The amount of aid to agriculture from Development Assistance Committee countries and from multilateral agencies declined by half in the early 2000s compared with the mid-1980s. As total aid has increased substantially in recent years, the share of aid to agriculture has declined even faster than its real dollar amount. For Development Assistance Committee countries, the share reached a peak of 17 percent in the late 1980s and has fallen from 13 to 6 percent since the mid-1990s, revealing relative neglect of the agriculture sector (OECD 2010).²

The following discussion summarizes the activity of a number of MDBs in agricultural areas.

- **The World Bank Group (WBG):** Support for projects that focused on agricultural growth and productivity declined from 1998 to 2003, in line with the World Bank's shift toward rural development. The share of commitments for projects focused on agricultural growth and productivity declined from 71 percent of the portfolio in 1998 to a low of 25 percent in 2003; it then picked up to 39 percent in 2008. During 1998–2008 the World Bank and International Finance Corporation (IFC) together committed \$23.7 billion in finance for agricultural activities in addition to analytical work and advisory services. This was less than half of the commitments in the agricultural portfolio (an even lower share in Sub-Saharan Africa), with the rest directed to other rural activities. An additional \$3.8 billion was committed by the World Bank and \$1.6 billion by IFC in 2009 (IEG 2010).
- **The Inter-American Development Bank (IDB):** For IDB, the share of rural and agricul-

tural operations in lending sharply declined in the 1990s. During 1961–90, lending for agriculture accounted for 22 percent of the total, while in the 1990s the share was just over 4 percent. IDB approved 123 rurally targeted projects totaling \$6.382 billion during 1990–2001. This is at odds with agriculture's contribution to regional GDP (more than 20 percent, counting agro-industry) and with its share of export trade in the region (more than 50 percent of export sales in some countries). This drop in percentage share is also evident in IDB's rurally targeted support generally. In short, the agriculture sector had ceased to be an IDB priority (IDB 2003).

- **Asian Development Bank (ADB):** From 1968 to 2008, ADB loans for agriculture and natural resources totaled \$18.6 billion, or approximately 13 percent of total approved loans. Investments were made in the form of loans, technical assistance, and grants. A total of 528 programs and projects were supported during the period. The proportion of ADB lending to the agriculture and natural resources sector was, however, on a downward slide, from 28 percent in 1980s to 12 percent in 1990s; the low of 8 percent was reached in the years 2000–08 (ADB 2010).
- **African Development Bank (AfDB):** The importance of newly approved investments for agriculture declined in recent years from about 13 percent of all loan approvals in 2004–06 to about 8 percent for 2007–08. This is because of the rapidly increasing overall volume of lending at the AfDB over the past decade, whereas lending for agriculture remained relatively constant. The volume of investments for agriculture since 2001 stabilized at around \$350 million annually. As a share of official development assistance, the proportion allocated to agriculture and rural development in Africa declined from 11.8 percent to 3.5 percent between 1995 and 2005 (AfDB-IFAD 2010).
- **European Bank for Reconstruction and Development (EBRD):**³ An EBRD evaluation (EBRD 2008a) rates as successful the EBRD's

1. This statistic might be slightly distorted. Since Agenda 21 in 1992, many agricultural programs and projects have been reclassified as environmental by international financial institutions (IFIs) and development agencies to better fit new national and IFI strategies, which are now focused on environmental improvement and climate change. Moreover, some programs classified as infrastructure also benefit agriculture, such as water supply in rural areas, and enable irrigation and contribute to improved crop yields.

2. The statistics from different MDBs are not directly comparable.

3. EBRD's strategy focuses primarily on supporting agribusiness projects with strong backward linkages, rather than pure primary agriculture.

response to the challenges of the agribusiness sector transition during the 1991–2007 period. In addition to the usual sponsor, market, and investment climate risks, agribusiness and agriculture generally involve other risks, such as weather, diseases, short-term price volatility of commodities, and government interventions, which affect both the domestic and international markets. The relatively small average size of investment operations has also been a major challenge for EBRD, especially in terms of efficiency. Standalone operations have an average size of €15.9 million, compared with the EBRD average of €20 million.

- **International Fund for Agricultural Development (IFAD):** Since 1978, IFAD has invested nearly \$12 billion in 673 projects in developing countries. Over the past five years its work program has been expanding. For example, in 2009 IFAD's work program grew by 19 percent, with approved loans and grants totaling \$717.5 million (IFAD 2010).

The Millennium Development Goal of halving poverty by 2015 will not be achieved without a large additional investment in agriculture. The additional annual investment needed is estimated to be \$14 billion for developing countries and \$3.8–\$4.8 billion for Sub-Saharan Africa (Fan and Rosegrant 2008). An evaluation of World Bank assistance to agriculture in Sub-Saharan Africa (IEG 2007c) finds, however, that bilateral and multilateral donor aid for development of African agriculture declined from \$1,921 million in 1981 to \$997 million in 2001 (in 2001 dollars). When donor support to agriculture declines, countries may not have the capacity to maintain or replace past donor-funded capital investment. Lending from bilateral and multilateral donors rebounded with the increasing focus on African development. Organisation for Economic Co-operation and Development statistics show that the disbursements of agriculture-focused aid from all donors to Africa were \$1,907 million (in 2007 dollars) per year for the period 2006–08.⁴ But this number is not directly comparable with the 1981 and 2001

data in the study by the Independent Evaluation Group (IEG).

Because of the food, fuel, and financial crises, the number of people living in hunger over the past two years increased rapidly.

Sudden increases in food prices in 2008 drove an estimated 100 million more people into poverty (Ivanic and Martin 2008). Before the food price crisis, 923 million people were undernourished. This number is estimated to have increased to 963 million people as a result of soaring food prices (FAO 2008a). The global economic crisis may have further strained the already stretched coping mechanisms of the poor, though this impact varies considerably by region. According to the Food and Agriculture Organization (FAO), the global economic crisis pushed the number of undernourished to more than 1 billion.

The food crisis placed agricultural growth and food production issues back on the development agenda.

From 2005 to 2008 food prices rose dramatically across the board and doubled or even tripled in some categories. During the first three months of 2008, international prices of major food commodities reached 30-year highs (FAO 2008b). That spike ended a 30-year period of gradual decline in real terms. Following the onset of the financial crisis, international food prices declined, but they have remained high compared to 2005 levels, and in many countries domestic prices have not declined to the same extent. Prices of domestic staples in several countries experienced double-digit increases in 2009, particularly in Sub-Saharan Africa.

First the food and fuel crises and then the economic crisis have revealed the fragility of food systems.

The world's poorest suffer the most: families in developing countries spend up to 70 percent of their income on food, compared with 5–10 percent in the United States. AfDB's Annual Report estimates that Africa's cereal import bill increased by 49 percent during 2009, compared with rises of 25 percent in Asia and 31 percent in Latin America (AfDB 2008). The World Bank food benchmark index increased 23 percent between January and December 2009.

4. http://www.oecd.org/document/44/0,3343,en_2649_34447_43817324_1_1_1_1,00.html.

Global grain prices rose sharply again in mid-2010. The summer of 2010 brought erratic weather with a deadly heat wave affecting wheat output in Russia and severe floods eroding vegetation in Pakistan. Abnormal weather patterns in Central Europe, China, Greenland, and India have also affected the global food supply. Moscow's recent decision to ban grain exports sent shockwaves through global commodities markets as concerns mounted that traders would hoard their stockpiles. Speculation on wheat substitutes (for animal feed, for example) such as corn, other grains, and soybeans have started to put upward pressure on the prices of these commodities. These higher prices are likely to feed into price rises for retail products such as bread and beverages.

The spike in food prices added momentum to an emerging renewal of attention to agriculture and agribusiness. Official development assistance in this area jumped to about \$8 billion in 2008 and even higher in 2009. The World Bank alone increased its lending from \$1.5 billion in 2008 to \$3.8 billion in 2009. The largest donors have been the World Bank, the European Union, Japan, and the United States; on a regional basis, the largest donors are the AfDB and the ADB. The WBG Agriculture Action Plan (World Bank 2009) projects an increase in support (from the International Development Association, the International Bank for Reconstruction and Development, and IFC) to agriculture and related areas from an average of \$4.1 billion annually in fiscal 2006–08 to between \$6.2 and \$8.3 billion annually over fiscal 2010–12. This would be 13–17 percent of projected WBG assistance.

In Africa, in 2008, IFAD approved agriculture and rural development financing of \$235 million (loans and grants) in 13 countries. AfDB provided \$360 million to 17 countries. During the same year, ADB approved 14 agriculture and natural resources loans totaling \$607 million. In recognition of Asia and the Pacific's sustainable food security, ADB allocated \$2 billion annually for the 2010–12 period for its own regions.

The private sector arms of the MDBs and bilateral agencies have also recently boosted their investments in this sector. In total they have invested about \$12 billion with private agribusiness companies during 1998–2008. The largest investors are IFC, with a 48 percent market share, the EBRD, with 31 percent, and the AfDB with 7 percent. IFC agribusiness investments have increased sharply since they became a corporate priority in 2007. At ADB, commercially oriented projects in the agriculture and natural resources sector increasingly focus on agribusiness development.

With the increase in demand for production and high food prices, agriculture is facing a unique opportunity. The renewed attention and the increase in investment could launch the agricultural sector on a path of sustained growth. However, it will be important to use limited resources effectively to achieve greater and better-distributed growth and poverty reduction outcomes.

The Critical Role of Productivity

Considerations of the effectiveness of investments and of environmental sustainability place the focus squarely on the critical role of agricultural productivity. Increasing agricultural productivity can help attack poverty through three channels. First, it increases the incomes of agricultural laborers, the majority of whom are poor. Second, it reduces food prices, which in turn increases real incomes and lowers poverty in urban areas. Third, it boosts the development of the entire economy through backward and forward linkages.

In most parts of the world agricultural growth will need to come from intensive rather than extensive growth. Given the limits on cultivable and fertile land and associated inputs, future growth in agriculture can only *exceptionally* rely on expansion in farmed area. Intensification of production and improvement in efficiency of input use are therefore important and were identified (along with diversification) as key strategies by a global farming systems study

(Dixon, Gulliver, and Gibbon 2001). The difference between actual and technically feasible yields for most crops implies large potential for increasing food and agriculture production through improvements in productivity (Zepeda 2001). Some 80 percent of the increases in food production in the developing world will come from increases in yields and cropping intensity and only 20 percent from expansion of arable land (FAO 2009c).

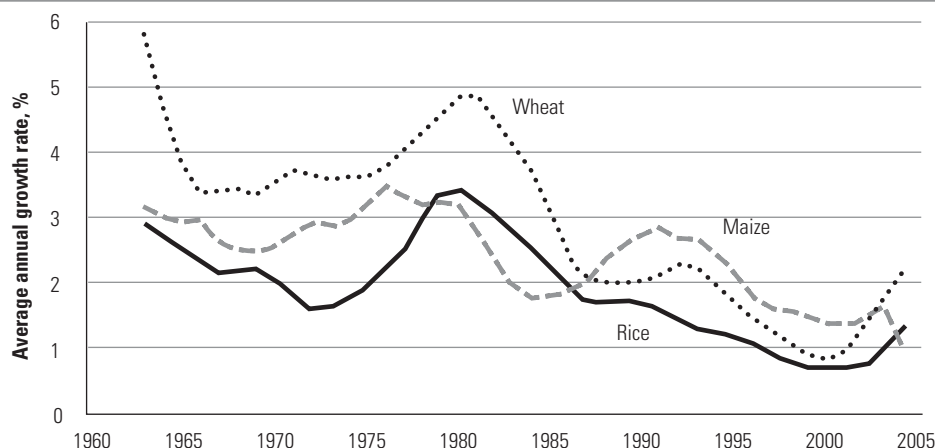
Intensification is vital not only to meet increasing demand but also to reduce deforestation, environmental devastation, and global warming. Agriculture contributes about 15 percent of annual greenhouse gas emissions (forestry contributes an additional 19 percent), compared with 13 percent from transportation (World Bank 2007). The Millennium Ecosystem Assessment (2005) finds that 15 of the planet's 24 natural ecosystems are in trouble or in decline, in large measure because of land and water degradation—mainly due to agriculture. Environmental degradation has resulted in agricultural productivity loss. Wolman (1985) reports significant agricultural productivity losses due to soil erosion of up to 40 percent in Europe and Central Asia, 25 percent in the United States, 30 percent in Haiti, and 25 percent

in Nigeria. Developing countries could experience a decline of 20 to 40 percent in potential agricultural productivity if temperatures rise by more than 2° C (FAO 2009b). Changes in agricultural systems are needed to make them more resilient to climate change (CGIAR 2009).

But the growth of agricultural productivity has stalled. The per capita production of cereals did not increase after the mid-1980s (African Green Revolution Conference 2009). Globally, the growth rates in yields of major grains declined from around 3 percent in 1980 to 1 percent recently (World Bank 2007). Figure 3 shows an example of the slowdown in developing countries.

Global trends mask large differences across countries and regions. Labor productivity ranges widely between the agriculture-based economies and the transforming and urbanized ones (categories used in the 2008 World Development Report)—\$599 versus \$1,398 versus \$3,357, respectively, in 2005 in 2000 dollars (IEG 2010). The great strides in cereal production in South Asia in 1961–2001 were mainly the result of yields that increased by 50 percent from 1987 to 2002, when poverty declined by 30 percent (World Bank 2007). In Latin America and the Caribbean,

Figure 3: Growth Rates of Yields for Major Cereals Are Slowing in Developing Countries



Source: World Bank 2007.

Note: Data smoothed by locally weighted regressions.

agricultural productivity (unit yields of core commodity crops) climbed steadily as farmers brought in improved technologies (IDB 2003).

In Africa, production of cereals and root crops rose mainly because more land was brought under cultivation; crop yields were largely stagnant. The average farmer in Sub-Saharan Africa harvests at most 2 metric tons of grain per hectare, which is half of what an Indian farmer gets, a quarter of what a Chinese farmer gets, and a fifth of what an American farmer gets (AfDB-IFAD 2010). Low growth rates in cereal yields and production in Africa have translated into falling per capita food production and increased imports (Forum for Agricultural Research in Africa 2006).

Women produce most of the food that is consumed locally in many countries. Blackden and Canagarajah (2003) calculate that agricultural productivity in Sub-Saharan Africa could rise by 20 percent if women had equal access to land, seeds, and fertilizers compared with men. Failure to recognize women's roles in agriculture is costly. It results in misguided policies and programs, forgone agricultural output and income flows, higher levels of poverty, and food and nutrient insecurity.

Agricultural growth also was hampered by factors outside the sector. In the 1990s, overvalued exchange rates, credit access difficulties, and asymmetries in market liberalization impeded agricultural growth in Latin America and the Caribbean. As a result of subsidized sales of agricultural commodities from the industrialized nations, the growth in agricultural import values outpaced that in exports in the region (IDB 2003).

Supporting interventions that lead to rapid productivity growth is fundamental. Such project interventions consist mainly of providing suitable improved technologies that overcome constraints on production and information. For programs and interventions, these technologies relate to the creation of an enabling environment through policy and institutional reforms.

A suitable combination of program and project loans that complement and reinforce productivity gains needs to be established, with country differences built in (ADB 2008).

However, support from international organizations for projects that focus on productivity in agriculture has declined, and the performance of projects has been mixed:

- Based on a performance evaluation of 25 loans (14 projects and 11 programs) completed by its Independent Evaluation Department from January 2000 to July 2009, ADB's performance in promoting agricultural productivity growth, employment, and returns on investment was mixed. Productivity growth was achieved in 51 percent of these loans, 62 percent were successful in generating employment, and only 30 percent were considered economically viable.
- Lack of a focus on agricultural productivity limited the performance of AfDB interventions. In line with the new corporate thematic priority areas, the AfDB's Department of Agriculture and Agribusiness developed a new business plan in 2007–08. One focus of the department's interventions is supporting growth in crop productivity, particularly through water, rural roads, and fertilizer.
- Only a share of World Bank interventions that included support for agricultural activities focused on improving agricultural productivity in poor agriculture-based economies. The World Bank's strategic focus had shifted in the early 1990s from a narrower focus on agriculture to a broader focus on poverty and rural development, leading to a focus beyond agricultural production in rural areas. This trend was particularly pronounced in Sub-Saharan Africa, which had one of the smallest shares among regions of rural projects focused explicitly on improving agricultural productivity. IFC investments, although focused on agribusiness growth and development, were concentrated primarily in urbanized and transforming economies in Latin America and Europe and Central Asia.
- EBRD focuses on supporting projects upstream in the agricultural value chain. However, backward linkages to primary agriculture

feature prominently in projects and are often addressed through covenants requiring food processors to work closely with farmers to increase farming efficiency. For instance, in 2010, EBRD's Evaluation Department found that sugar plant modernizations in Ukraine and Croatia dramatically improved sugar beet yields by setting yield increase targets, which provided incentives to sugar plant managers to finance high-quality extension services to sugar beet farmers (EBRD 2010b).

The development of agribusiness and of agriculture is closely linked. Agribusiness investment is required for increasing the productivity of the agricultural production activities, improving market opportunities for smallholders, increasing employment opportunities, delivering affordable and nutritious foods to growing urban populations, and ultimately improving the economic growth of developing countries. Agribusiness activities also provide seeds, agricultural chemicals, and pesticides—inputs of critical importance for sustained improvements in agricultural productivity.

Nonagricultural organizations are also increasing their focus on agribusiness as a key strategy for poverty reduction. For example, the United Nations Industrial Development Organization has an Agribusiness Development Branch that is a vitally important pathway for poverty reduction.

Regional Differences

The engagement and performance of international institutions in agriculture and agribusiness vary widely, depending on the conditions and priorities of regions and countries. The focus of donor agencies' interventions, the balance of agricultural production and poverty reduction in agriculture and agribusiness, vary depending on the stages of development of the countries where they operate. Three categories developed in the 2008 World Development Report highlight the differences: agriculture-based (mostly in Sub-Saharan Africa), transforming (mostly in South and East

Asia and North Africa and the Middle East), and urbanized (mostly in Eastern Europe and Latin America and the Caribbean) economies. In the agriculture-based category, development of the agriculture sector is essential to growth and poverty reduction, yet productivity is low, constrained by limited access to modern inputs, irrigation, communication, and transport. In transforming economies, the sector's contribution to economic growth is comparatively less important, and land and labor productivity are much higher, but poverty is still predominantly a rural phenomenon. In the urbanized category, poverty is no longer primarily rural, and agriculture contributes relatively little to growth (IEG 2010).

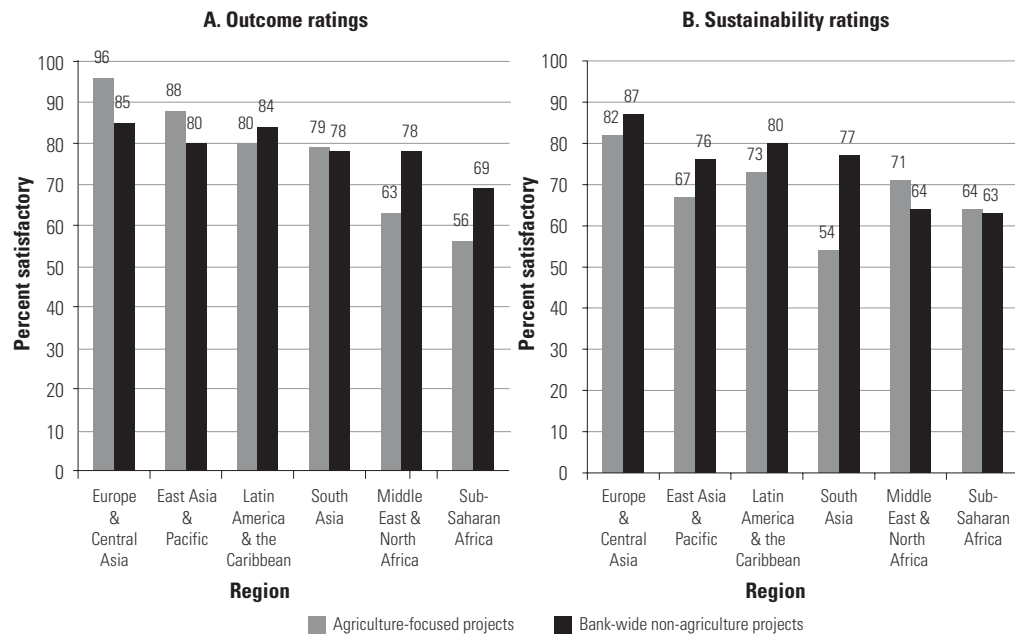
Increasing global agriculture production and addressing food security require effective interventions. The agriculture-based economies, particularly those of Sub-Saharan Africa, are where support is most needed and success has been lowest. Other countries and regions also have important needs, given that the increased demand for global food production also has to be met. However, greater effectiveness in the poorest countries is the most critical challenge.

Agriculture-Based Economies

World Bank projects in agriculture-based economies performed significantly worse than those in urbanized economies on extension and significantly worse than projects in transforming economies on research (IEG 2010). Figure 4 shows that, among all World Bank interventions over the 1998–2008 period, outcome ratings of agriculture-focused projects in Africa are the lowest (with only 56 percent satisfactory) and sustainability ratings the second lowest (with 64 percent satisfactory).

The performance of WBG interventions has been well below average in Sub-Saharan Africa, and IFC has had little engagement in agribusiness in the region. Many countries—particularly transforming and urbanized economies—have benefited from the

Figure 4: Ratings for Agriculture-Focused Projects versus All Other Projects, by Region (1998–2008)



Source: IEG 2010.

Note: Differences in ratings are statistically significant for Sub-Saharan Africa and Europe and Central Asia. Sub-Saharan Africa performs below average for both types of projects, but particularly so for agriculture-focused projects.

Note: Differences are statistically significant for South Asia.

exposure to improved management practices and production technologies that come with WBG interventions, but it has been more difficult for agriculture-based economies in Africa to benefit commensurately (IEG 2010). The World Bank's limited and until recently declining support for addressing the constraints on agriculture has not been strategically used to meet the diverse needs of the sector.

The World Bank has recently increased support for agriculture-related public expenditures. This is an important step, particularly for Sub-Saharan Africa, given high dependency on donor funding and the sustainability problems that have plagued many donor-funded projects in the region. Difficult business environments, a shortage of indigenous entrepreneurs, the small size of the potential investments, lack of access to markets, and the dismal experience with small-scale sponsors have all constrained IFC engagement and performance in Africa.

Other organizations share the challenges of addressing agriculture in Africa. The performance of IFAD projects in Africa was lower than in other regions. The performance of AfDB's agriculture and rural development operations was found to be less successful than in other sectors. Benchmarking evidence indicates that the performance of other agencies working in agriculture and rural development in Africa was at a similar level (AfDB-IFAD 2010).

The experience of agriculture operations in Africa is linked to the special difficulties in the region. First, resource endowment in Africa is poor. Not only is the environment for agricultural development less favorable in Sub-Saharan Africa's agriculture-based economies—with poor road and market infrastructure, underdeveloped financial sectors, difficult business environments, a shortage of indigenous entrepreneurs, and higher weather-related and disease risks—but country capacity and governance have been weaker as well.

A majority of Africa's poor people live in rural areas and engage in some form of agricultural activity. They are small landowners who produce both for subsistence purposes and increasingly for the market. As shown by research and field experience in the past two decades, smallholder development in Sub-Saharan Africa is one of the main ways to reduce poverty and promote growth. The AfDB and IFAD already focus on smallholders, yet future efforts by the two organizations will need to ensure that the needs of smallholder farmers are adequately considered so that they can improve their low productivity and incomes (AfDB-IFAD 2010).

Several African countries have achieved success in the past, indicating significant potential for growth. For the past 40 years cotton production in Mali has grown at 9 percent per year. Kenyan horticultural exports have increased fivefold since 1975 (Haggblade and Hazell 2010). More recently, Malawi transformed itself from a recipient of food aid in 2005 to a net exporter of maize in each of the past four years. Rwanda increased its food production by 15 percent in 2007 and 16 percent in 2008. Ghana is on track to becoming the first country in Africa to achieve the MDG of halving poverty and hunger (AGRA 2009b).

Africa's agriculture and agribusiness has enormous potential. Africa has 60 percent of the world's uncultivated arable land. A recent study (McKinsey 2010) estimates that, if Africa could overcome its complex barriers, its agricultural output could grow in value more than threefold, from \$280 billion today to \$880 billion by the year 2030. This growth would increase demand for upstream products such as fertilizers, seeds, and pesticides, while spurring growth of downstream activities such as grain refining, biofuels, and other types of food processing. Together, these could be worth an additional \$275 billion in revenue by 2030.

A joint AfDB-IFAD evaluation (AfDB-IFAD 2010) suggests that increasing agricultural growth and productivity in Africa will require a range of actions. Priorities can be

summarized as (i) improving the investment climate, through better incentives for farmers and private-sector engagement; (ii) infrastructure, including irrigation; (iii) innovation, the primary motor for productivity growth and competitiveness; and (iv) institutional capacity.

Transforming Economies

Better results have been achieved in transforming economies than in agriculture-based economies. IEG has found that in Bank work in regions where transforming or urbanized economies dominate, although aggregate lending commitments are lower, there is greater focus on agricultural growth and productivity than in the World Bank's overall portfolio (IEG 2010). The share of World Bank lending commitments primarily focused on agricultural growth and productivity is highest in transforming economies—45 percent versus 39 percent in urbanized economies and 37 percent in agriculture-based economies. The World Bank also carried out more agriculture analytical and advisory activities in transforming economies than in agriculture-based economies.

For IFC, the transforming economies achieved better outcomes than urbanized or agriculture-based economies.⁵ Its food and agriculture projects in South Asia and Europe and Central Asia have achieved the highest development outcome and investment outcome ratings (IEG 2010).

The ADB operational plan for sustainable food security is based on its Strategy 2020. That strategy emphasizes a multisectoral approach to transforming Asia's rural and agriculture sector. It calls for synergy and value addition in the backward and forward linkages along the food and agricultural value chain. The operational plan identifies ADB's role and contributions in addressing the three binding constraints to achieving sustainable food security: (i) stagnating food productivity and production;

5. The outcomes of the urbanized economies were negatively affected by poor-performing investments in fiscal years 1998–2001.

(ii) lack of access to rural finance, infrastructure, technology, markets, and nonfarm income opportunities; and (iii) threat of climate change and volatility of food prices. In addressing these constraints, the operational plan focuses on three areas of influence—productivity, connectivity, and resilience.

The International Food Research Policy Institute (IFPRI) has worked to develop viable strategies in five areas to assist in East Asia: making growth pro-poor, revitalizing agricultural research and technology dissemination, managing land and water scarcity and degradation, managing globalization, and building good governance. In East Asia, investment in both infrastructure and marketing and distribution systems will provide significant benefits to those who depend on agriculture. However, a reliance on market forces alone may mean that many poorer regions and poor people are likely to be left in poverty.

Urbanized Economies

Productivity is higher in urbanized economies. World Bank interventions during the period evaluated by IEG were distributed relatively evenly across the agriculture-based, transforming, and urbanized economies. IFC interventions were concentrated in the urbanized category, with investments in only eight agriculture-based economies. Transforming and urbanized country borrowers tended to have clear strategic visions for agricultural development that directed resources for agricultural sector development to the areas where they were most needed (IEG 2010).

EBRD's operations supported skill transfer, demonstration, and improved standards (EBRD 2008a). In recent years, EBRD increased its operations in connection with new hypermarkets and supermarkets. This important modernization of the retail sector creates new challenges for a largely fragmented and inefficient agricultural system, which also has to move toward higher standards for food safety and hygiene. So far only a single EBRD-financed project in

primary agriculture (a cooperative in Kyrgyzstan) has been evaluated as unsuccessful, but in response to market demand, EBRD financed a farming project in Ukraine in 2010. This project benefits from a strong private sector sponsor and enhanced extension services, giving it a better chance for success.

There is considerable scope for the IDB to increase involvement in projects (IDB 2003). IDB finds that supporting production chain improvements specific to certain crops or products has the potential to yield high economic and social returns, particularly with trade liberalization and integration processes. One item to consider for the IDB's agriculture agenda is support for programs to improve the productivity of crops that are household staples. This would be particularly important in low-income countries undertaking trade liberalization, which operate in a context where a sizable percentage of the rural population works small holdings and agricultural research systems are weak.

Differentiation of Rural Households and Development Strategies

Overall, effective intervention tailored to the specific contexts of recipient countries in improving agriculture performance is key. The 2008 World Development Report suggests that in agriculture-based countries, a productivity revolution in smallholder farming is required. In transforming countries, shifts to high-value agriculture, decentralization of nonfarm economic activities to rural areas, and direct assistance to moving people out of poverty are among the measures to be considered. In urbanized countries, agriculture can help reduce the remaining rural poverty if smallholders become direct suppliers in modern food markets.

An ongoing IFAD study (IFAD forthcoming) **suggests that, although the classification of the national economies is necessary and helpful in providing policy guidance, it is also useful to examine the differentiation at the household level.** The current production priorities in the international community follow-

ing the price spike in commodities tend to see all rural households as specialized in agriculture, no matter what assets they have. There may be a broad consensus that developing small farms is both feasible and desirable in most parts of the developing world, but doubts emerge when looking at the differentiation in the rural population. Those who are optimistic that intensified and increasingly commercialized small-scale farming can be achieved usually have in mind farmers with two, three, or more hectares, with some assets, and located in areas of medium to high potential. It remains obscure how the rest, who are subsistence farmers or the vulnerable, will benefit.

Smallholder farmers are a very heterogeneous group (for example, commercially viable, subsistence, vulnerable). OECD/DAC (OECD 2006) identifies five different “rural worlds”: (i) commercial producers, globally competitive with large-scale agriculture operations; (ii) agricultural households that produce for the market but also to meet subsistence needs; (iii) subsistence producers with small landholdings; (iv) agricultural laborers, mainly dependent on casual, unskilled labor; and (v) those unable to engage in regular productive activity (very elderly, sick, disabled, and the very young), all of whom rely on informal transfers of food, shelter, and clothing. It includes the households that are chronically poor with few assets and having little or no labor because the adults are elderly, disabled, or chronically sick. They have little hope of working their way out of it.

Agricultural and rural development strategies need to include a menu of options for households with different possibilities as different target groups requiring different project strategies. The 2008 World Development Report presents a scheme for differentiating household livelihood groups based on their prime sources of income and identifies three trajectories out of poverty for farm households: agriculture, rural labor, and migration. Dorward (2009) links the OECD/DAC scheme with the World Development Report categories, envisaging three development strategies for rural households: (i) *stepping up* for those households with land and

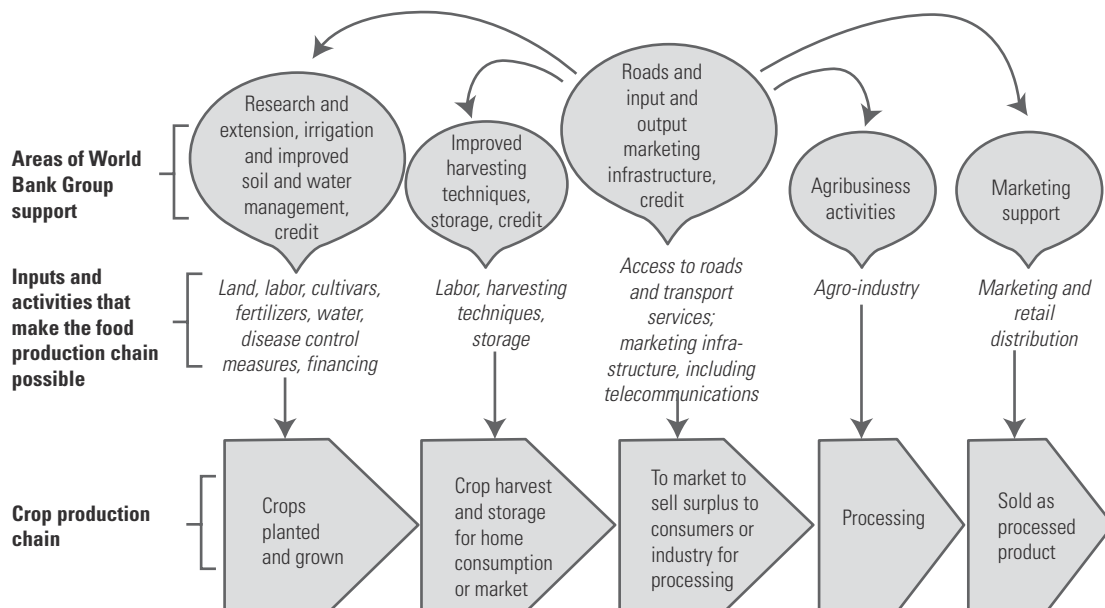
labor—intensify farming by improving transport, facilitating access to inputs and credit, investing in technology, and farmer organization; (ii) *stepping out*: for households with labor but not necessarily land—move into the nonfarm economy through more education and skills, better health care, and providing potential migrants with information on opportunities, conferring on them transferable rights as citizens and facilitating remittances; and (iii) *hanging in* for chronically poor households that lack labor—provide social protection for those who have few assets and options, investing in technology for food staples to allow them to make best use of their small plots, and making sure that the next generation gets a better start than its parents through primary health care, infant nutrition, and schooling.

Six Action Areas

The agriculture production chain is a complex system (Figure 5). For example, once a crop is produced and harvested, a range of agribusiness activities link farmers to consumers. Underinvestment in research and extension, water constraints, underdevelopment of rural transport infrastructure, limited access to credit, land issues, market support, and agribusiness activities often are major constraints to agricultural productivity (IEG 2010). Interventions on many factors can make a difference. Actions can range from land reform to technology adoption support, rural finance, public-private partnerships, and improving access to risk management mechanisms.

This section focuses on six areas: research and extension; access to water; access to credit; access to land and formalization of land rights; transport and marketing; and policies, markets, and agribusiness.

Weakness at any point in the crop production chain can hinder agriculture and agribusiness productivity. Investment in research and extension and road infrastructure has some of the largest returns (Fan 2008). Irrigation investments also have made significant contributions to increasing crop production (Fan, Hazell, and Thorat 1999; Fan and Hazell 1999; Fan, Zhang, and Zhang 2002),

Figure 5: Crop Production Chain

Source: IEG 2010.

and water management is important to improving food production under increasingly stressed water resources (IEG 2006c). Improving access to credit is crucial for development programs (World Bank 2004; Conning and Udry 2007). Secure rights to land can encourage farmers to invest in irrigation and drainage, soil conservation measures, and other natural resource management practices to improve the productivity of their land (World Bank 2003). Efficient markets allow farmers and agribusinesses to capitalize on market opportunities and benefit from increased farm productivity (World Bank 2004).

It is critically important, given the large cross-sectoral impact on agriculture, to prioritize the allocation of scarce resources and to coordinate. The FAO World Food Summit of 2009 recognized that achieving a safe, reliable, and affordable supply of food is a multifaceted project: technology, trade, markets, and aid all need to be addressed (*Financial Times* 2009). Fan, Mogues, and Benin (2009) suggest that the contribution of rural road infrastructure to agricultural productivity may be substantial and may sometimes dwarf the sectoral impacts of spending directly in agriculture. Haggblade and Hazell (2010) argue that sustained productivity-enhancing research and favorable

market incentives for farmers and agribusinesses are the key determinants of outstanding agricultural performance. Countries face unique conditions and donors and governments have different priorities. Carefully targeting public spending and leveraging private investments to high-priority sectors to release the binding constraint, along with coordinated spending in complementary areas, are important steps to maximize development impact.

Research and Extension

Research and extension are essential to improving agricultural productivity. The rate of return to investment on developing and extending agricultural technology is high. In a survey of studies on Asia, Pray and Evenson (1991) find that rates of return to national research and extension investment, though variable, were high, ranging from 15 to 220 percent. Evenson and McKinsey (1991) find that public investment in agricultural research in India accounted for 30 percent and extension for 25 percent of growth, with rates of return of 63 percent and 52 percent, respectively.

Research is effective when the appropriate technology reaches farmers and they adopt it. Agricultural research and development (R&D)

that helped semidwarf and high-yielding varieties of rice, wheat, and maize evolve resulted in rapid yield increases throughout Latin America and Asia. The knowledge was communicated directly through extension or outreach services and was embodied in improved inputs such as hybrid varieties. This led to further yield increases through the application of chemical fertilizers and, in Asia, the Green Revolution. Between 1961 and 2001 in South Asia the area planted with cereal increased less than 20 percent, whereas cereal yields increased 145 percent. Most of this yield increase came between 1981 and 2001, when input delivery systems, output marketing systems, and other assets complementary to high-yielding varieties were put in place.

However, optimal technologies differ across countries and regions. The conditions of soils, climates, water availability, and related pests and diseases are different for Africa than for Asia. Thus, a Green Revolution in Africa will need to begin at the opposite end from Asia's (Box 1). Challenges to African agricultural growth include poor soils and seeds, lack of finance and markets, and weak policy support. These challenges have been compounded by climate change and threats to biodiversity and natural resources, which have compromised soil health and water availability. Starting with a focus on the "breadbasket areas" and optimizing food production in areas with

relatively good rainfall, soils, infrastructure, and markets would help agricultural development innovations.

Focusing on the right technologies is important for improving agricultural productivity. For example, the level of fertilizer use in Africa is lowest in the world, averaging only 8 kilograms per hectare, compared with the global average of more than 100 kilograms per hectare. Because of extensive agricultural land use practices the rate of deforestation in Africa is two times greater than the global average. Africa loses an estimated \$4 billion worth of soil nutrients annually (AGRA 2009a). An African Green Revolution must also revive the soils. The success in cassava transformation is a good example. In the past three decades, a stream of improved cassava varieties—the Tropical Manioc Selection series—has increased on-farm yield gains by more than 40 percent across Africa through breeding and pest control efforts without purchased inputs (Hagglblade and Hazell 2010).

Various country cases show the importance of research generated by credit and extension. ADB's agriculture and natural resources research was relevant, and the modalities used in supporting the research were effective in achieving ADB objectives (ADB 2010). IDB's Farm Modernization and Development

Box 1. Africa's Agricultural Revolution Will Need to Be Different than Asia's

A Green Revolution in Africa will need to begin with improving the productivity of rain-fed crops such as millet, sorghum, and cassava (Thomas 2008). Much of Africa is akin to the drier regions of Asia, yet only 5 percent of the cultivated area is irrigated, compared with South Asia's 40 percent. Africa's highly varied agroecological zones imply that it cannot simply replicate Asia's transformation, which was based on the use of reliable irrigation, fertilizers, and improved seeds, beginning in fertile regions and eventually moving to arid areas. It will need to begin its revolution where Asia's ended.

In Africa, increasing agricultural productivity implies a trans-

formation from traditional to modern agriculture, which involves both technical change and the presence of input, seasonal finance, and marketing systems to increase farm production and deliver it to consumers at a competitive price (Poulton, Kydd, and Dorward 2006, 2007). As the conditions of soils, climates, water availability, and related pests and diseases are different for Africa than for Asia, optimal technologies are also different. In addition, releasing the bottleneck constraints in many places of Africa—such as underdeveloped transportation facilities, weak property rights, poor security conditions, weak supporting markets, especially for fertilizers, and low human capital—can improve productivity.

Source: IEG 2009c.

Program in Uruguay was useful for providing incentives to adopt specific technologies, as well as for crop-specific technical assistance like plant health (IDB 2003). The effects on productivity, however, vary by crop (Cerdan-Infantes, Maffioli, and Ubfal 2009). In the Dominican Republic, effects of the technologies financed through the Program for Technical Support in the Agricultural Sector vary by crop—the productivity of rice producers and breeders improved, whereas the effect on the productivity of other producers was insignificant (Gonzalez and others 2009). A recent evaluation of several World Bank projects (IEG 2009a) finds that, in Brazil, Colombia, Peru, and Nicaragua, competitive research funds can help better mobilize available research capacity, stimulate scientific creativity, and promote efficiency in the national research system.

EBRD’s Competitive Grant Schemes complement traditional “block” funding allocated annually to specified public research organizations for their core research programs, infrastructure, and human resources. They can be used to accomplish objectives that may be difficult to achieve through block funding, such as funding to specific research topics. EBRD’s recent evaluation of the Tajik Agricultural Finance Facility indicates the importance of providing affordable and timely financing for working capital for cotton growers (EBRD 2009).

Public research and private research are complementary. Public funding of research and extension services will be needed because of the public good nature of the services. Poor farmers and smallholders are generally unwilling and unable to pay for advisory services that deal with public knowledge and information (Swanson and Rajalahti 2010). Although farming is essentially a private sector activity in which farmers apply their labor and capital to land to produce crops, the public good nature of a wide range of support services they require implies the need for public support, which will not be provided in sufficient quantity or quality only by market institutions. R&D performance can be improved through better public-private collaboration.

Building capacity facilitates productivity increases. One way to address research and extension is to establish a strong public education and research system (Evenson and Pray 1991; Pray, Fuglie, and Johnson 2007). R&D in *agricultural-based countries* is most effective when oriented toward increasing the productivity of on-farm assets, including land, labor, and smallholder human capital. R&D in *transforming* countries needs public sector R&D institutions and projects that partner with both input suppliers and the food supply chain. R&D in *urbanized* countries may need to focus on providing appropriate technology to smallholders such that they can access the growing urban markets in a sustainable way.

However, agricultural research is underfunded in the developing world, with large variations across regions. In 2000, developing countries spent an average of 0.5 percent of agricultural GDP on R&D, whereas developed countries spent 2.4 percent (Oxford Policy Management 2007). The average rates of return on investment in agricultural research and extension—in the range of 35 percent in Sub-Saharan Africa and 50 percent in Asia, for example—far exceeded borrowing costs. But growth rates of public agricultural R&D expenditures fell noticeably in the past decades after a rapid expansion in the late 1970s. This is in part due to the winding down of the Green Revolution and donor fatigue with agriculture. Asian countries spent nearly five times what countries in Sub-Saharan Africa spent on agricultural research per hectare over the period 1980–2003 (Alene and Coulibaly 2009). Agricultural investment in R&D increased by barely a fifth in Sub-Saharan Africa in the past 20 years, with a decline in about half of the countries there.

International institutions should more actively facilitate an improvement in research and extension. Evaluative evidence suggests that MDB interventions in supporting research and extension can be improved:

- WBG interventions have had limited success in ensuring adequate support for research and extension activities after project close (IEG 2010).

Links between the Consultative Group on International Agricultural Research (CGIAR) centers and national programs are weak; research findings from CGIAR institutions need to be mainstreamed consistently in country-level World Bank projects. Sustainability has been an issue in the World Bank's support for research and extension because of insufficient government funding and limited cost recovery, whereas IFC's trader-processors can recover costs through farmers' crops. The World Bank's agriculture analytic and advisory activities have generally been of sound quality, and the lending that it informed had better outcomes than lending that did not; but insufficient attention has been given to enhancing the impact and sustainability of those activities at the country level. IFC advisory services have been largely supply driven and have lacked a focus on relevant agribusiness subsectors. Few advisory services leveraged outcomes by linking with investments.

- ADB experience in this area has been more positive, as indicated by its *Special Evaluation Study on Policy Implementation and Impact of Agricultural and Natural Resources Research* (ADB 2000). For example, some activities initiated by ADB have been incorporated in other follow-on projects or have received continued support from other development partners. Some activities were also absorbed into the core agendas of international agricultural research centers. Major collaboration developed involving government, international agencies, and the private sector in rain-fed areas, where there is much need for investment (Box 2). However, the success of extension services in contributing to higher yields has been limited in ADB projects (ADB 2010). Crop yields (including livestock) achieved under some of the evaluated projects have been lower than expected. Poor extension services also resulted in low levels of project acceptance and beneficiary participation. Extension services would be more effective if they were integrated with other support services, such as inputs delivery, credit, supply, and marketing, most importantly involving the private sector in improving the value chain.
- IDB has helped develop ways of partnering the public and private sectors for agricultural services

delivery (notably animal health and plant protection) and has provided support for the explicit use of matching grants and business plans to spur technology change (IDB 2003). However, development efforts in research program systems have been hurt by decreases in spending and limited funding commitments. Special attention to outcome tracking, sustainability of the models adopted, and promotion of the requisite adjustments is needed in view of recent structural overhauls of agricultural research and extension systems in the region covered by IDB.

- AfDB and IFAD's investments in agricultural research have achieved good or promising results. Examples include the IFAD roots and tubers program in West Africa, AfDB funding for Nerica rice, and control of animal diseases and locusts by AfDB and IFAD (AfDB-IFAD 2010). IFAD has also established a partnership that enables IFPRI research in IFAD-funded projects. But the knowledge and innovation gaps are large in Africa. The joint AfDB-IFAD evaluation finds three reasons for the inadequate resources for research in Africa: (i) inefficient and underfunded science and technology institutions; (ii) a lack of effective identification and extension of innovations that work; and (iii) rapid changes in the international research environment toward biotechnology and private agricultural research.

Many IFIs are not set up to support agricultural research. Nonetheless, they should better coordinate their projects and strengthen cooperation with research-supporting organizations, such as CGIAR or the International Development Research Centre (Canada). Those organizations in turn could benefit from follow-up projects financed by the IFIs.

Access to Water

Access to water is a major determinant of agricultural productivity and the stability of yields. Advancing technology can raise yields further in irrigated areas and help farmers deal with a more variable future climate. More attention is required for improving productivity in rain-fed areas. Water management interventions need to

Box 2. Consortium for Unfavorable Rice Environments

The Consortium for Unfavorable Rice Environments (CURE), established in 2002 with the support of ADB regional technical assistance, builds on the knowledge gained, technologies developed, and partnerships established over the past decade. CURE has 10 developing country members—Bangladesh, Cambodia, India, Indonesia, Lao PDR, Myanmar, Nepal, the Philippines, Thailand, and Vietnam—and is coordinated by the International Rice Research Institute.

CURE emphasizes bringing technologies and knowledge to farmers using a participatory mode of identifying problems and working out solutions. Consultations among CURE partners and stakeholders were frequent during implementation of the regional technical assistance. Three major rain-fed lowlands (drought, submergence, and salt-affected lowlands across monsoon Asia) and three distinct highland environments (drought-affected plateaus in South Asia, drought-prone and mountain areas of Southeast Asia, and the rainy but intensively cultivated uplands of Indonesia and the Philippines) were identified for CURE to focus on. Outputs of the project include (i) cropping innovations that combine complementary technologies for increasing rice productivity and reducing risk in rice-based cropping systems; (ii)

knowledge distilled into decision tools, management principles, and operational guidelines that are extension ready; (iii) capacity building for national agricultural research systems (NARSs) for implementing integrative and participatory technology development and dissemination; and (iv) acceptability to farmers and viability of innovative rice-based production systems based on their biophysical performance and socioeconomic circumstances. Specific technologies for the fragile rice ecosystems were developed and tested.

CURE activities continued even after the completion of the ADB project. The International Rice Research Institute and NARS partners have realized the value of CURE and support its operation with their own funds. The member countries believe that “star technologies” developed from CURE and validated under local conditions could provide opportunities for improving rice productivity in the most adverse production systems and for improving the livelihood of the poor and subsistence households. The collaboration with NARSs has enhanced capacity in extending knowledge, technologies, and skills to nongovernmental organizations, local communities, and farmers and is expected to ensure realization of impact.

Source: ADB 2008.

address three interconnected issues: improving access to water, enhancing recovery of operation and maintenance costs, and improving water use efficiency.

Irrigation benefits millions of people (Box 3). About 80 percent of the World Bank’s irrigation projects increased farmers’ access to water by meeting their targets for physical infrastructure development. Sustainability, however, has been an issue because of the lack of reliable funding for operation and maintenance. Irrigation projects also report positive agricultural outcomes, particularly when supported by complementary activities (IEG 2010). An earlier IEG study on water management in agriculture (IEG 2006b) noted the scope for increasing complementarity among irrigation investments and credit, extension, and marketing services.

Financing irrigation systems as well as other local infrastructure has been a priority for

AfDB and IFAD in Africa. A joint AfDB-IFAD analysis (AfDB-IFAD 2010) of project effectiveness finds that more than 80 percent (the highest percentage of satisfactory rating of all subsectors) of AfDB’s and more than 60 percent of IFAD’s irrigation development projects have satisfactory performance. The attention devoted to promoting participatory processes for the management of activities is a common element in those successes.

However, cost recovery of irrigation projects has been difficult. Political and institutional factors—including difficulties associated with imposition and enforcement of pricing policies, lack of capacity or motivation of collection agencies to enforce water charges, and a vicious cycle of low operations and maintenance expenditure—lead to poor performance and increase farmers’ reluctance to pay for irrigation. The WBG needs to devote more attention and resources to helping governments implement politically and institutionally feasible mechanisms

Box 3. Cases of Effective Water Management Support

IEG evaluations have cited some successful cases of water management. During 1994–2004, World Bank agricultural water projects benefited up to 12 million households (IEG 2006b). Mali's Office du Niger invested in the maintenance and reform of irrigation, almost tripling rice production (IEG 2007b). A small-scale irrigation project in Nigeria benefited more than 2 million rural households (World Bank 2008). A World Bank-supported irrigation project in Peru led to agricultural improvements in the rural coastal area (IEG 2009a). Irrigation investments in India's Andhra

Pradesh increased the demand for labor, particularly for women (IEG 2008). For three decades, the World Bank has been Egypt's principal partner in irrigation and water, and the renewed irrigation system has contributed to increases in agriculture productivity (IEG 2009c). An IFC study (IFC 2008) found that investment in the irrigation system in India allowed an additional 1 million hectares of farmland to be irrigated over four years.

for cost recovery, to foster an environment in which public-private partnerships can succeed and to monitor results (IEG 2010).

Although there is potential to increase irrigation, the availability of water is a growing constraint. Agriculture accounts for 70 percent of fresh water use globally, 71 percent in Latin America, 81 percent in Asia, and 86 percent in Africa (AQUASTAT 2010). Only a small percentage of agricultural land—4 percent in Sub-Saharan Africa, 29 percent in East Asia, and 39 percent in South Asia—is irrigated. In Tanzania, of the 44 million hectares suitable for agricultural production, only 10 million are under cultivation and only 200,000 irrigated. This represents a mere 2 percent of total cultivated area in the country (Makki and de Jong 2008). There is definitely potential to increase irrigation in Sub-Saharan Africa: only 18 percent of the potentially irrigable land is under irrigation (Peacock and others 2004).

Water scarcity is also a key constraint to agribusiness. Agribusiness and beverage firms use an enormous amount of fresh water and are concerned about shortages of clean potable water as they compete with demand from growing populations. Increases in the demand for all foods result in an increase in the demand for water, and increases in demand for high-value foods—such as meats and dairy—and for processed foods increases water demand from production systems. For example, 1 kilogram of maize requires approximately 900 kilograms of water,

and 1 pound of packaged beef requires about 16,000 kilograms of water.⁶ IFPRI developed a global model of supply and demand for food and water that shows that if current water policies continue, farmers will find it difficult to meet the world's food needs.

Climate change is likely to make water sources more variable, and increased droughts and floods will further stress agricultural systems. Meeting future food demand will also require development of crop varieties and livestock that respond reasonably well in a range of production environments rather than extremely well in a narrow set of climatic conditions (IFPRI 2009). Agribusiness is being pushed to reduce its water footprint throughout the food supply chain and to reclaim wastewater, particularly in fragile ecosystems.

Addressing the challenge of agriculture productivity requires wider implementation of management practices in water use (FAO 2009a). Greater attention to water use efficiency and its monitoring is critical. Rainwater harvesting and runoff farming are low-investment technologies under certain circumstances (Pacey and Cullis 1986). Irrigation water should be treated as an economic good to reflect its true social costs rather than as a public good with underestimated price, and farmer participation in irrigation management should be increased. But farmers must have incentives to diversify crops or invest in improved technologies. In Africa, given the

6. See <http://www.waterfootprint.org>.

poor record of investments in large-scale public irrigation schemes, the focus should be on small-scale schemes that can be managed by groups of farmers themselves (AfDB-IFAD 2010).

There needs to be more attention to water management in rain-fed agriculture.

Although productivity is lower, most agriculture production occurs in rain-fed areas. The literature notes the greater marginal impact on agricultural production and poverty alleviation from an additional unit of investment in rain-fed areas compared with irrigated areas (Fan and Hazell 1999; Fan 2008). An IEG evaluation recommends that the World Bank track its water management activities separately in rain-fed areas so it can take stock of what works in addressing water management issues in these areas and contribute strategically to their development (IEG 2010).

Access to Credit

Access to credit is a major constraint to improving agricultural productivity. Inadequate incomes and limited access to credit often impede growth, especially in agriculture-based economies. Facilitation of accessible and financially sound credit facilities is important in all countries. In agricultural countries, access of farmers or farmers' groups and women's groups to microcredit helps farmers and women accumulate productive assets. As countries transition, small and medium enterprise credit becomes more important. In urbanized countries, one expects a reasonably well-developed private sector credit market.

International institutions have played a role in facilitating access to credit through their rural finance programs.

But sustainability beyond project duration remains a challenge, and greater synergy is needed between financial sector interventions and agriculture lending. Addressing risks related to weather and prices in the agriculture sector also requires synergies among agriculture, the financial sector, and disaster and risk-management lending.

The World Bank's rural finance approach appears to be benefiting the agriculture sector.

World Bank country studies and rural finance reviews reveal that financial sector interventions may affect the availability of agricultural credit, and agricultural and community support interventions may affect the quality of the participating financial institution's loan portfolio. However, sustainability remains a challenge. IFC has supported farmers' access to credit with investment and advisory services focused on traders and processors; in a few cases it has resorted to financial intermediaries. For example, providing small amounts to thousands of individual farmers through large trader-processors can make a big difference; sometimes involving commercial lenders and buyback arrangements has demonstrated effectiveness in improving the livelihood of small-scale farmers.

IDB supported rural financial services through its agriculture sector programs.

In the first half of the 1990s, a serious distortion in agricultural credit relating to state-owned agricultural banks was removed. But no parallel initiatives were fostered to develop an alternative institutional apparatus to fill the void left when existing systems were dismantled. There was little appreciable improvement in the availability of credit or financial services for small farmers. Hence, an IDB evaluation recommended that the IDB revisit its approach to rural finance (IDB 2003). A preeminent focus should be financing for small and medium-sized agricultural operations; that should further the development of enabling regulatory environments and institutions for the growth of rural finance institutions and for adapting financial technologies in urban microfinance programs for a rural clientele.

EBRD's recent evaluation of Tajik Agricultural Financial Facility confirmed the effectiveness of support to primary agriculture through the provision of credit to farmers

(EBRD 2009). Lessons from this evaluation show the importance of providing proper incentives to local banks participating in such a program, as well as to the consultants. The evaluation also stressed the need to better coordinate the program with local banks to ensure compliance with conditions before the planting season starts; it also stressed the importance of providing not only agronomic

but also financial training to farmers who are to become borrowers, often for the first time.

A study by the Independent Evaluation Department of ADB (ADB 2009) provides a different perspective with a focus on microfinance. It suggests three things. First, the majority of existing clients, new clients, and nonparticipating households deemed qualified for the program are not really poor by official definition. Second, microfinance has a positive and significant effect on income and expenditure. However, the effect is regressive, which implies that poorer households do not feel the effects of the intervention as much as the richer households. Third, the interventions indicated no significant impact on household assets or on human capital investments such as health and education. It appears that the mild impacts on income and expenditures were insufficient to change either accumulation of household assets or human capital investments.

It is crucial that increased public spending in agriculture leverages private initiatives.

Market-based private sector investments can be major drivers of technical change. Such investments can generate new sources of demand for innovation. Rural financial market development deserves priority attention. AGRA's Innovative Financing Program (AGRA 2009a) assembles "loan guarantee funds" to insure against some proportion of loan defaults. It provides credit for smallholder farmers and small agricultural businesses previously considered too risky for lending. With additional partners, the program aims to leverage up to \$2 billion in low-interest loans for smallholder farmers and small to medium-sized African agricultural businesses. International institutions can capitalize on the opportunities for agriculture and agribusiness by bringing partners together to deliver practical market-based solutions.

Access to Land and Formalization of Land Rights

Land tenure essentially gives rural farmers rights to an important asset with two critical

features. First, with secure land tenure, the landowner can invest in land improvements with less fear of losing the land and therefore being unable to recoup the investment. Second, the landowner can use the land title as equity to leverage credit for further investment in income-generating opportunities. Projects promoting access to land can increase agricultural production by bringing underutilized land under cultivation.

Access to land and formalization of land rights are thought to contribute to both poverty reduction and improvements in agricultural productivity, and the World Bank and IFC have been active in both—most notably land administration—in recent years. Evidence of the impacts of these efforts on agricultural productivity is sparse, however, particularly for land administration, because these projects do not typically have agricultural productivity as a core objective to be monitored. Given the multifaceted nature of agricultural development, in some settings it may be important to combine land administration with other support services to achieve productivity gains (IEG 2010). More attention and evaluation work is required in this area.

Uncertain land tenure or limited private use rights can greatly restrict the efficacy of a variety of rural development activities. One reason that formalization of land rights can achieve positive agricultural outcomes is that they have supported on-farm investments. To provide incentives for investments into improved productivity of primary agriculture, well-functioning agricultural land markets are important (EBRD 2008a).

IDB has supported operations to finance community-based physical, social, and production infrastructure investments for settlements of *campesinos* who are in the process of securing ownership of the parcels they farm. Modernization of land registries and of cadastres is the most frequently mentioned objective of the land administration and titling programs reviewed. Evaluative evidence also suggests that land administration programs are

technically complex and politically difficult to administer, which explains the frequent delays in implementation (IDB 2003).

EBRD supports access to land through the policy dialogue conducted by its Legal Department under the Law in Transition program (EBRD 2010a). The focus is on central Asia, where farmers still do not have land ownership rights and therefore have limited access to more substantial credit financing because they lack collateral.

Transport and Marketing

The greatest returns for agricultural productivity often result from investments in roads (IEG 2007c). In Ethiopia, access to all-weather roads decreased poverty by 6.9 percent and increased food consumption by nearly 17 percent. In an ADB occasional paper (Rauniyar and Kanbur 2009), rural roads were cited as among the most effective investments for reducing rural poverty. However, rural roads are not sufficient for inclusive development. Adequate enabling investments and support services are required. In most of the road corridors, there are opportunities to provide backward and forward linkages for adding value to agricultural production.

Although half of the rural population of south Asia lives within one hour of a market, nearly half of African farmers still live five hours or more from a market. Not only are there few rural roads, but transport costs in Africa are among the highest in the world, reaching as much as 77 percent of the value of exports. Rural and trunk roads constitute a significant challenge to agriculture and agribusiness in Africa (AfDB 2010).

The World Bank has been engaged extensively in building roads, storage, ports, forwarders, and trading platforms. During 1995–2005, about 15 percent of road projects consisted of rural roads (IEG 2007a). Two-thirds of the projects in the reviewed portfolio indicated that the transport component would contribute to improvements in agricultural production or

productivity. World Bank transport interventions have generally been successful, but results have varied by region. Available data point to high average success rates in these projects. As in other sectors, rates are lower in Sub-Saharan Africa.

IFC has helped bridge infrastructure and logistics gaps. Investments in railway systems, trucks, barges, ports, and warehouses have helped relieve constraints along the supply-value chains. IFC has focused on market infrastructure, integration of farmers into modern supply chains, commodity supply, and standards. IFC's investment and advisory services have concentrated on traders, processors, and logistics client companies. Projects have addressed infrastructure bottlenecks along the supply-value chain related to transport, distribution, and primary production inputs. Investments in logistics companies have facilitated their integration of procurement, transport, warehousing, distribution, and forwarding of agribusiness inputs and outputs. The projects have provided logistics solutions to client companies and their competitors. IFC investments in agribusiness had above-average development outcome ratings in Latin America and the Caribbean and Europe and Central Asia, but ratings were weak in Africa. Given the low rates of market access in Sub-Saharan Africa, the World Bank and IFC need to continue to seek innovative ways to support the development and maintenance of transport and market infrastructure in the region through both public and private investments.

The joint AfDB-IFAD evaluation corroborates the point that in Africa extremely high transportation costs and access to markets are impediments to private sector development (AfDB-IFAD 2010). In some cases new or improved roads alone are enough to have a significantly positive impact on market access, particularly where the underlying supply and demand conditions are favorable. The *Annual Report on Results and Impact of IFAD Operations* (IFAD 2009) identified impact on market access as an area in which IFAD-supported projects and programs need to be improved.

Maintenance and scant cost and benefit tracking are some of the most serious weak points in rural roads. In Latin America and the Caribbean, some programs in the 1990s launched new arrangements involving the community and local microenterprises, which offer promise from an operational standpoint despite frequent funding and institutional constraints (IDB 2003).

Policies, Markets, and Agribusiness

There is a positive correlation between good governance and economic growth, as well as between good governance and satisfactory project outcomes. A recent report, *Distortions to Agricultural Incentives: A Global Perspective, 1955–2007* (Anderson 2009), finds that the incentives farmers face are affected not only by direct protection or taxation of primary agricultural industries but also indirectly by policies assisting nonagricultural industries, as the latter can have an offsetting effect by drawing resources away from farming. Nonagricultural distortions can also have a negative impact on farmers.

The effects of liberalization on farmers' welfare depend on the accompanying policies. The ability of smallholders to compete in expanding markets can be limited by high transaction costs; insufficient access to credit, inputs, and extension; the need for training to meet food safety and international sanitary standards; and procurement practices that favor larger transactions (World Bank 2007). In Latin America, asymmetric market liberalization has hurt agriculture. In the 1990s, policy reform moves failed to take into account the adverse effects of sharp exchange-rate appreciations once capital accounts were opened or of inflexible exchange-rate policy management. This opened the way for imports (often of subsidized Organisation for Economic Co-operation and Development products), discriminating against local farmers and making export agriculture less competitive (IDB 2003).

Nonreciprocal trade reforms have also harmed African agriculture, as African

farmers often cannot compete with imports of subsidized cereals and meat (AfDB-IFAD 2010). Some exports—often those of promising nontraditional items such as horticultural products and high-value fish—run into nontariff barriers, such as very demanding sanitary and phytosanitary regulations. Agro-industries in Africa considering exports run into tariff escalation on processed goods whereby there may be free access for unprocessed produce, but tariffs rise rapidly with any additional processing.

Market failures in rural areas are acute in Africa. Potential suppliers of inputs and capital and buyers of produce often know little about farmers, particularly small farmers, and vice versa. Rural financial systems are underdeveloped because formal agencies face high transaction costs in dealing with a new clientele of small farm households scattered over large areas. Both AfDB and IFAD recognize the importance of the private sector in promoting access to markets, but their efforts have not matched the important role of the private sector in agriculture and rural development. The IFAD Strategic Framework 2007–2010 includes promoting access to markets and engagement of the private sector.

The “imperative of regionalization” is important for Africa (AfDB-IFAD 2010). Many issues in agriculture and agribusiness, particularly for small, poor, and landlocked countries, can best be solved through a regional approach. For example, regional trade in agriculture and food products is good for growth, farmers' incomes, and regional food security. Efforts to augment regional trade and food security will be aided by the harmonization of standards and sanitary measures and bolstered by subregional and regional capacities for their implementation. Similarly, for small countries, regional infrastructure—roads, communications, ports—is critical for access to each other's and external markets.

Recent country strategies and operations have emphasized commodity value-chain approaches, the provision of rural finance, and the commercialization of small farmers. AfDB focuses on enhanced marketing

through better postharvest technologies, rural market infrastructure, and agribusiness development, lately through its private sector window. A joint AfDB-IFAD evaluation finds that developing institutional measures to remedy multiple market failures is a major challenge for agriculture in Africa. Solutions have been found to some of the failures. Examples include (i) contract farming, public training, and underwriting of input suppliers; (ii) brokering by third parties for deals between groups of small farmers and buyers; (iii) the formation of farmers' associations; and (iv) group lending.

Agribusiness, agro-industry, and market activities are integral to agricultural and rural development. They connect farmers to input and output markets and economic opportunities and enhance linkages between agricultural and nonagricultural economic activities. Farmers are increasingly being integrated into the industrialized farm-processor-market chain through contract growing arrangements with primary processors.

Increasing the productivity of the assets used throughout the supply chain can increase the profit potential. Accumulation of productive assets throughout the supply chain allows greater flow of product, promoting food security in the country or region as well as increases in income. The competitiveness of modern supply chains depends on the ability to understand and instantly respond to changing consumer demands. Information and communications technologies are central to transforming and urban economies as they attempt to become more competitive globally. Successful supply chain investments may need to simultaneously resolve inefficiencies at multiple leverage points. These leverage points include input supply, producers, market linkages, processing, transportation, cold chains, wholesaling, and retailing.

International institutions have engaged in facilitating the improvement of markets and supply chains with success to various extents.

- ADB finds that 60 percent of the loans included in a synthesis study (ADB 2010) indicated that

improving the functioning of the market as one of their objectives. Most of these loans were programs loans directed toward correcting failures in agricultural markets or reforming policies. Approximately half of these loans reported important achievements in improving market conditions. Most of the policy changes—such as removal of subsidies and taxation at various stages of production systems and better access to market services—were directed toward improving market functions.

- World Bank projects recognize the importance of collective action and assist farmers to form producer organizations and build links with exporters. IFC is exploring a business model in Eastern Europe that seeks to achieve integration of farming and food retailing by reducing barriers and costs to exchange and encouraging greater market integration between rural and urban areas. Commodity roundtables have not yet developed international standards for supply chain certification.
- EBRD's Agribusiness Operation Policy evaluation, completed in 2008, indicates that a new agribusiness sector operations policy is required to more clearly address processors and marketing companies and enhance their backward linkages (EBRD 2008b). It also finds that EBRD has been more successful in addressing competition and market expansion than in addressing institutions and policies. More attention to the food supply chain, financial services, and logistical services is needed. The evaluation recommends some renewed initiatives in the area of improved markets and transparency from primary production to end users.

Donors should better monitor and evaluate project impact along food supply chains.

Just because smallholders are involved in a large growing scheme does not automatically mean that rural incomes increase. In fact, they could be squeezed further if farmers have to adopt technology packages and meet higher grading requirements and production standards yet receive no additional compensation. Being able to keep the contract and having a guaranteed market may be the main reason farmers in this situation

remain faithful suppliers. As liberalization may exclude small and asset-poor farmers who do not have the capacity to respond to requirements of quality, consistency, and volume and to transaction specifications demanded by the modern food industry, small and medium-size enterprises could be captured by multinational organizations in the increase in vertical integration. It is important to measure the impact and track the beneficiaries.

Institutional Factors

Institutional factors have overarching impacts on performance. Coordination within and among institutions plays an important role in the effectiveness of interventions. Commitment, capacity, and country governance have been found to be associated with borrower performance and project outcomes, regardless of whether the borrower is a sovereign government or a private company (IEG 2010).

WBG project performance is strong in some urbanized countries but weak in some agriculture-based countries with lower capacity (IEG 2010). Bank agricultural projects were less likely to achieve their objectives in countries with weak governance (where 72 percent were rated moderately satisfactory or better) than in countries with a more favorable governance environment (where 82 percent were rated moderately satisfactory or better). Projects in countries with high levels of corruption—one aspect of weak governance—performed even worse, with 67 percent moderately satisfactory or better. IFC’s agribusiness portfolio review confirms that strong client commitment and capacity have underpinned positive outcomes, and a paucity of indigenous entrepreneurial capacity is key to weak outcomes.

Many countries in Africa need to build capacity to lead development, especially rural development (AfDB-IFAD 2010). Whereas most governments have decentralization initiatives under way, administrative and fiscal decentralization lags far behind political decentralization. The institutions responsible

for setting and monitoring policy and financing or providing services for small farmers remain largely ineffective. A number of recent reforms at IFAD and AfDB have been oriented toward improving lending agency performance, and evaluation of recently approved country strategies, programs, and projects found signs of improvement in quality. However, little attention has been given to improving government performance. There is, consequently, an urgent need to strengthen government capacity to achieve successful results. Strong political will supporting agriculture and rural development is generally lacking in Africa, but such support is essential to ensure that donors align their interventions within the overall priority areas defined by national policies.

The joint AfDB-IFAD evaluation concludes that there is a large policy gap: significant shortcomings in policies, institutions, and ultimately leadership are constraining successful development of the agriculture and rural development sector. Related to the policy gap is a knowledge gap, where public goods are underinvested. An appropriate policy environment has yet to tap into and exploit the full potential of African agriculture. It is important to embed training in broader programs that address organizational and institutional capacity constraints so that trained individuals can apply their training in the workplace. The joint evaluation also finds that lack of incentives posed a particular problem to civil service training in low-capacity countries.

Coordination within Organizations

Inadequate coordination within international institutions as well as among partner institutions affects the effectiveness of interventions. Potential synergies among sectors such as transport, finance, and agriculture have sometimes been missed within the World Bank and IFC, and synergies between the complementary public-private sector roles of the World Bank and IFC have not yet been fully exploited (IEG 2010). Inadequate coordination between the transport and agricultural sectors was noted as a limitation for strategically developing rural

roads (IEG 2007a). And the World Bank's matrix management structure does not seem to encourage staff to work across sectoral boundaries (IEG 2006b). Interdepartmental coordination issues also exist in IFC, which lacks a cross-department strategy to cover the supply chain from inputs and farms to markets, processors, retail stores, and consumers (IEG 2010). IFC investment departments have been working globally in various aspects of the agribusiness supply chain without a strategic approach to supply chains at country and regional levels. Yet a lack of coordination has impaired the ability of the WBG to deliver the maximum impact from its agricultural investments in terms of contributions to economic growth and poverty reduction.

Efforts at World Bank-IFC collaboration in the agricultural and agribusiness sector have picked up recently. This bodes well for the increased emphasis on agriculture, provided there is adequate follow through. The May 2008 Country Partnership Strategy for Brazil mentioned preparation for increased coordination between IFC and the World Bank. Likewise the Tamil Nadu Irrigated Agriculture Modernization and Water Bodies Restoration and Management Project (fiscal 2007) sought strengthened collaboration with IFC in the marketing sector. A recent World Bank document notes the effort made in the context of the Tajikistan Country Assistance Strategy to place IFC in the lead for designing the WBG program for one of three pillars—improve business opportunities in rural and urban areas (IEG 2010). Collaboration also appears to be emerging in response to the global food crisis.

The IDB evaluation (IDB 2003) finds that coordination of the IDB group products is vital. This is particularly true in areas that are being addressed through multisector operations, where the selection of sector-neutral instruments can mean access difficulties for agriculture and rural areas. A shared assessment and greater coordination of the work of IDB group institutions could yield considerable positive externalities and synergies in rurally targeted programs. To achieve this coordination, a stronger internal organizational commitment will be needed.

Coordination among Donors

Challenges to effective coordination arise because many donors provide support to agriculture and agribusiness. Donors are accountable to constituencies in their home countries and hence have an incentive to support projects and programs that can be attributed to them. This can lead to duplication, fragmentation, and sometimes contradictory donor interventions (World Bank 2008). An FAO study⁷ finds that the large number of donor projects, poorly coordinated and lacking a common policy framework, was seen as imposing high costs on government capacity, leading to weak ownership, poor sustainability, and uneven service provision. Foster, Brown, and Naschold (2000) find evidence of only modest improvements from sector approaches in agriculture and rural development. Sectorwide approaches have been bogged down at the policy development phase and, where donors have tried to push their views onto government, ownership of the sector strategy has remained limited.

The ADB finds that design flexibility, improved donor coordination, and joint implementation can fill funding gaps and provide other support while protecting against changes in donor priorities (ADB 2010). Most of ADB's agriculture and natural resources operations were executed with additional support from and in close coordination with other development agencies. This included a wide range from cofinancing, implementation of advisory technical assistance, follow-on activities by other development agencies in ADB's completed projects, and general information sharing among development agencies.

EBRD's Agribusiness Operation Policy evaluation finds that more intensive cooperation among financial institutions and small and medium enterprise teams is needed to achieve linkages (EBRD 2008b). In many cases the main obstacle is lack of access to

7. http://www.donorplatform.org/component/option,com_docman/task,doc_view/gid,314/.

finance in rural areas. This may require a strengthening of the multidisciplinary approach in EBRD involving different teams and providing appropriate incentives for all participants. The evaluation indicates that EBRD can only have an impact on the sector framework in coordination with the development community. It recommends that the coordination and EBRD's own sector policy dialogue to be more specifically targeted and documented.

The joint AfDB-IFAD evaluation indicates that in many African countries, cooperation among institutions involved in agriculture and rural development needs to be strengthened. Effective partnerships among the public, private, and voluntary sectors have high payoffs. International donors have also not realigned their priorities to promote agriculture and rural development in Africa. African governments need trusted, knowledgeable, and competent development partners who will work with them to address the agriculture and rural development challenges and build on opportunities. The evaluation finds that the partnership between AfDB and IFAD was weak and that an action plan, backed by adequate resources and focused attention to management, can channel efforts more effectively.

The agriculture-based and poorer economies are heavily dependent on donor support and generally have weaker capacity to coordinate. In Nepal, an agriculture-based economy heavily dependent on donor assistance, donors dominate design and implementation programs. In Ethiopia almost 20 donors were supporting more than 100 agricultural projects in 2005, with high transaction costs and duplication of efforts (World Bank 2007).

The proliferation of donors in Africa is causing severe strain on national systems and resources. The number of donors who claim a legitimate interest has exploded (Kharas 2007). There are 233 multilateral development agencies, 51 bilateral donor countries (most with multiple official agencies), several hundred international nongovernmental organizations, and tens of thousands of national nongovernmental organi-

zations, not including community-based organizations, which could number in the millions.

Donors' entrepreneurial drive and ability to raise and deploy resources should be encouraged without taxing government capacities (Binswanger-Mkhize and McCalla 2008). Donors are bringing additional resources, but they also come with high government transaction costs for coordination and dialogue, including receiving donor missions and following up on their reports and recommendations. The study draws out the implications of the increasing number of organizations in the sector and the need for a sensible division of labor based on comparative advantage and specialization.

Increased donor participation in cofinancing, parallel financing, and post-project support is an effective way of mobilizing resources (ADB 2010). Such participation leverages partners' areas of expertise. Improved donor coordination, backed by contingency planning in case donors change their priorities and funding commitments during implementation, is needed to ensure that key program components are adequately supported and implemented in a timely manner for synergy. Such contingency plans should be sufficiently flexible to accommodate unanticipated eventualities that adversely affect the program performance.

Monitoring and Evaluation

Projects with good M&E quality are more likely to have satisfactory outcome and sustainability ratings. IEG evaluations have found that more than 90 percent of the projects rated high and about 80 percent of those rated substantial on the quality of their M&E systems between 2007 and 2009 were rated satisfactory or better on their development outcomes. But those with M&E ratings of modest had satisfactory outcomes or better in only 56 percent of cases. Those with negligible ratings for M&E had satisfactory ratings or better in just 32 percent of cases. M&E is also important for measuring impacts of specific actions and examining the beneficiaries. As discussed, poor farmers do not automatically

benefit from trade liberalization if no appropriate accompanying policies in place. The same is true for investment in the supply chain connecting small and medium enterprises to multinational retailers.

However, M&E in agriculture and agribusiness projects is weak. Incomplete reporting on outcomes constrains assessment of project effectiveness and inhibits institutional learning (IEG 2010). The poor state of M&E in agriculture and agribusiness projects is not just a case of poor data entry, missing files, and confusing or cross-cutting categories. The apparent correlation between poor M&E and poor project outcomes almost certainly implies a systematic problem at the stage of design and implementation. By region, Sub-Saharan Africa had the lowest percentage of projects with good M&E; East Asia and the Pacific had the highest. The main weaknesses found in the country studies included design of agricultural productivity indicators, questions about the generally satisfactory carry-through of objectives into indicators, delays, and weaknesses in livestock indicators.

There is little information on the impact of the IDB's projects in the agriculture sector, and tracking is inadequate (IDB 2003). Of a total of 123 agriculture projects financed between 1990 and 2001, only one ex post evaluation was conducted. There were problems of missing information, primarily because only one in four projects made progress toward an operation's development objectives being tracked and documented. The situation with regard to component-specific objectives was better but still far from satisfactory: only 4 in 10 projects had adequate information to substantiate the component-specific performance assessments. This suggests that there is large room for improvement in project structuring to facilitate M&E and in substantiating monitoring system ratings.

Similarly, ADB emphasizes the importance of functional M&E systems in project and program success. It argues that functional M&E systems are needed, not only for promoting institutional learning but also for detecting signs

of problems early enough to implement suitable mitigation measures. The climatic variability in the agriculture and natural resources operations puts an additional dimension of risk that increases the importance of M&E. Although ADB has been adhering to the formulation of a design and monitoring framework to accompany project proposals, full compliance must be ensured to improve project tracking and performance. There is a need to ensure that M&E activities are well funded and managed as an integral part of implementation.

Conclusion

Agricultural production can be greatly improved worldwide. By one estimate, by 2030 it could triple in Africa alone. This could lead to an increase in the regional economy of nearly \$900 billion. As discussed, improving road infrastructure and strengthening research and extension are among the most important challenges for agriculture and agribusiness development.

Investment in agriculture and agribusiness is poised for a substantial increase, with greater support from the MDBs than in recent decades. Along with the sustained increase in demand and high food prices, the renewed attention by governments and donors provides an opportunity for the sector to turn around from the stagnant growth of the past decades. The crucial question is how well new financing will be used. Clearly, a variety of factors need to come together to ensure better outcomes in the future than were seen in the past. This synthesis, drawing on the works of various organizations, emphasizes four dimensions:

- **Public-private partnership:** A prerequisite for promoting public-private partnership is for governments to provide a policy environment that will induce private sector participation. Unless this condition is present, generating interest from the private sector is futile. One factor that differentiates effective use of public investment in agriculture relates to the link it fosters with private investments and activities. Public-private partnership is necessary not only for an effective linkage in the production chain between agriculture and agribusiness

but also for the provision of complementary services. One example is basic human capital and physical infrastructure. Public funding is needed because of the public good nature of much of that infrastructure. Public-private partnership in research and dissemination of research results can improve technologies for the small-scale sector, and capacity building can help farmers meet new quality and safety requirements. Public-private partnership is important for sustainability as well.

- ***Cross-sector synergy and complementarity:*** A second overarching element of effectiveness concerns the extent to which complementarities and synergies across sectors, infrastructure, education, health, the environment, are leveraged. The strong interdependence and backward-forward linkages between agriculture and various sectors indicate the need for cross-sector approaches. Further exploiting cross-sector synergy and complementarity helps capture and respond to the needs of farmers and entrepreneurs and promotes growth in the agriculture and agribusiness sector.
- ***Intra- and interinstitutional coordination:*** In a sector where so many players are involved, results depend vitally on how well diverse efforts are coordinated. Lack of collaboration between the public and private arms within an organization leaves constraints in the value chain unaddressed and lowers the effectiveness of interventions. Inadequate coordination among donors not only results in duplication,

fragmentation, and sometimes contradiction in interventions, but it also further stretches the already limited capacity of the recipient countries and reduces overall effectiveness. Transaction costs also increase from inadequate coordination.

- ***Sustainability and beyond:*** Finally, recognizing how much more precarious the natural environment has become, the success of any agricultural strategy depends on how it integrates environmental and climate change issues. Climate change threatens agricultural production through higher and more variable temperatures, changes in precipitation patterns, and increased occurrences of extreme events such as droughts and floods. The costs of adapting to climate change in developing countries are estimated at tens of billions of dollars. The importance of risk management is increasing, given the volatility of agriculture production and climate change effects. It is essential to address agriculture and the environment issues with an integrated approach that makes agriculture more resilient to climate change and reduces the sector's environmental footprint. User rights for access to water should be managed to prevent further environmental degradation and strike a balance between poverty reduction and resource use. Actions and solutions are required at the global, national, and local levels, with inclusive participation that links government agencies with smallholder farmers and their organizations.

REFERENCES

- ADB (Asian Development Bank). 2010. *Performance of ADB Assistance to Agriculture and Natural Resources—Evidence from Post Completion Evaluations*. ADB Independent Evaluation Department. Manila: ADB.
- . 2009. *Making Microfinance Work: Evidence from Evaluations*. ADB Independent Evaluation Department. Manila: ADB.
- . 2008. *Policy Implementation and Impact of Agriculture and Natural Resources Research*. ADB Evaluation Study. Manila: ADB.
- . 2000. *Special Evaluation Study on Policy Implementation and Impact of Agricultural and Natural Resources Research*. Manila: ADB. <http://www.adb.org/Documents/PERs/SST-STU-2000-17/Policy-Implementation.asp> 2000.
- AfDB (African Development Bank). 2010. *Agriculture Sector Strategy 2010–2014*. Tunis: AfDB.
- AfDB-IFAD. 2010. *Towards Purposeful Partnerships in African Agriculture*. AfDB-IFAD Joint Evaluation on Agriculture and Rural Development in Africa. Tunis: AfDB-IFAD.
- African Green Revolution Conference. 2009. http://www.africangreenrevolution.com/en/conferences/2009/documentation/acting_to_put_agriculture_solidly_on_agenda.html.
- AGRA (Alliance for a Green Revolution in Africa). 2009a. “African Agriculture in the 21st Century: Meeting the Challenges.” Dr. Akinwumi A. Adesina’s keynote address at a High-Level Meeting Convened by the UN Commission for Sustainable Development (9–10 February 2009), Windhoek, Namibia.
- AGRA. 2009b. *Early Accomplishments, Foundations for Growth*. Nairobi, Kenya: AGRA.
- AGRA. 2009c. *Strategy for an African Green Revolution*. Nairobi, Kenya: AGRA.
- Alene, A.D., and O. Coulilaly. 2009. “The Impact of Agricultural Research on Productivity and Poverty.” *Food Policy* 34(2): 198–209.
- Anderson, K. (ed.). 2009. *Distortions to Agricultural Incentives: A Global Perspective, 1955–2007*. Washington, DC: World Bank.
- AQUASTAT. 2010. “FAO’s Global Information System on Water and Agriculture.” <http://www.fao.org/nr/water/aquastat/main/index.stm>.
- Blackden, C. Mark, and R. Sudharshan Canagarajah. 2003. “Gender and Growth in Africa: Evidence and Issues” World Bank/UNECA Expert Meeting on Pro-Poor Growth Kampala, Uganda, June 23–24.
- Binswanger-Mkhize, H., and A.F. McCalla. 2008. “The Changing Context and Prospects for Agricultural and Rural Development in Africa.” In R. E. Evenson and P. Pingali (eds.) *Handbook of Agricultural Economics*, Volume 4. Amsterdam: North-Holland.
- Cerdan-Infantes, P., A. Maffioli, and D. Ubfal. 2009. “Improving Technology Adoption in Agriculture through Extension Services: Evidence from Uruguay.” Inter-American Development Bank, Office of Evaluation and Oversight Working Paper OVEWP-04/09.
- CGIAR (Consultative Group on International Agricultural Research). 2009. *Global Climate Change: Can Agriculture Cope?* Washington, DC: CGIAR.
- Conning, J., and C. Udry. 2007. “Rural Financial Markets in the Developing Countries.” In R. E. Evenson, P. Pingali, and T.P. Schultz (eds.), *Handbook of Agricultural Economics*, Volume 3, *Agricultural Development: Farmers, Farm Production, and Farm Markets*. Amsterdam: North-Holland.
- Dixon, J., A. Gulliver, and D. Gibbon. 2001. *Farming Systems and Poverty: Improving Farmers’ Livelihoods in a Changing World*. Rome and Washington, DC: FAO and World Bank. <http://www.fao.org/farmingsystems/>
- Dorward, A. 2009. “Integrating Contested Aspirations, Processes and Policy: Development as Hanging In, Stepping Up, and Stepping Out.” *Development Policy Review* 27 (2): 131–46.
- EBRD (European Bank for Reconstruction and Development). 2010a. “EBRD Law in Transition.” EBRD. <http://www.ebrd.com/pages/research/publications/newsletters/lit102.shtml>.

- . 2010b. *Support to Ukrainian Sugar Producers*. http://www.ebrd.com/pages/project/case/ukraine_sugar.shtml.
- . 2009. *Strategy for Tajikistan*, EBRD. http://www.ebrd.com/downloads/country/strategy/tajikistan_comments.pdf.
- . 2008a. *Annual Evaluation Overview Report for 2008*. Evaluation Department. London: EBRD.
- . 2008b. *Agribusiness Operations*. Evaluation Department. London: EBRD.
- Evenson, R.E., and J.W. McKinsey Jr. 1991. "Research, Extension, Infrastructure and Productivity Change in India Agriculture." In R.E. Evenson and C.E. Pray (eds.) *Research and Productivity in Asian Agriculture*. Ithaca, NY: Cornell University Press.
- Evenson, R. E., and C. E. Pray (eds.). 1991. *Research and Productivity in Asian Agriculture*. Ithaca, NY: Cornell University Press.
- Fan, S. 2008. "Public Expenditures, Growth and Poverty. Lessons from Developing Countries." IFPRI Issues Brief 51. Washington, DC: IFPRI.
- Fan, S., and P. Hazell 1999. *Are Returns to Public Investment Lower in Less-Favored Rural Areas? An Empirical Analysis*. Environment and Production Technology Division, EPTD Discussion Paper No. 43. Washington, DC: IFPRI.
- Fan, S., and M. Rosegrant. 2008. "Investing in Agriculture to Overcome the World Food Crisis and Reduce Poverty and Hunger." Policy Brief 3. Washington, DC: IFPRI.
- Fan, S., and A. Saurkar. 2008. "Public Spending in Developing Countries: Trends, Determination, and Impact." In *Public Expenditures, Growth, and Poverty: Lessons from Developing Countries*, ed. S. Fan (Baltimore, MD, USA: Johns Hopkins University Press for the International Food Policy Research Institute, 2008).
- Fan, S., and A. Saurkar. 2006. "Public Spending in Developing Countries: Trends, Determination and Impact." Mimeo. IFPRI.
- Fan, S., P. Hazell, and S. K. Thorat. 1999. "Linkages between Government Spending, Growth, and Poverty in Rural India." Research Report No. 110. Washington, DC: IFPRI.
- Fan, S., T. Mogues, and S. Benin. 2009. "Setting Priorities for Public Spending for Agricultural and Rural Development in Africa." IFPRI Policy Brief 12, Washington, DC: IFPRI.
- Fan, S., L. Zhang, and X. Zhang. 2002. "Growth, Inequality, and Poverty in Rural China: The Role of Public Investments." IFPRI Research Report 125. Washington, DC: IFPRI.
- FAO (Food and Agriculture Organization of the United Nations). 2009a. "2050: A Third More Mouths to Feed." FAO Media Center.
- . 2009b. "New Challenges: Climate Change and Bioenergy." FAO WSFS Issues Paper, FAO.
- . 2009c. "The Technology Challenge: How to Feed the World 2050," High-Level Export Forum October 12–13, FAO.
- . 2008a. "FAO and Emergencies: From Prevention to Building Back Better," FAO Newsroom, <http://www.fao.org/emergencies/tce-home/news/emergency-news/emergency-detail/en/item/8894/icode/?uidf=1345>.
- . 2008b. "Soaring Food Prices: Facts, Perspectives, Impacts and Actions Required," High-Level Conference on World Food Security: The Challenges of Climate Change and Bio-Energy, Rome 3–5, June 2008.
- Financial Times*. 2009. "World Food Security Battle Is Fought on Many Fronts." November 18.
- Forum for Agricultural Research in Africa. 2006. "Framework for African Agricultural Productivity." Accra, Ghana.
- Foster, M., A. Brown, and F. Naschold. 2000. "What's Different about Agricultural SWaps?" Centre for Aid and Public Expenditure, Overseas Development Institute.
- Gonzalez V., P. Ibrarraran, A. Maffioli, and S. Rozo. 2009. "The Impact of Technology Adoption on Agricultural Productivity: The Case of the Dominican Republic." Inter-American Development Bank, Office of Evaluation and Oversight Working Paper OVEWP-05/09.
- Haggblade, S., and P.B.R. Hazell. 2010. "Successes in African Agriculture: Lessons for the Future." IFPRI Issue Brief 63. Washington, DC: IFPRI.
- IDB (Inter-American Development Bank). 2003. *Evaluation of the IDB's program in the agriculture sector (1990–2001)*. IDB Office of Evaluation and Oversight.
- IEG (Independent Evaluation Group). 2010. *Growth and Productivity in Agriculture and Agribusiness: Evaluative Lessons from World Bank Group Experience*. Washington, DC: World Bank.
- . 2009a. "Agricultural Research and Competitive Grant Schemes—An IEG Performance Assessment of Four Projects in Latin America." Washington, DC: World Bank.
- . 2009b. *Egypt: Positive Results from Knowledge Sharing and Modest Lending: An IEG Country Assistance Evaluation 1999–2007*. Washington, DC: World Bank.

- . 2009c. "Evaluative Lessons in Agriculture and Agribusiness: Outline for an ECG Paper." Mimeo.
- . 2009d. "An Impact Evaluation of a Multicomponent Irrigation Project on Farm Households in Peru." Mimeo.
- . 2008. *An Impact Evaluation of India's Second and Third Andhra Pradesh Irrigation Projects: A Case of Poverty Reduction with Low Economic Returns*. Washington, DC: World Bank.
- . 2007a. *A Decade of Action in Transport: An Evaluation of World Bank Assistance to the Transport Sector 1995–2005*. Washington, DC: World Bank.
- . 2007b. "Mali: National Agricultural Research Project (Credit 25570–ML), Agricultural Trading and Processing Promotion Pilot Project (Credit 27370–ML), Pilot Private Irrigation Promotion Project (TF N0210–ML)." Project Performance Assessment Report No. 40206, Washington, DC: World Bank.
- . 2007c. *World Bank Assistance to Agriculture in Sub-Saharan Africa: An IEG Review*. Washington, DC: World Bank.
- . 2006a. *Annual Review of Development Effectiveness 2006: Getting Results*. Washington, DC: World Bank.
- . 2006b. *Water Management in Agriculture: Ten Years of World Bank Assistance, 1994–2004*. Washington, DC: World Bank.
- IFAD (International Fund for Agricultural Development). Forthcoming. *Different Groups, Different Strategies*. Rome: Office of Evaluation, IFAD.
- . 2010. *Annual Report 2009*. Rome: IFAD.
- . 2009. *The 2009 Annual Report on Results and Impact of IFAD Operations (ARRI)*. Issues Paper, Office of Evaluation, IFAD.
- IFC (International Finance Corporation). 2008. *IFC Annual Report*. Washington, DC: World Bank.
- IFPRI (International Food Policy Research Institute). 2009a. "Climate Change: Impact on Agriculture and Costs of Adaptation." IFPRI Food Policy Report. Washington, DC: IFPRI.
- Ivanic, M., and W. Martin. 2008. "Implications of Higher Global Food Prices for Poverty Reduction in Low-Income Countries." *Agricultural Economics* 39: 405–416.
- Kharas, H. 2007. *The New Reality of Aid*. Washington DC: Center for Global Development.
- Krugman, P. 1997. *The Age of Diminished Expectations: U.S. Economic Policy in the 1990s*. Cambridge, MA: MIT Press.
- Makki, S., and I. de Jong. 2008. "Ground Water Irrigation in Tanzania," Background paper for Tanzania Country Economic Memorandum, World Bank.
- McKinsey. 2010. *Lion on the Move: The Progress and Potential of African Economies*. McKinsey Global Institute.
- Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-Being: Synthesis*. Washington, DC: Island Press.
- Naudé, W., and M. Matthee. 2007. "The Significance of Transport Cost in Africa." Policy Note, United Nations University, New York.
- OECD. 2010. "Measuring Aid to Agriculture." www.oecd.org/dac/stats/agriculture.
- . 2006. *Promoting Pro-Poor Growth Agriculture*. <http://www.oecd.org/dataoecd/9/60/37922155.pdf>.
- Oxford Policy Management. 2007. "The Decline in Public Spending to Agriculture—Does It Matter?" OPM Briefing Note 2007–02.
- Pacey, A., with A. Cullis. 1986. "Rainwater Harvesting: The Collection of Rainfall and Runoff in Rural Areas." http://www.villageearth.org/pages/Appropriate_Technology/ATSourcebook/Watersupply.php#RainwaterHarvesting: The Collection of Rainfall and Runoff in Rural Areas
- Pardey, P.G., N. Beintema, S. Dehmer, and S. Wood. 2006. "Agricultural Research: A Growing Global Divide?" Washington DC: IFPRI.
- Peacock, C., A. Jowett, A. Dorward, C. Poulton, and I. Urey. 2004. *Reaching the Poor: A Call to Action. Investment in Smallholder Agriculture in Sub-Saharan Africa*. London: FARM-Africa.
- Poulton C., J. Kydd, and A. Dorward. 2007. "Price Intervention in Sub-Saharan African Agriculture: Can an Institutional View Alter Our Conception of the Costs and Benefits?" Mimeo, World Bank.
- . 2006. "Traditional Domestic Markets and Marketing Systems for Agricultural Products." Background paper for 2008 World Development Report. Washington, DC: World Bank.
- Pray, C.E., and Evenson R.E. 1991. "Research Effectiveness and the Support Base for National and International Agricultural Research and Extension Programs." In R.E. Evenson and C.E. Pray (eds.) *Research and Productivity in Asian Agriculture*. Ithaca, NY: Cornell University Press.
- Pray, C. E., K.O. Fuglie, and D.N. Johnson. 2007. "Private Agricultural Research." In R. E. Evenson, P. Pingali, and T.P. Schultz (eds.), *Handbook of Agricultural Economics*, Volume 3, *Agricultural Development: Farmers, Farm Production, and Farm Markets*. Amsterdam: North-Holland.
- Rauniyar, G., and R. Kanbur. 2009. "Inclusive Growth and Inclusive Development: A Review and Synthe-

- sis of Asian Development Bank Literature.” ADB Occasional Paper No. 8.
- Swanson, B.E., and R. Rajalahti. 2010. “The World Bank Agriculture and Rural Development.” Discussion Paper 44. Washington, DC: World Bank.
- Thomas, V. 2008. “Africa’s Green Revolution Must Heed Local Conditions,” *Financial Times*. June 6.
- Wolman, M.G. 1985. “Soil Erosion and Crop Productivity: A Worldwide Perspective.” In R.F. Follett and B.A. Stewart (eds.), *Soil Erosion and Crop Productivity*. Madison, Wisconsin: American Society of Agronomy.
- World Bank. 2009. “World Bank Group Agriculture Action Plan: FY2010–2012.” Washington, DC: World Bank.
- . 2008. *Community Driven Development: Delivering the Results People Need*. Washington, DC: World Bank Institute.
- . 2007. *World Development Report 2008: Agriculture for Development*. Washington, DC: World Bank.
- . 2004. *Agriculture Investment Sourcebook*. Washington, DC: World Bank.
- . 2003. *Land Policies for Growth and Poverty Reduction*. World Bank Policy Research Report. Washington, DC: World Bank.
- Zepeda L. 2001. “Agricultural Investment, Production Capacity and Productivity.” FAO Economic and Social Development Paper #148.

ECG Papers

- 1 The Nexus Between Infrastructure and Environment (June 2007)
- 2 Making Microfinance Work: Evidence from Evaluations (November 2010)
- 3 Evaluative Lessons for Agriculture and Agribusiness (January 2011)

