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each group of countries and look at countries that are typical of their region and some countries and districts that deviate from the pattern.

Over two-thirds of the world's extreme poor are involved in agricultural activities. We will therefore examine the economics of traditional (or peasant) subsistence agriculture and discuss the stages of transition from subsistence to commercial farming in developing nations. Our focus is not only the economic factors but also on the social, institutional, and structural requirements of small-farm modernization. We will then explore the meaning of *integrated rural development* and review alternative policies designed to raise levels of living in rural areas. The chapter concludes with a case study of problems of agricultural extension for women farmers in Africa.

9.2 Agricultural Growth: Past Progress and Current Challenges

Trends in Agricultural Productivity

The ability of agricultural production to keep pace with world population growth has been impressive, defying some neo-Malthusian predictions that global food shortages would have emerged by now. And it has actually been output gains in the developing world that have led the way. According to World Bank estimates, the developing world experienced faster growth in the value of agricultural output (2.6% per year) than the developed world (0.9% per year) during the period 1980–2004. Correspondingly, developing countries' share of global agricultural GDP rose from 56% to 65% in this period, far higher than their 21% share of world nonagricultural GDP. Since 2005, the growth gap has widened further. And research by the International Food Policy Research Institute points up that a wide range of successful programs have reduced hunger while raising agricultural productivity over the last several decades, including **Green Revolution** successes in Asia; containment of wheat rusts; improved maize and pest-resistant cassavas in sub-Saharan Africa; shallow tubewells for rice and homestead food production in Bangladesh; hybrid rice and mung bean improvement in East Asia; pearl millet and sorghum and smallholder dairy marketing in India; improved tilapia in the Philippines; successful land tenure reform in China and Vietnam; cotton reforms in Burkina Faso; and improvements of markets in Kenya.[5]

Green Revolution The boost in grain production associated with the scientific discovery of new hybrid seed varieties of wheat, rice, and corn that have resulted in high farm yields in many developing countries.

The degree to which general agricultural output grew significantly faster in developing countries in the 40-year period from 1970 to 2010 is reflected in Table 9.1. Output also grew in OECD regions; the sole exception was the poor performance in the transition countries. But growth in the value of output has not kept pace with population growth in Africa.

As Figure 9.1 shows, low-income countries tend to have the highest share of the labor force in agriculture, sometimes as much as 80 to 90%. The share of agriculture in GDP is lower but can represent as much as half of the value of output. These shares both tend to fall as GDP per capita rises: This is one of the broad patterns of economic development (see Chapter 3). But attention to the time paths of the share of agriculture in specific countries reveals a great deal of variation, which is also informative. In particular, sometimes the share of labor in agriculture declines greatly even when GDP per capita does not

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TABLE 9.1 Average Annual Growth Rates of Agriculture, by Region (%)

	1971–1980	1981–1990	1991–2000	2001–2010	1971–2010
High-income countries	1.83	0.97	1.25	0.47	1.14
Developing countries					
Latin America and Caribbean	2.93	2.35	3.09	3.21	2.89
Northeast Asia	3.23	5.04	5.04	3.39	4.19
South Asia	2.19	3.70	2.76	2.80	2.86
Southeast Asia	3.66	3.32	3.41	4.23	3.64
Sub-Saharan Africa	1.05	2.68	3.11	2.97	2.44
West Asia and North Africa	3.31	3.84	2.61	2.75	3.13
Transition countries	0.81	1.42	−4.03	2.28	0.04
World	2.08	2.42	2.09	2.42	2.25

Source: IFPRI (International Food Policy Research Institute). 2013. Global Food Policy Report, Table 1. Washington, DC.

increase much, if at all; examples are seen in the time paths of Nigeria and Brazil, as traced out in Figure 9.1. This finding parallels the observation in the Chapter 7, that urbanization is proceeding in many countries even when per capita income is falling or not rising much. Problems in the agricultural sector can suppress incomes, encouraging more migration to the urban informal sector. We will review the most important problems of developing-country agriculture in this chapter. Figure 9.1 also illustrates the time path of China, in which growth has been extremely rapid but the fall of the share of labor in agriculture has been unusually slow due in significant part to restrictions on rural-urban migration (though migration out of agriculture has greatly accelerated in the ensuing decade through 2013).

In marked contrast to the historical experience of advanced countries' agricultural output in their early stages of growth, which always contributed at least as much to total output as the share of the labor force engaged in these activities, the fact that contemporary agricultural employment in developing countries is much higher than agricultural output reflects the relatively low levels of labor productivity compared with those in manufacturing and commerce.

Agricultural production continues to rise around the world, broadly keeping pace with the rising population. But progress has been very uneven, as seen in Figure 9.2. In Asian developing countries, cereal yields per hectare in 2005 were nearly triple their 1960 levels. Production in Latin America also posted strong gains. Hunger in China fell. Agriculture in South Asia performed well, although hunger is thought to have increased in India in recent years. And in sub-Saharan Africa, yields increased by only about one-third. One of the causes is that in many areas of Africa, the population has reached a size where traditional slash-and-burn agricultural practices are no longer feasible without reusing land after too little rest, resulting in significant deterioration of soil nutrients. But subsistence farmers cannot purchase improved seeds, fertilizers, and other essentials of modern agriculture; the result can be a poverty trap in which farmers must work harder and harder just to stay in place.

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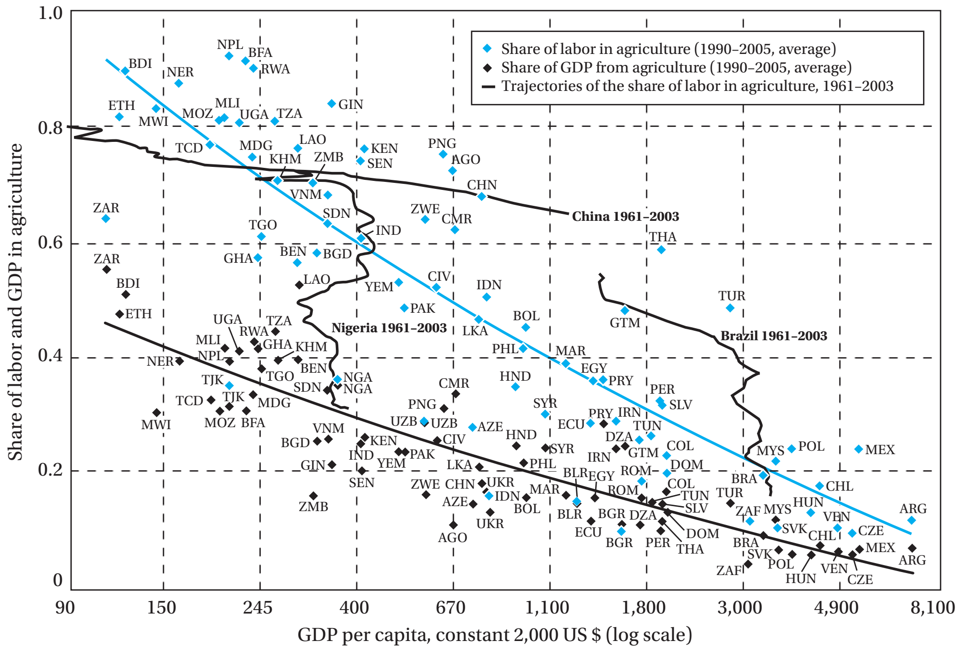
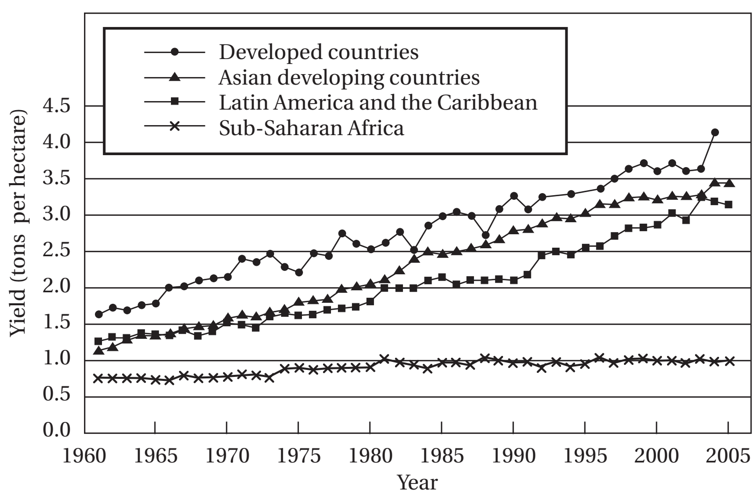
FIGURE 9.1 As Countries Develop, the Shares of GDP and Labor in Agriculture Tend to Decline, but with Many Idiosyncrasies



Source: International Bank for Reconstruction and Development/World Bank, *World Development Report, 2008*. Reprinted with permission.
Note: The list of 3-letter codes and the countries they represent can be found in Table 2.1 on pp. 43–44 of this text.

FIGURE 9.2 Cereal Yields by World Region, 1960–2005



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Recurrent famine, regional famine, and catastrophic food shortages have repeatedly plagued many of the least developed countries, particularly in Africa. The 2011 drought and famine in the Horn of Africa, which affected over 13 million people, brought renewed attention to the problem (see Box 9.1). Of Africa's 750 million people, more than 270 million suffer from some form of malnutrition associated with inadequate food supplies. The severe famine of 1973–1974 took the lives of hundreds of thousands and left many more with permanent damage from malnutrition across the continent in the Sahelian belt that stretches below the Sahara from Cape Verde, off the coast of Senegal in the west, all the way to Ethiopia in the east. Four times in the 1980s and 1990s, at least 22 African nations faced severe famine. In the 2000s, famine again seriously affected African countries as widely separated as Mauritania in the northwest, Ethiopia and Eritrea in the east, and Angola, Zambia, Zimbabwe, Malawi, and Mozambique across the south.[6] The recent famine in the Horn of Africa is examined in Box 9.1.

Calls to mount a new Green Revolution in Africa like the successful one in Asia are now starting to get the hearing they deserve, with public, private, and nonprofit sector actors getting involved—including major support from the Alliance for a Green Revolution in Africa (AGRA), chaired by former UN secretary general Kofi Annan. Technical advances are clearly needed, and institutional and social transformation on the ground will also be needed to achieve the goals of rural development. The African Union's peer-review NEPAD initiative developed the Comprehensive Africa Agricultural Development Program to emphasize investments and regional cooperation in agriculture-led growth as a main strategy to achieve the first Millennium Development Goal of halving hunger and poverty. It targets the allocation of 10% of national budgets to agriculture and a 6% rate of growth in the agriculture sector at the national level.[7]

One early success is in work at the Africa Rice Center in Benin to develop varieties of New Rice for Africa (NERICA). These have so far proven beneficial in Benin, Uganda, and the Gambia, with apparently greater impact on women farmers than men farmers. It is not easy to replicate successes across Africa, however; for example, NERICA varieties have not helped in Guinea and Côte d'Ivoire. And food production will not automatically solve the problems of hunger among people living in poverty.

The food price spike of 2007–2008 and an additional spike in 2011 highlighted the continuing vulnerabilities. During the food price crisis, progress in reducing hunger ground to a halt and showed little improvement in the ensuing years. Some of the causes were temporary factors. But expert predictions are for high food prices in the longer term. Throughout the twentieth century, food prices fell at an average rate of 1% per year; but so far in the twenty-first century, food prices have risen on average. Figure 9.3 shows price trends for several key agricultural commodities; prices have generally returned to levels not seen since the late 1970s.[8]

As Nora Lustig has summarized, some of the causes of the 2007–2008 food price spike also reflect longer-term forces that will lead to high future food prices, including diversion of food to biofuels production, increase in the demand for food (particularly meat, which uses much more land than grain

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BOX 9.1 Development Policy Issues: Famine in the Horn of Africa

On July 20, 2011, the United Nations declared formally that a famine was under way in two regions of Somalia, after horrific images of suffering were publicized.

Facts about the Famine

Somalia and neighboring countries faced a terrible drought, probably the worst in a half-century. More importantly, it took place in one of world's worst governance situations, which created a catastrophe for many women, children, and other noncombatants caught in the crossfire—metaphorically and sometimes literally. The situation was further compounded by rapidly increasing food prices. Tens of thousands of people died as a result of this famine according to UN estimates. The appalling images of the famine compare with similar catastrophes, and already 100,000 residents reportedly fled to refugee camps to seek shelter and food. Health and nutrition conditions in the camps were reportedly very dangerous. Malnutrition rates in southern Somalia are among the highest in the world, over 50% in some regions, with 6 deaths per 10,000 people per day. After famine was declared, some commentators said starvation in Somalia seemed like a never-ending story, but this was the first time in close to 20 years that conditions reached the point of a declared famine.

Drought afflicts not just Somalia but also parts of Ethiopia, Kenya, and South Sudan, and agencies report that about 11.5 million people are severely affected. A key to the drought seems to be an unusually strong Pacific La Niña, which has interrupted seasonal rains for the last two seasons. About half of all livestock has died in some areas. Staple food prices are soaring in affected areas, making the situation dire for the poor. Globally, food prices have risen greatly over the past few years with a new spike in 2011, which saw average global prices nearly double. Some causes are temporary including bad weather, but longer-term forces at work include diversion of food to biofuels production, increase in demand, including grain, for meat production for China, general population growth, higher energy prices affecting agricultural costs, lack of new farmland, and impacts of climate change. Food prices have shot up more than the global average in this region, most dramatically in Somalia, where prices reportedly have tripled—just when the earnings capacity of most households has been falling. There are severe hardships in the other drought-stricken areas, such as northern Kenya, and people living there are at serious risk and need help. At the same time, more aid is getting to those who need it, and the suffering is not on the same scale, reflecting Somalia's "man-made" famine conditions.

Perspective on the Region

The East African "Horn" region is sometimes given a broad definition to include large parts of Ethiopia, Eritrea, Kenya, Djibouti, southern Sudan, and Uganda as well as Somalia. Taken as a region, the Horn is the poorest area in sub-Saharan Africa, though at least nine individual countries elsewhere in Africa are even poorer. Conditions in the region have historically been difficult; the record shows drought has intermittently afflicted the area. No doubt the region was seriously harmed by colonialism, with regions agglomerated arbitrarily, notably Eritrea to Ethiopia, and South Sudan to northern Sudan. This is a major reason the region has been plagued by conflict in the postcolonial era. The assumption in much of the press is that there must be something fundamentally different and special about the geography and climate of this region and the culture of its peoples to explain its recurrent plight. But, in fact, similar root problems are found in this area as in other regions that have failed to develop: poor institutions, ethnolinguistic fractionalization, and "fault lines" of regional inequality corresponding with ethnic or religious areas. Undoubtedly the area has some quite unfavorable geography; but other regions with unfavorable endowments have substantially overcome their disadvantages over time. However, adapting to future impacts of climate change projected for this region will be a challenge the international community will have to respond to.

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Other conditions have compounded the problems; for example, Somalia's population was well under 3 million in 1960 but is well over 9 million today, and this is a factor putting strain on the food supply. However, as explained in Chapter 6, the poor have children as a survival necessity; rapid population is far more a symptom of poverty than its cause.

International Response

This famine has already reached a huge scale, and it would be difficult to reach all the affected people without a large, consolidated effort even under low-conflict conditions. But as with the last famine in Somalia in 1992, it will be one thing to rush food into the country and another to see that it reaches many of the people most in need. Al-Shabaab, a militant Islamist group linked to Al-Qaeda controls large parts of the declared famine areas. Some relief groups are getting through, but the militants have thwarted efforts by the UN'S World Food Program (WFP)—one of the most efficient food deliverers—from coming into these regions, claiming the WFP is biased and has a hidden agenda. The militants claim drought conditions have been exaggerated into famine proportions for political purposes, but the facts on the ground are too obvious to ignore; and there are indications they are reconsidering: There is little political gain in claiming dominance of an area depopulated by the escape of refugees and famine deaths. But governments, international organizations, and NGOs are now gearing up for a full-scale response to worsening famine. The problem is complex, because low incomes resulting from drought mean people cannot afford food, but dumping food on markets may keep prices so low that local growers find it unfavorable to produce for the market. In response, an important strategy is to purchase food for those suffering from local producers whenever possible.

The Entitlement Problem

Historically, a large majority of famines have been "man-made." Amartya Sen frames "the acquirement problem" as one of establishing "command over commodities." *Famine* is defined for international humanitarian and UN purposes as a combination of child malnutrition, deaths from hunger, and low food access, specifically: (1) more than 30% of children suffering from acute malnutrition; (2) more than two adults or four children dying of hunger each day per 10,000 people; and (3) the population overall having access to less than 2,100 kilocalories of food and 4 liters of water per day on average. This definition is not quite the same as Webster's "extreme scarcity of food; a great shortage." For example, in the Bangladesh famine in 1974, food output was actually there; it just wasn't getting to hungry people. According to Amartya Sen's research, also in Bengal in 1943, incomes were actually up as an average, which increased those more fortunate peoples' purchasing power, thus pushing food prices up, and then others such as laborers could not afford it in sufficient amounts.

In Somalia, and elsewhere in the region, output is drastically lower due to the severe drought. Commonly in famines, when many people are unable to buy as much locally grown food as they usually do, it becomes more attractive for sellers to export food out of the area. But if people had earning power, they could afford to buy food and traders would bring it to villages where they lived. The problem is that markets may not provide command over commodities, or entitlements, which people living in poverty need to survive in such conditions. While specific evidence of food exporting is not yet readily verifiable in Somalia, this problem is one of the reasons why public action is generally needed in a famine when entitlement is not established. There may be droughts and drastic declines in food output, but there never needs to be a famine.

Sources: Dreze, Jean, and Amartya Sen. *Hunger and Public Action.* New York: Oxford University Press, 1989; Amartya Sen. *Poverty and Famines: An Essay on Entitlement and Deprivation.* New York: Oxford University Press, 1981. For more details on the economics of conflict and development, see section 14.6, pages 708–717. For analysis of the importance of institutions and the historical legacy, see section 2.7, pages 83–91. On impact of and adaptation to climate change in developing countries, see section 10.3, pages 476–480

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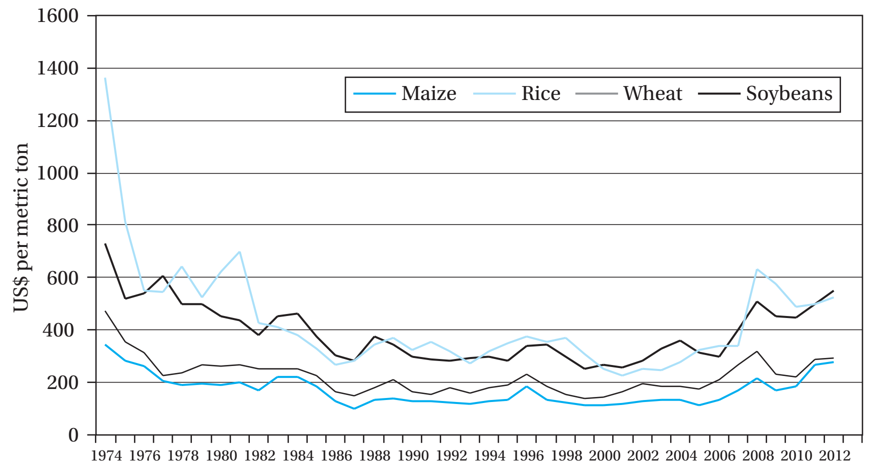
FIGURE 9.3 World Prices for Agricultural Commodities, 1974–2012



Source: Based on International Food Policy Research Institute, 2012 Global Food Policy Report, p. 90 (Washington, D.C.: IFPRI, 2013); downloaded at: http://www.ifpri.org/sites/default/files/publications/gfpr2012.pdf (accessed February 7, 2014). Prices for 2012 are through August 2012.
Note: Prices are in real 2005 US dollars.

production) due to higher incomes in China and elsewhere, the slowdown in productivity growth of agricultural commodities, higher energy prices affecting agricultural input costs, running out of new land to be brought into farming, and the negative impact of climate change on developing-country food production. These are exacerbated by a number of unfavorable policies, including various forms of interference with food prices.[9]

Furthermore, there is not a large global market for food in relation to total demand. Most countries strive for food self-sufficiency, largely for national security reasons. Embargoes of food exports by such countries as Egypt, Vietnam, and Russia reflect this reluctance. In the late 2040s, the world will find itself having to manage to feed over 9 billion people. While highlighting impressive successes, we must also keep in mind looming challenges.

Market Failures and the Need for Government Policy

A major reason for the relatively poor performance of agriculture in low-income regions has been the neglect of this sector in the development priorities of their governments, which the initiatives just described are intended to overcome. This neglect of agriculture and the accompanying bias toward investment in the urban industrial economy can in turn be traced historically to the misplaced emphasis on rapid industrialization via import substitution and exchange rate overvaluation (see Chapter 12) that permeated development thinking and strategy during the postwar decades.[10]

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If agricultural development is to receive a renewed emphasis, what is the proper role for government? In fact, one of the most important challenges for agriculture in development is to get the role of government right. A major theme of development agencies in the 1980s was to reduce government intervention in agriculture. Indeed, many of the early interventions did more harm than good; an extreme example is government requirements for farmers to sell at a low price to state marketing boards, an attempt to keep urban food prices low. Production subsidies, now spreading like a contagion from high-income to middle-income countries, are costly and inefficient.

Agriculture is generally thought of as a perfectly competitive activity, but this does not mean that there are no market failures and no role for government. In fact, market failures in the sector are quite common and include environmental externalities, the public good character of agricultural research and development and extension services, economies of scale in marketing, information asymmetries in product quality, missing markets, and monopoly power in input supply, in addition to the more general government roles of providing institutions and infrastructure. Despite many failures, sometimes government has been relatively effective in these roles, as in Asia during its Green Revolution.[11]

But government also has a role in agriculture simply because of its necessary role in poverty alleviation—and a large majority of the world's poor are still farmers. Poverty itself prevents farmers from taking advantage of opportunities that could help pull them out of poverty. Lacking collateral, they cannot get credit. Lacking credit, they may have to take their children out of school to work, transmitting poverty across generations. Lacking health and nutrition, they may be unable to work well enough to afford better health and nutrition. With a lack of information and missing markets, they cannot get insurance. Lacking insurance, they cannot take what might seem favorable risks for fear of falling below subsistence. Without middlemen, they cannot specialize (and without specialization, middlemen lack incentives to enter). Being socially excluded because of ethnicity, caste, language, or gender, they are denied opportunities, which keep them excluded. These poverty traps are often all but impossible to escape without assistance. In all of these areas, NGOs can and do step in to help (Chapter 11), but government is needed to at least play a facilitating role and to create the needed supporting environment.[12]

Policies to improve efficiency and alleviate poverty are closely related. Many market failures, such as missing markets and capital market failures, sharply limit the ability of poor farmers to take advantage of opportunities of globalization when governments liberalize trade, for example. If these problems are not addressed prior to deregulation or making other structural changes, the poor can remain excluded and even end up worse off. A key role for government, then, is to ensure that growth in agriculture is shared by the poor. In some countries, impressive agricultural growth has occurred without the poor receiving proportional benefits. Examples include Brazil, with its extremely unequal land distribution, and Pakistan, with its social injustices and inequality of access to key resources such as irrigation. But by including the poor, the human and natural resources of a developing nation are more fully employed, and that can result in an increased rate of growth as well as poverty reduction.[13]

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9.3 The Structure of Agrarian Systems in the Developing World

Three Systems of Agriculture

A first step toward understanding what is needed for further agricultural and rural development progress is a clear perspective of the nature of agricultural systems in diverse developing regions and, in particular, of the economic aspects of the transition from subsistence to commercial agriculture.

One helpful way to categorize world agriculture, proposed by the agricultural development economist Alain de Janvry and his colleagues in the World Bank's 2008 *World Development Report,* is to see that alongside advanced agricultural systems in developed countries, three quite different situations are found among developing countries.

First, in what the report terms *agriculture-based countries*, agriculture is still a major source of economic growth—although mainly because agriculture makes up such a large share of GDP. The World Bank estimates that agriculture accounts for some 32% of GDP growth on average in these countries, in which 417 million people live. More than two-thirds of the poor of these countries live in rural areas. Some 82% of the rural population of sub-Saharan Africa lives in these countries. It also includes a few countries outside the region, such as Laos. And a few African countries, such as Senegal, are undergoing transformation.

Second, most of the world's rural people—some 2.2 billion—live in what the report categorizes as transforming countries, in which the share of the poor who are rural is very high (almost 80% on average) but agriculture now contributes only a small share to GDP growth (7% on average). Most of the population of South and East Asia, North Africa, and the Middle East lives in these countries, along with some outliers such as Guatemala.

Third, in what the report calls *urbanized countries*, rural-urban migration has reached the point at which nearly half, or more, of the poor are found in the cities, and agriculture tends to contribute even less to output growth. The urbanized countries are largely found in Latin America and the Caribbean, along with developing eastern Europe and Central Asia, and contain about 255 million rural dwellers.

In many cases, the position of countries within these groups is not stagnant. Many countries that were in the agriculture-based category moved to the transforming category in recent decades, most prominently India and China.

Figure 9.4 shows some of the country positions in each group, along with the movement over time for four major countries over an approximately three-decade period: China, India, Indonesia, and Brazil. For example, Brazil has moved from being a borderline transforming country to a solidly urbanized one according to the World Bank classification.

Agricultural productivity varies dramatically across countries. Table 9.2 shows variations in land productivity (measured as kilograms of grain harvested per hectare of agricultural land) between 3 developed countries (Canada, Japan, and the United States) and 12 developing countries, along with the averages for low-, middle-, and high-income countries. Despite the far smaller number of farmworkers per hectare in the United States, its grain yield per hectare was about 2.4 times that of India and almost 9 times that of the DRC

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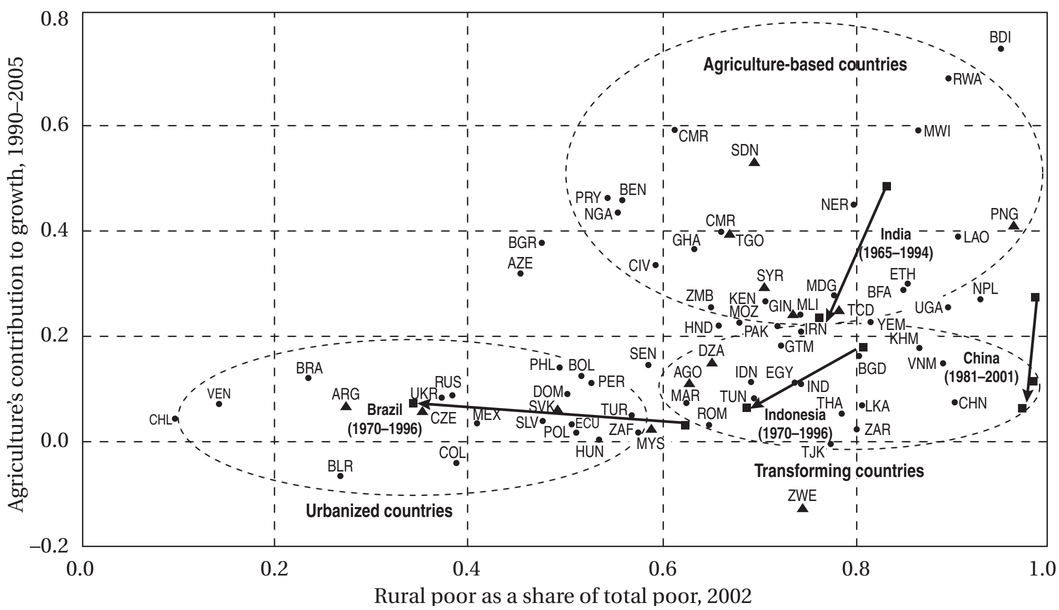
FIGURE 9.4 Agriculture's Contribution to Growth and the Rural Share in Poverty in Three Types of Countries



Source: International Bank for Reconstruction and Development/The World Bank, *World Development Report, 2008.* Reprinted with permission.
Note: Arrows show paths for Brazil, China, India, and Indonesia in previous periods. A triangle denotes predicted poverty data used. Country letter codes are found in Table 2.1 on pp. 43–44 of this text.

(Congo). The value added per worker in U.S. agriculture was over 75 times that of India and over 177 times that of Congo.

It is also important to note that regional disparities can be quite large *within* countries. India has regions that fall within each of the three classifications, from modernized Punjab to semifeudal Bihar. Even upper-middle-income, urbanized Mexico has regions in the south with substantial poverty and high dependence on agriculture. Moreover, within regions, large and small, rich and poor often exist side by side—though large does not necessarily mean efficient. Let us look at agricultural issues facing countries in Latin America, Asia, and sub-Saharan Africa in more detail.

Traditional and Peasant Agriculture in Latin America, Asia, and Africa

In many developing countries, various historical circumstances have led to a concentration of large areas of land in the hands of a small class of powerful landowners. This is especially true in Latin America and parts of the Asian subcontinent. In Africa, both historical circumstances and the availability of relatively more unused land have resulted in a different pattern and structure of agricultural activity.

Although the day-to-day struggle for survival permeates the lives and attitudes of impoverished peasants in both Latin America and Asia (and also

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TABLE 9.2 Labor and Land Productivity in Developed and Developing Countries

Country Group	Agricultural Productivity (value added per worker, US$, in 2011)	Average Grain Yield (kilograms per hectare, 2011)
Low-income	337	2,035
Middle-income	953	3,678
High-income	21,957	4,645
Country		
Burundi	123	1,326
Congo, DR	281	766
Senegal	346	966
Kenya	363	1,514
Bangladesh	475	4,191
Bolivia	629	2,365
India	657	2,883
China	713	5,706
Ghana	810	1,594
Indonesia	937	4,886
Mexico	4,028	3,241
Brazil	5,019	4,038
Japan	42,953	4,911
United States	49,817	6,818
Canada	59,818	3,527

Source: Based on data from World Bank, *World Development Indicators, 2013* (Washington, D.C.: World Bank, 2013), tab. 3.3.

Agrarian system The pattern of land distribution, ownership, and management, and also the social and institutional structure of the agrarian economy.

Africa, although the rural structure and institutions are considerably different), the nature of their **agrarian systems** differs markedly. In Latin America, in a number of poorer and more backward areas, the peasants' plight is rooted in the *latifundio–minifundio* system (to be explained shortly). In Asia, it lies primarily in fragmented and heavily congested dwarf parcels of land. The average farm size in Latin America is far larger than in Asia; the countries included in Table 9.3 are typical. The average farm size for Latin American countries such as Ecuador, Chile, Panama, and Brazil are several *times* larger than farm size in Asian countries such as Bangladesh, Pakistan, Thailand, and India. But the variance of farm size is much higher in Latin America, with huge farmlands controlled by the largest farms in Latin America. As the table reveals, patterns are anything but uniform, with farms in some countries splitting into smaller sizes and in other countries consolidating to larger sizes, and some experiencing increasing and others showing decreasing inequality over time.

Just as we can draw income Lorenz curves from data on the distribution of income (see Figure 5.1), we can draw land Lorenz curves from data on the distribution of farmholds among farmers. In this case, the *x*-axis reports the proportion of total holdings, and the *y*-axis reports the proportion of total

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TABLE 9.3 Changes in Farm Size and Land Distribution

Country	Period	Land Distribution Gini (percent) Start	Land Distribution Gini (percent) End	Average Farm Size (hectares) Start	Average Farm Size (hectares) End	Change (%) Total Number of Farms	Total Area	Farm Size Definition Used
Smaller Farm Size, More Inequality								
Bangladesh	1977–1996	43.1	48.3	1.4	0.6	103	–13	Total land area
Pakistan	1990–2000	53.5	54.0	3.8	3.1	31	6	Total land area
Thailand	1978–1993	43.5	46.7	3.8	3.4	42	27	Total land area
Ecuador	1974–2000	69.3	71.2	15.4	14.7	63	56	Total land area
Smaller Farm Size, Less Inequality								
India	1990–1995	46.6	44.8	1.6	1.4	8	–5	Total land area
Egypt	1990–2000	46.5	37.8	1.0	0.8	31	5	Total land area
Malawi	1981–1993	34.4	33.2[a]	1.2	0.8	37	–8	Cultivated crop area
Tanzania	1971–1996	40.5	37.6	1.3	1.0	64	26	Cultivated crop area
Chile	1975–1997	60.7	58.2	10.7	7.0	6	–31	Arable land area
Panama	1990–2001	77.1	74.5	13.8	11.7	11	–6	Total land area
Larger Farm Size, More Inequality								
Botswana	1982–1993	39.3	40.5	3.3	4.8	–1	43	Cultivated crop area
Brazil	1985–1996	76.5	76.6	64.6	72.8	–16	–6	Total land area
Larger Farm Size, Less Inequality								
Togo	1983–1996	47.8	42.1	1.6	2.0	64	105	Cultivated crop area
Algeria	1973–2001	64.9	60.2	5.8	8.3	14	63	Arable land area

[a] Figure for 2004–2005

Source: World Development Report, 2008: Agriculture and Development by World Bank. Copyright © 2008 by World Bank. Reproduced with permission.

area. A land Gini may be calculated in a manner analogous to that of the income Gini: It is the ratio of the area between the land Lorenz curve and the 45-degree line, and the whole triangle. Table 9.3 presents land Gini coefficients and their change over time for representative developing countries.

One of the broadest trends is for farm sizes to become smaller over time in Asia as land is subdivided, and this trend is seen increasingly also in Africa.

Agrarian Patterns in Latin America: Progress and Remaining Poverty Challenges

In Latin America, as in Asia and Africa, agrarian structures are not only part of the production system but also a basic feature of the entire economic, social, and political organization of rural life. The agrarian structure that has existed in Latin America since colonial times and is still widespread in a substantial

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part of the region is a pattern of agricultural dualism known as *latifundio-minifundio*.[14] Basically, ***latifundios*** are very large landholdings. They are usually defined as farms large enough to provide employment for more than 12 people, though some employ thousands. In contrast, ***minifundios*** are the smallest farms. They are defined as farms too small to provide employment for a single family (two workers) with the typical incomes, markets, and levels of technology and capital prevailing in each country or region.

Latifundio A very large landholding found particularly in the Latin American agrarian system, capable of providing employment for more than 12 people, owned by a small number of landlords, and comprising a disproportionate share of total agricultural land.

Minifundio A landholding found particularly in the Latin American agrarian system considered too small to provide adequate employment for a single family.

Using Gini coefficients to measure the degree of land concentration, as seen in Table 9.3, researchers report that the coefficient for Brazil is 0.77, for Panama is 0.75, and for Ecuador is 0.71. Although estimates vary, changes in land inequality are limited in the case of Latin America (for example, see the data for Brazil and Ecuador in Table 9.3). Other countries are even more unequal; the Gini for Paraguay has been estimated to be an astoundingly unequal 0.94, and very high inequality has been estimated for Colombia and Uruguay, among others.[15] These are the highest regional Gini coefficients in the world, and they dramatically reflect the degree of land ownership inequality (and thus, in part, income inequality) throughout Latin America.

But *latifundios* and *minifundios* do not constitute the entirety of Latin American agricultural holdings. A considerable amount of production occurs on **family farms** and **medium-size farms**. The former provide work for two to four people (recall that the *minifundio* can provide work for fewer than two people), and the latter employ 4 to 12 workers (just below the *latifundio*). In Venezuela, Brazil, and Uruguay, these intermediate farm organizations account for almost 50% of total agricultural output and employ similar proportions of agricultural labor. These farms use a more efficient balance between labor and land, and studies show that they have a much higher total factor productivity than either *latifundios* or *minifundios,* as the law of diminishing returns would suggest. Indeed, evidence from a wide range of developing countries demonstrates that smaller farms are more efficient (lower-cost) producers of most agricultural commodities.[16]

Family farm A farm plot owned and operated by a single household.

Medium-size farm A farm employing up to 12 workers.

A major explanation for the relative economic inefficiency of farming the fertile land on the *latifundios* is simply that the wealthy landowners often value these holdings not for their potential contributions to national agricultural output but rather for the considerable power and prestige that they bring. Much of the land is left idle or farmed less intensively than on smaller farms. Also, *latifundio* **transaction costs**, especially the cost of supervising hired labor, are much higher than the low effective cost of using family labor on family farms or *minifundios*. It follows that raising agricultural production and improving the efficiency of Latin American agrarian systems in traditional areas will require much more than direct economic policies that lead to the provision of better seeds, more fertilizer, less distorted factor prices, higher output prices, and improved marketing facilities.[17] It will also require a reorganization of rural social and institutional structures to provide Latin American peasants, particularly indigenous people who find it more challenging to migrate, a real opportunity to lift themselves out of their present state of economic subsistence and social subservience.[18]

Transaction costs Costs of doing business related to gathering information, monitoring, establishing reliable suppliers, formulating contracts, obtaining credit, and so on.

Despite the fact that many *minifundio* owners remain in poverty, especially among indigenous and mixed-race populations, and many *latifundios* continue to operate well below their productivity potential, a more dynamic sector,

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including some larger farms, has emerged. Efficient family and medium-size farms are found throughout the region.

At an aggregate level, the agricultural sector in Latin America appears to be doing fairly well. Chile has led the way in "nontraditional exports," notably fresh fruits for the northern hemisphere winter markets and also aquaculture, vegetables, and wines; performance in Chile has benefited from an active and relatively efficient agricultural extension system that has included efforts to promote new exports. Diversification has reduced variance in export earnings. Productivity growth in cereals has been quite solid. Sugarcane-based biofuels and soybeans have played important roles in agricultural growth in Brazil. And in traditional exports, particularly coffee, Latin America has led the way in taking advantage of niche opportunities for higher-value-added activities such as organic and Fair Trade markets.[19]

Some Latin American countries, such as Guatemala and Honduras, are still in the mixed transition phase, and in such countries, the *latifundio-minifundio* pattern tends to remain particularly dominant. But much of this pattern still prevails in many other areas. As noted in Chapter 2, the extreme rural inequalities in Latin America typically stem from the Spanish and Portuguese colonial period, in which indigenous peoples were exploited in what often amounted to slavery (see Box 2.3 on continuing effects of the *mita* system in Peru) and African slaves were forcibly brought to the region. Overcoming this legacy has been a long and painful process, with much remaining to be achieved. Social discrimination continues, and improved access for the poor to agricultural land in countries such as Colombia is still in all too many cases suppressed.[20]

Areas with less favorable agricultural conditions, often with a concentration of minority populations, such as northeast Brazil, the Andean region, and parts of Mexico and Central America, tend to have persistently high poverty levels. Extreme rural inequality inhibits progress in these areas, both because of reduced access by the poor to credit and other inputs and because elites effectively continue to block political participation by the poor, who often receive low levels of government services. Moreover, rural-to-urban migration has been disproportionately among more educated people, and the result is that rural populations are becoming older, more female, and more indigenous. These are factors in poverty rates that remain high for middle-income countries and will require sustained action by government and civil society.[21]

Transforming Economies: Problems of Fragmentation and Subdivision of Peasant Land in Asia

If the major agrarian problem of Latin America, at least in traditional areas, can be identified as too much land under the control of too few people, the basic problem in Asia is one of too many people crowded onto too little land. For example, the average farm size is just 3.4 hectares in Thailand, 3.1 hectares in Pakistan, 1.4 hectares in India, and 0.6 hectares in Bangladesh; in each of these cases, farm sizes have been getting even smaller over time (see Table 9.3). The land is distributed more equally in Asia than in Latin America but still with substantial levels of inequality. As seen in Table 9.3, the estimated Gini coefficients for land distribution in Asia range from 0.448 in India, to 0.483 in Bangladesh and 0.467 in Thailand, to 0.540 in Pakistan.

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Throughout much of the twentieth century, rural conditions in Asia typically deteriorated. Nobel laureate Gunnar Myrdal identified three major interrelated forces that molded the traditional pattern of land ownership into its present fragmented condition: (1) the intervention of European rule, (2) the progressive introduction of monetized transactions and the rise in power of the moneylender, and (3) the rapid growth of Asian populations.[22]

The traditional Asian agrarian structure before European colonization was organized around the village. Local chiefs and peasant families each provided goods and services—produce and labor from the peasants to the chief in return for protection, rights to use community land, and the provision of public services. Decisions on the allocation, disposition, and use of the village's most valuable resource, land, belonged to the tribe or community, either as a body or through its chief. Land could be redistributed among village members as a result of either population increase or natural calamities such as drought, flood, famine, war, or disease. Within the community, families had a basic right to cultivate land for their own use, and they could be evicted from their land only after a decision was made by the whole village.

The arrival of the Europeans (mainly the British, French, and Dutch) led to major changes in the traditional agrarian structure, some of which had already begun. As Myrdal points out, "Colonial rule acted as an important catalyst to change, both directly through its effects on property rights and indirectly through its effects on the pace of monetization of the indigenous economy and on the growth of population."[23] In the area of property rights, European land tenure systems of private property ownership were both encouraged and reinforced by law. One of the major social consequences of the imposition of these systems was, as Myrdal explains, the

> breakdown of much of the earlier cohesion of village life with its often elaborate, though informal, structure of rights and obligations. The landlord was given unrestricted rights to dispose of the land and to raise the tribute from its customary level to whatever amount he was able to extract. He was usually relieved of the obligation to supply security and public amenities because these functions were taken over by the government. Thus his status was transformed from that of a tribute receiver with responsibilities to the community to that of an absolute owner unencumbered by obligations toward the peasants and the public, other than the payment of land taxes.[24]

Landlord The proprietor of a freehold interest in land with rights to lease out to tenants in return for some form of compensation for the use of the land.

Sharecropper A tenant farmer whose crop has to be shared with the landlord, as the basis for the rental contract.

Tenant farmer One who farms on land held by a landlord and therefore lacks ownership rights and has to pay for the use of that land, for example, by giving a share of output to the owner.

Contemporary **landlords** in India and Pakistan are able to avoid much of the taxation on income derived from their ownership of land. There are variations, but landlords in South Asia are often absentee owners who live in the town and turn over the working of the land to **sharecroppers** and other **tenant farmers**. Sharecropping is widespread in both Asia and Latin America but more pervasive in Asia. It has been estimated that of all tenanted land, some 84.5% is sharecropped in Asia but only 16.1% in Latin America. The institution is almost unknown in Africa, where the typical arrangement continues to be farms operated under tribal or communal tenures. For example, it has been estimated that about 48% of all tenanted land is sharecropped in India, 60% in Indonesia, and 79% in the Philippines. Though common in Colombia, sharecropping is unusual elsewhere in Latin America; for example, it has all but disappeared in Peru.[25]

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The creation of individual titles to land made possible the rise to power of another dubious agent of change in Asian rural socioeconomic structures, the **moneylender**. Once private property came into effect, land became a negotiable asset that could be offered by peasants as security for loans and, in the case of default, could be forfeited and transferred to the often unscrupulous moneylender. At the same time, Asian agriculture was being transformed from a subsistence to a commercial orientation, both as a result of rising local demand in new towns and, more important, in response to external food demands of colonial European powers. With this transition from subsistence to commercial production, the role of the moneylender changed drastically. In the subsistence economy, his activities had been restricted to supplying the peasant with money to tide him over a crop failure or to cover extraordinary ceremonial expenditures such as family weddings or funerals. Most of these loans were paid in kind (in the form of food) at very high rates of interest. With the development of commercial farming, however, the peasant's cash needs grew significantly. Money was needed for seeds, fertilizer, and other inputs. It was also needed to cover his food requirements if he shifted to the production of cash crops such as tea, rubber, or jute. Often moneylenders were more interested in acquiring peasant lands as a result of loan defaults than they were in extracting high rates of interest. By charging exorbitant interest rates or inducing peasants to secure larger credits than they could manage, moneylenders were often able to drive the peasants off their land. They could then reap the profits of land speculation by selling this farmland to rich and acquisitive landlords. Largely as a consequence of the moneylenders' influence, Asian traditional peasant cultivators saw their economic status deteriorate.[26] And rapid population growth often led to fragmentation and impoverishment.[27]

Moneylender A person who lends money at high rates of interest, for example to peasant farmers to meet their needs for seeds, fertilizers, and other inputs.

To understand the deterioration of rural conditions in some Asian countries during the twentieth century, consider the cases of India, Indonesia, and the Philippines. In 1901, there were 286 million Indians; by 2013, there were more than quadruple that number. The Indonesian population grew from 28.4 million in 1900 to 210 million in 2000. The population of central Luzon in the Philippines increased more than tenfold from its level of 1 million from 1903 to 2003. In each case, severe fragmentation of landholdings inevitably followed so that today average peasant holdings in many areas of these countries are less than 1 hectare. As seen in Table 9.3, average farm size has fallen throughout South Asia and in Thailand.

For many impoverished families, as these holdings shrink even further, production falls below the subsistence level, and chronic poverty becomes a way of life for many. Peasants are forced to borrow even more from the moneylender at interest rates ranging from 50 to 200%. Most cannot repay these loans. They are then compelled to sell their land and become tenants with large debts. Because land is scarce, they are forced to pay high rents or sharecrop on unfavorable terms. And because labor is abundant, wages are extremely low. Peasants can thus get trapped in a vise of chronic poverty from which, in the absence of major rural reconstruction and reform, there is no escape. Thus, many rural Asians are gradually being transformed from small proprietors to tenant farmers and sharecroppers, then landless rural laborers, then jobless vagrants, and finally migrant slum dwellers on the fringes of modern urban areas.[28] At the same time, many other farmers have benefited from the

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enormous productivity gains resulting from the Green Revolution; yet for an increasing number of them, environmental problems such as rapidly falling water tables represent new and looming challenges.

Again, as noted in Chapter 2, colonial practices often had long-lasting influences. In the case of India, regions in which property rights to land were given to landlords had significantly lower productivity and agricultural investments—and significantly lower investments in health and education—in the postindependence period than regions in which property rights were given to cultivators.[29]

Subsistence Agriculture and Extensive Cultivation in Africa

Subsistence farming Farming in which crop production, stock rearing, and other activities are conducted mainly for personal consumption.

Subsistence farming on small plots of land is the way of life for the majority of African people living in agriculture-based economies. The great majority of farm families in tropical Africa still plan their output primarily for their own subsistence. There are important exceptions, including the sugar, cocoa, coffee, tea, and other plantations in East and West Africa; and farms devoted to such export crops as green beans in Niger, cut flowers in Kenya and Ethiopia, legumes in Tanzania, and other contract farming arrangements.

Since the basic variable input in traditional African agriculture is farm family and village labor, African agriculture systems are dominated by three major characteristics: (1) the importance of subsistence farming in the village community; (2) the existence of some (though rapidly diminishing) land in excess of immediate requirements, which permits a general practice of shifting cultivation and reduces the value of land ownership as an instrument of economic and political power; and (3) the rights of each family (both nuclear and extended) in a village to have access to land and water in the immediate territorial vicinity, excluding from such access use by families that do not belong to the community even though they may be of the same tribe. Where traditional systems are breaking down, inequality is often increasing.

The low-productivity subsistence farming characteristic of most traditional African agriculture results from a combination of three historical forces restricting the growth of output:

1. In spite of the existence of some unused and potentially cultivable land, only small areas can be planted and weeded by the farm family when it uses only traditional tools such as the short-handled hoe, the ax, and the long-handled knife, or *panga*. In some countries, use of animals is impossible because of the tsetse fly or a lack of fodder in the long, dry seasons, and traditional farming practices must rely primarily on the application of human labor to small parcels of land.

2. Given the limited amount of land that a farm family can cultivate in the context of a traditional technology, these small areas tend to be intensively cultivated. As a result, they are subject to rapidly diminishing returns to increased labor inputs. In such conditions, **shifting cultivation** is the most economic method of using limited supplies of labor on extensive tracts of land. Under shifting cultivation, once the minerals are drawn out of the soil as a result of numerous croppings, new land is cleared, and the process of planting and weeding is repeated. In the meantime, formerly

Shifting cultivation Tilling land until it has been exhausted of fertility and then moving to a new parcel of land, leaving the former one to regain fertility until it can be cultivated again.

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cropped land is allowed to recover fertility until it can be used again. Under such a process, manure and chemical fertilizers have been unnecessary, although in most African villages, some form of manure (mostly animal waste) is applied to nearby plots that are intensively cultivated in order to extend their period of fertility.

3. Labor is scarce during the busiest part of the growing season, planting and weeding times. At other times, much of the labor is underemployed. Because the time of planting is determined by the onset of the rains and because much of Africa experiences only one extended rainy season, the demand for workers during the early weeks of this rainy season usually exceeds all available rural labor supplies.

The net result of these three forces had been slow growth in agricultural labor productivity throughout much of Africa. As long as population size remained relatively stable, this historical pattern of low productivity and shifting cultivation enabled most African tribes to meet their subsistence food requirements. But the feasibility of shifting cultivation has now broken down as population densities increase. It has largely been replaced by sedentary cultivation on small owner-occupied plots. As a result, the need for other nonhuman productive inputs and new technologies grows, especially in the more densely populated agricultural regions of Kenya, Nigeria, Ghana, and Uganda. Farm size has also fallen in countries such as Malawi and Tanzania, as seen in Table 9.3. Moreover, with the growth of towns, the penetration of the monetary economy, soil erosion and deforestation of marginal lands, and the introduction of land taxes, pure subsistence-agricultural practices are no longer viable. And as land becomes increasingly scarce, land degradation is increasing in scope. The 2008 *World Development Report* concluded:

> Higher productivity is not possible without urgent attention to better soil and water management. Sub-Saharan Africa must replace the soil nutrients it has mined for decades. African farmers apply less than 10 kilograms of fertilizer per hectare, compared with more than 100 kilograms in South Asia. Programs to develop efficient fertilizer markets, and agroforestry systems to replenish soil fertility through legumes, need to be scaled up.[30]

Moreover, by 2007, only 4% of the cropland in sub-Saharan Africa was irrigated, in sharp contrast to 39% in South Asia and 29% in the East Asia and Pacific region. Despite some recent progress, just 22% of the cereal-growing farmland in sub-Saharan Africa is sown with improved varieties, which are used on a large majority of the land in all other developing regions. Dependence on unimproved seeds sown on unfertilized, rain-fed fields is a worsening problem for the region, given both the depletion of soils and the unreliability of rainfall (see Figure 9.5).

Of all the major regions of the world, Africa has suffered the most from its inability to expand food production at a sufficient pace to keep up with its rapid population growth.[31] As a result of declining production, African per capita food consumption fell dramatically during the 1980s and 1990s, while dependence on imports—particularly wheat and rice—increased.[32]

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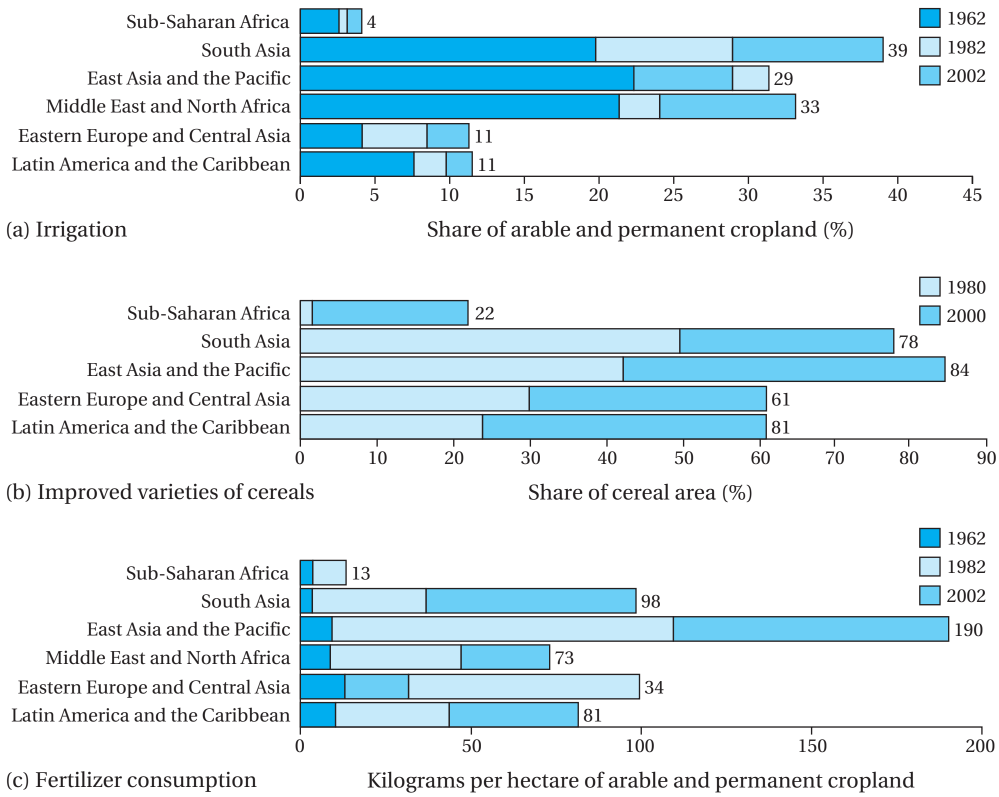
FIGURE 9.5 Expansion of Modern Inputs in the World's Developing Regions



Source: World Development Report, 2008: Agriculture and Development by World Bank. Copyright © 2008 by World Bank. Reproduced with permission.
Note: Figures for improved cereal varieties are based on estimates for rice, wheat, maize, and sorghum.

9.4 The Important Role of Women

A major and until recently often overlooked feature of agrarian systems in the developing world, particularly in Africa and Asia, is the crucial role played by women in agricultural production.[33] In Africa, where subsistence farming is predominant and shifting cultivation remains important, nearly all tasks associated with subsistence food production are performed by women. Although men who remain home generally perform the initial task of cutting trees and bushes on a potentially cultivable plot of land, women are typically responsible for all subsequent operations, including removing and burning felled trees, sowing or planting the plot, weeding, harvesting, and preparing the crop for storage or immediate consumption. In her pioneering work on women and development, Ester Boserup examined many studies on African women's participation in agriculture and found that in nearly all cases recorded, women did most of the agricultural work. In some cases, they were found to do around 70% and in one case, nearly 80% of the total. Typically, these tasks are performed only with primitive tools and require many days of

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long, hard labor simply to produce enough output to meet the family's subsistence requirements, while the men often attempt to generate cash income through work on nearby plantations or in the cities.[34] Recent research confirms women's "time poverty" predicament.

Women do much of the labor for cash crop production, cultivate food for household consumption, raise and market livestock, generate additional income through cottage industries, collect firewood and water, and perform household chores, including the processing and cooking of food. Due to the time-consuming nature of their diverse responsibilities—and no doubt to their limited household bargaining power—women tend to work longer hours than their male counterparts. Studies concerning the allocation of women's time among different activities have greatly increased recognition of the importance of rural women's economic contribution. It has become clear that since women produce a large share of agricultural output and supply a large share of the labor—a share that has actually been increasing over time—successful agricultural reform will require raising women's productivity and ensuring that gender-specific policies are at the core of rural development strategy. The necessity of starting with women's activity when agricultural policy is designed is captured by the maxim of feminist economists that "you cannot just add women and stir."

The diversity of women's duties makes it difficult to determine their share of agricultural production, much less place an economic value on their work. However, current estimates underscore the importance of women's agricultural labor. It is estimated that in addition to work in the household, women provide 60 to 80% of agricultural labor in Africa and Asia and about 40% in Latin America. Much of this work, however, is statistically "invisible" in that women often receive no payment for the work they perform.

Women make an important contribution to the agricultural economy through the labor they supply in the cultivation of **cash crops**. Though the production and profits from commercial crops are generally controlled by men, women are usually responsible for the strenuous jobs of weeding and transplanting. As population density increases and land becomes more fragmented, the length of time that women must spend walking to and from the fields increases, often in very hot climates that make strenuous work exceedingly difficult. In addition to commercial crops, women frequently cultivate small vegetable gardens that provide food for family consumption. Though the cash value of produce from these gardens may be small, it often represents an important component of the total resources available to women.

Cash crops Crops produced entirely for the market.

Women's work in the low-income household involves a range of demanding tasks, including processing and pounding raw grains, tending livestock, cooking, and caring for children. Collecting increasingly scarce firewood and water from distant sources may add several hours to the workday. To raise additional income, it is common for women to engage in household production of goods for sale in village markets. These items are specific to each region, but a few examples are homemade beer, processed foods, handicrafts, and textiles.

Perhaps the most important role of women is providing food security for the household. This is accomplished through the supplementation of household earnings, diversification of household income sources, and raising of livestock to augment household assets. The production of vegetables for

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household consumption helps insulate households from swings in food prices and reduces cash outlays for the purchase of household necessities. Women's investments in revenue-generating projects and livestock are crucial to stabilizing household income, especially but not only in female-headed households, where resource constraints are the most severe.

However, financial investments are inherently risky, and the poorer the household, the more averse its members are to taking any kind of risk. When credit and resources are unavailable, reducing the variability of household earnings generally entails choosing less efficient methods of production and thus, lower average income. This trade-off occurs most frequently in female-headed households, where resource constraints are greatest. Thus, as a consequence of their restricted range of choices, women tend to retain traditional modes of economic activity. The upshot is that their productivity has stagnated while that of men has continued to improve.

Where the structure of agriculture is becoming more commercialized, women's roles and hence their economic status are changing. In many developing regions, women are still unremunerated for the long hours they contribute to the tending of commercial crops. As revenue-generating cash cropping rises in importance, the proportion of resources controlled by women tends to diminish. This is largely due to the fact that household resources, such as land and inputs, are transferred away from women's crops in order to promote the production of cash crops. Nonfarm activities are growing in importance and represent an important path for rural women's economic and social advancement.

Government extension programs that provide resources exclusively to men tend to exacerbate existing disparities between men's and women's access to resources (see the case study at the end of this chapter). If credit is provided solely or preferentially to men for the purpose of cash cropping, commercial production will increase at the expense of women's vegetable gardens. Since homegrown vegetables must be replaced by purchased substitutes, significant increases in a male spouse's cash contribution are necessary to offset a woman's losses. If the market price of vegetables increases markedly (there are now fewer producers) and the increase in the husband's contribution is not sufficient to compensate for the increased need for cash, the welfare of the woman and her children will decline.

This drop in the well-being of family members is due to the fact that a considerably higher proportion of women's income than men's is used for nutrition and basic necessities. Thus, if men's incomes rise at the expense of women's resources, as many studies have indicated, an increase in household income will not necessarily lead to improvements in health and nutrition. Changes in land use that increase household income but reduce women's economic status can be detrimental to the welfare of both women and children. Consequently, it is important that the design of government extension programs reflect the interests of all household members.

Recent economic studies have improved our understanding of these problems. A traditional economics assumption following Nobel laureate Gary Becker has been that households cooperate to maximize effectively shared objectives: the "unitary household" model. But development economics research has found that households engage in extensive bargaining, sometimes to the point where higher incomes would be possible if husbands and wives