Chapter 1

FOOD, AGRICULTURE, AND RURAL DEVELOPMENT IN PAKISTAN

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Introduction

At the same time that policy makers, media, and the international community focus their attention on Pakistan's ongoing security challenges, the potential of the agricultural sector and rural economy to improve the well-being of Pakistan's population is being neglected. Pakistan's agricultural sector and rural economy have a central role to play in national development, food security, and poverty reduction. Since independence in 1947, the country's rich natural resource base, its hardworking farmers, and its rural communities have done much to drive national economic growth and development. Aided by public investments in irrigation, roads, agricultural technology, and market development, agriculture was at the heart of Pakistan's economic growth trajectory through the country's first four decades.

But the subsequent decline in evidence-based policy making on agricultural-sector issues has changed the prospects for the rural economy's role in Pakistan's development. As a result, growth in the rural economy has lost momentum, leaving Pakistan's rural population to face continuing high levels of poverty, and food insecurity, as well as limited access to the public services and markets required for a modern economy. Today, the country's rural poor make up 76 percent of the poor population, but only 9 percent of the overall population (GoP various years, *Pakistan Economic Survey*). Addressing their needs will require renewed attention both to agriculture and to investments in rural development more broadly. This book aims to revitalize interest in Pakistan's agricultural sector and the rural economy. And, more specifically, it seeks to identify public policy solutions that can accelerate agricultural growth, expand the rural economy, and improve the welfare and livelihoods of the rural poor.

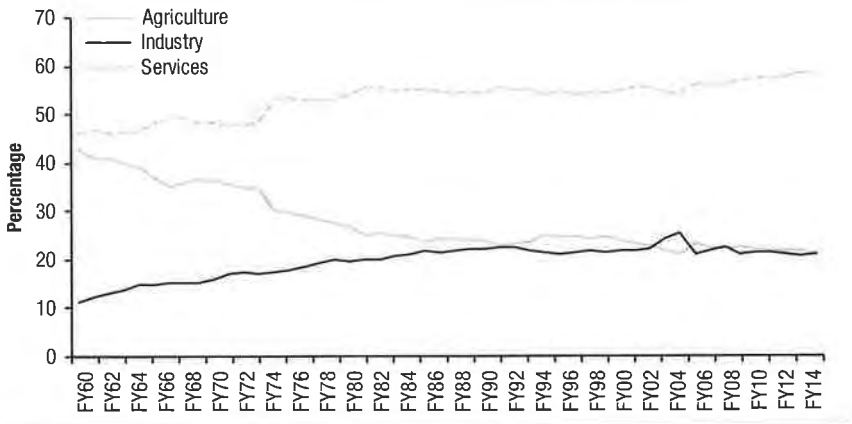
The agricultural sector—comprising the subsectors of crops, livestock and poultry, fisheries, and forestry—has traditionally served as the backbone of Pakistan's economy. Until the early 1960s, agriculture generated

approximately 40 percent of Pakistan's gross domestic product (GDP) (GoP various years, *Pakistan Economic Survey*). Since then, growth in the industrial and service sectors has outpaced positive, but often only moderate, growth in the agricultural sector. As a result, since 2010 the share of agriculture in GDP has dropped to approximately 20 percent, while the combined share of the industrial and services sectors has risen to more than 80 percent, led primarily by growth in the services sector (Figure 1.1). This means that agriculture is no longer a major channel for promoting overall economic growth and development, though as we will show in this book, it remains a major instrument for rural and overall poverty reduction.

Despite the slow but steady structural transformation of Pakistan's economy since the 1960s, the agricultural sector is still a key component of the national economy. First, agriculture remains central to the livelihoods of almost half the country's population and is essential to the future of rural areas. Agriculture is the main sector of employment for approximately 24 million people—who make up approximately 47 percent of the country's labor force. Second, agriculture provides Pakistan's rapidly growing population with the basic food staples and sources of micronutrients. Third, agriculture is essential for many parts of the industrial and services sectors, providing both an important market for industrial products (for example, farm machinery and inorganic fertilizer) and critical inputs to those products. Textile manufacturing, for example, which accounted for about 30 percent of the total industrial GDP in 2013/2014, is highly dependent on domestic cotton production. Foreign exchange earnings are similarly dependent on agriculture: cotton, rice, and leather accounted for nearly 11 percent of Pakistan's export earnings in 2013/2014, while cotton textiles and ready-made garments accounted for another 27 percent (GoP 2014).

Beyond these direct contributions, the rural economy encompasses much more than agricultural production. Pakistan's rural nonfarm economy plays a significant role in generating output and employment through a wide and diversified range of enterprises. Various estimates from the early to mid-2000s indicate that nonfarm incomes contributed between 40 and 57 percent to total rural household income, and even households engaged specifically in farming derived between 36 percent and 51 percent of their household income from nonfarm rural sources (Farooq 2014; World Bank 2007; Dorosh et al. 2003). These nonfarm income sources include a variety of enterprises, ranging from small village shops selling everyday consumables to equipment repair shops, transportation services, small-scale rural processors, and other enterprises; other sources include jobs in local schools, clinics, and government

FIGURE 1.1 Shares of sectors in national GDP at factor cost, FY1960–FY2014



Source: Authors, based on data from GoP (various years), *Pakistan Economic Survey*.

offices and services. Estimates from the same period suggest that there were roughly 3.8 to 5 million nonfarm rural enterprises in Pakistan (Farooq 2014; World Bank 2007). Pakistan's experience has been consistent with the wealth of theoretical and empirical evidence on agriculture's central role in economic development via intersectoral linkages that support industrialization (Vogel 1994; Adelman 1984; Singer 1979; Johnston and Mellor 1961) and via rural nonfarm activities (Haggblade, Hazell, and Reardon 2010; Start 2001; Lanjouw and Lanjouw 2001; Fan, Hazell, and Thorat 1999).

Given these linkages to the broader economy, as well as the large share of the population supported directly by agriculture, the agricultural sector and the rural nonfarm economy clearly have a crucial role to play in promoting growth and reducing poverty in Pakistan (Dorosh, Niazi, and Niazi 2003). Thus, the slow growth of agriculture in recent years is particularly problematic. The annual agricultural growth rate has averaged just 2.8 percent over the four years 2010–2014, nearly a full percentage point lower than the average of 3.7 percent per year during the previous decade of 2000–2010, and approximately 2 percentage points lower than the period between 1990 and 2000 when the growth rate averaged 4.6 percent per year (Table 1.1). On a per capita basis, agricultural GDP grew at 1.3 percent per year during 2000–2010, well below the 2.5 percent growth rate attained during the 1990s. And in comparison to the rest of the economy, growth rates of the agricultural sector have been lagging: the services and industrial sectors grew significantly faster

TABLE 1.1 Value added to Pakistan's economy and growth rate by sector, 1990–2014

	2014 value added			Growth rate (%)		
	PKR (billion)	Share of GDP (percent)	Share of Ag GDP (percent)	1990–2000	2000–2010	2010–2014
Agriculture	2,152	21.05	100.00	4.59	3.71	2.76
Major Crops	550	5.38	25.55	2.99	2.82	3.73
Other Crops	251	2.45	11.65	4.27	1.10	–0.85
Cotton Ginning	61	0.59	2.81			0.97
Livestock	1,203	11.77	55.91	6.24	4.61	3.48
Forestry	44	0.43	2.04	0.10	–5.89	2.08
Fishing	44	0.43	2.03	3.28	6.31	–1.78
Industry	2,129	20.82	98.92	3.27	4.28	3.23
Services	5,945	58.14	276.23	3.69	4.99	4.42
Total	**10,227**	**100.00**	**n.a.**	**3.81**	**4.54**	**3.81**
Agricultural GDP per capita (PKR/year)	11,559.8	n.a.	n.a.	2.46	1.32	0.71
Cropped area (million ha)	19.0	n.a.	n.a.	0.92	0.86	–0.60
Crop GDP/ha (PKR thousands/year)	42.2	n.a.	n.a.	2.54	1.30	2.79

Source: Authors, based on data from the GoP (various years), *Pakistan Economic Survey*.

Note: Growth rates are calculated as logarithmic estimates of annual growth based on data from 1990 to 2014. n.a. = not applicable; PKR = Pakistani rupees; ha = hectares.

than agriculture during 2000–2010, at 5.0 percent and 4.3 percent per year, respectively, compared with 3.7 percent for the agricultural sector.

The book examines the performance of both agriculture and the rural economy in the face of the frequent macroeconomic crises and weather-related shocks that have occurred in recent decades. It also appraises the causes and consequences of Pakistan's substandard social indicators among its rural population. While it does not provide a comprehensive treatment of every policy dimension under the broad topic of agriculture and rural development, it presents new evidence on a range of essential issues. These include not only availability of agricultural inputs (water, seeds, fertilizer) and agricultural markets, but also the provision of public services (education, water and sanitation, electricity, health), women's empowerment, aspirations of the large youth population, and the impact of decentralization (brought about by the 18th Amendment)—all of which play a vital role in shaping rural development.

To set the stage for the book's wider analysis, this introduction proceeds as follows. First, it reviews the historical evolution of public policy on food

security, agriculture, and the rural economy in Pakistan. Second, it describes the current state of affairs with respect to agricultural growth, rural development, and poverty reduction. Third, it outlines the main messages emerging from the research and analysis presented in the remainder of the book, highlighting the major issues on which evidence-based insights can assist decision makers in Pakistan in their pursuit of beneficial policy outcomes. Fourth, it describes the types of data and analysis used in the book. A final section provides a brief summary of the book's chapters.

A Historical Perspective

To understand the state of the agricultural sector and rural development today, we need to take a historical perspective. Many factors have contributed to Pakistan's erratic economic and social progress in recent decades, and lagging agricultural performance is only one among several. But because agriculture is so central to Pakistan's economy, society, and politics, a narrative of Pakistan is incomplete without devoting careful attention to agriculture and the rural economy. To this end, we briefly examine the history of policy engagement with agriculture and rural development in Pakistan and its impacts on the rural economy since independence (Table 1.2).

During the two decades that followed independence in 1947, Pakistan was largely fed by the bounty of Punjab Province, which is home to the rich alluvial soils and vast irrigation system in the Indus River basin. Unfortunately, the cleaving of Punjab across two separate countries diminished the depth and breadth of agricultural markets served by farmers on Pakistan's side of the new border (Murgai, Ali, and Byerlee 2001; Krishna 1963). The effects of this reduced market were exacerbated by the neglect of agricultural development by public policy makers, who followed much of the developing world in turning their attention to industrialization. However, as Pakistan became a net importer of food grains in the early 1950s, about half a million tons annually, attitudes in the government changed. In particular, a severe drought in 1952 forced Pakistan to import one million tons of wheat to meet basic food staple requirements, reminding policy makers of the insecurity of the young country's food supply. Policy makers acknowledged the fundamental importance of agriculture and the rural sector to Pakistan's future with the introduction in 1953 of the Village Agricultural and Industrial Development Program (commonly referred to as Village AID)—a social protection program created to provide rural employment opportunities on short-duration projects (Green 1957).

TABLE 1.2 Major events and policies relating to food security, agriculture, and rural development in Pakistan's history, 1947 to present

Year	Event/policy
1947	Pakistan gains independence.
1953	Village Aid Program, Pakistan's first rural social protection program, is established.
1955–1960	First Five-Year Plan is produced.
1958	Water and Power Development Authority is created.
1959–1960	Land reforms are pursued through various ordinances and regulations.
1960	India and Pakistan sign the Indus Waters Treaty.
1959–1970	Basic Democracies system, including district and union councils, is established.
1963	Rural Works Program is introduced.
1964	Pakistan and the International Maize and Wheat Improvement Center (CIMMYT) begin collaboration on high-yielding wheat.
1965–1985	Pakistan Perspective Plan introduces 20-year vision to national development strategy.
1966	Pakistan and the International Rice Research Institute (IRRI) begin collaboration on high-yielding rice.
1970–1990	Green Revolution is put into practice in growing wheat and rice.
1971	East Pakistan secedes to become Bangladesh.
1972	New land reforms are undertaken; Peoples Work Program and Integrated Rural Development Program are introduced.
1980	National Agricultural Policy is introduced; economic liberalization measures are pursued in the agricultural sector.
1981	Agricultural Prices Commission (APC) and Pakistan Agricultural Research Council (PARC) are established.
1987	National Agricultural Commission, recommending a new strategy for agricultural development, is established.
1991	National Agricultural Policy is introduced; Pakistan Water Apportionment Accord is signed.
2004	Agricultural Perspective and Policy is drafted but not formally adopted.
2008	Prime Minister's Task Force on Food Security is established following global food price shock.
2010	18th Amendment of the national constitution devolves responsibilities for agriculture and other key sectors from the federal to provincial governments.
2010	Massive floods take place in the Indus River basin.
2011	New Framework for Economic Growth is introduced.
2014	Agriculture and Food Security Policy is drafted.

Source: Authors' compilation.

Pakistan's policies for the agricultural sector and rural development, beginning with a series of five-year development plans, have focused on aggregate production, land distribution, and governance, with varying degrees of commitment and impact across the years. During the course of the First Five-Year Plan (1955–1960), the Government of Pakistan set bold targets to increase both cereal and cash crop production. Few of these targets were met, despite allocations of 24 percent of the national development budget per year for agriculture and water. Nevertheless, the period did see several major changes in the institutional landscape of Pakistan's agricultural sector, and in the government apparatus designed to promote its growth and development. In 1958 policy makers took aim at harnessing Pakistan's vast natural endowment of water resources in the Indus River basin with the establishment of the Water and Power Development Authority (WAPDA). WAPDA was created to coordinate activities in the water and power sectors that had previously been managed by provincial departments of electricity and irrigation. WAPDA assumed oversight over efforts to manage the Indus River basin for both irrigation and power generation purposes, and over schemes designed to reclaim waterlogged, sodic, and saline lands for use in agriculture.

The Food and Agriculture Commission was created in 1959 to assess the causes of and solutions to poor performance in the country's agricultural sector. This step led to the creation of the Agriculture Development Corporation, which sought to improve the implementation and coordination of policies pertaining to agricultural development. These initiatives were consistent with strategies pursued in many other developing countries at the time, but their impact was likely mixed at best.

Similarly, beginning in 1959, Pakistan pursued efforts to address equity issues related to land tenure. Prior to partition in 1947, Hindus and Sikhs had owned vast stretches of agricultural land in Punjab, Sindh, and the present-day Khyber Pakhtunkhwa (KPK). The British had allocated this land, particularly in settlements along the canals in Punjab, to powerful elites and members of the upper castes in exchange for state patronage. After partition, and what was the largest mass migration in human history, millions of Muslim refugees left India for Pakistan and settled in the 2.7 million hectares of cultivable land made vacant following the migration of approximately five million Hindus and Sikhs to the newly divided east Punjab just across the border (Kapur 2010). Some of the incoming migrants undoubtedly benefitted from this resettlement. However, this process was extremely skewed and essentially mirrored the hierarchical colonial social patterns, leaving millions landless while concentrating ownership in a few hands. This inequity

eventually pressured the government into introducing land reforms in 1959. Policy makers put in place several key ordinances and regulations that were designed to address the skewed land tenure patterns. These policy shifts sought to protect the small-scale sharecroppers from the exploitative hold of the large and often absent landlords through legislation to ensure that the landlords shared not only in the revenue but also in the cost of inputs, while limits were also placed on the maximum size of landholding. On the formal records, approximately 2.5 million acres, or 5 percent of the country's total farm area, were brought under land reforms that sought to abolish large landholdings and reallocate land from landlords to tenants (Gazdar 2009; Nabi, Hamid, and Zahid 1986). The impact of these land reforms was marginal at best and did little to bring about more effective reforms in subsequent decades.

Land reforms occurred at roughly the same time as Pakistan rolled out its Basic Democracies system (1959–1970). This system was designed to build grassroots democratic institutions throughout the country that would engage and involve communities in development planning and implementation. The Basic Democracies and their associated district and union councils (referred to frequently throughout the book) were expected to play a central role in fostering agricultural productivity growth and wider rural development. The system, while only somewhat effective in engaging the rural population in governance, encouraged other, later experiments in decentralized governance.

During the Second Five-Year Plan (1960–1965), Pakistan began to reap some modest gains from land reforms and efforts to manage its water resources and to reverse degradation of the land. These gains were partly due to the historic Indus Waters Treaty that was signed with India in 1960, which opened the way for the construction of the Tarbela Dam and other major irrigation investments. On the social side, the poorly performing Village Aid Program was replaced by the Rural Works Program (1963–1972), which, alongside Basic Democracies, aimed to sustain the country's commitment to social protection and accelerate rural growth.

Food staple output and yield growth increased substantially during the Second Five-Year Plan, supported by the first large-scale investments in improved cultivars, plant protection chemicals, mechanization, and tube wells. These investments were accompanied by input subsidies designed to promote the adoption of the new technologies among farmers. Area cultivated and production increased substantially: Pakistan realized a 10 percent rise in net area sown, a massive surge in double cropping, and increases in production on the order of 5 percent per year for major and minor food staple crops and

4 percent per year for the agricultural sector overall (World Bank 2007; Ali and Byerlee 2002; Murgai, Ali, and Byerlee 2001).

The 20-year Pakistan Perspective Plan, issued in 1965, laid out a longer-term vision for Pakistan's economy and society. However, urgent, short-term considerations, including war, drought, and escalating food prices, forced themselves onto center stage in the late 1960s. Despite these setbacks, the Green Revolution began to bring major improvements in agricultural yields, in large part through the rapid introduction of new high-yielding, semidwarf wheat varieties that were highly responsive to inorganic fertilizer and irrigation. These varieties were bred through a research collaboration between Pakistan's national agricultural research system and the International Maize and Wheat Improvement Center (CIMMYT) in Mexico (CIMMYT 1989). A similar research collaboration between Pakistan's research system and the International Rice Research Institute (IRRI) in the Philippines led to the introduction of high-yielding rice varieties (IRRI 2013). Concerted efforts were made by Pakistan's research and extension system to distribute these improved varieties, complementary inputs, and the knowledge required to rapidly intensify cultivation (Hazell 2010; Evenson and Gollin 2003; Lipton, with Longhurst 1989). Policies at the federal and provincial levels that promoted modern inputs and technology, stabilized commodity markets with procurement pricing, and increased public investment in other critical inputs—irrigation, infrastructure, and agricultural science—also led to growth in agricultural productivity.

By 1970 the Green Revolution had swept across Pakistan's irrigated farmlands. Intensification of rice and wheat production was concentrated primarily in the Punjab, where 52 percent of the area under wheat cultivation came to be sown with modern varieties, and comparable rates were achieved with modern rice varieties. Nationally, the agricultural sector grew by an average of 6.4 percent per year between 1966 and 1970, with the production of major crops increasing by 9 percent per year (GoP, various years, *Pakistan Economic Survey*). While the gains in productivity from the Green Revolution are among the most notable achievements in the agricultural sector, serious concerns have arisen about the narrow crop focus of the Green Revolution, its contribution to accelerating natural resource degradation, and its heterogeneous impacts across regional lines (Ali and Byerlee 2002; Byerlee and Husain 1992).

Following the rapid growth in production induced by the Green Revolution and despite the introduction of new development programs, agricultural-sector growth slowed during the 1970s. Pakistan effectively did

away with its five-year plans for most of the decade as it lurched from crisis to crisis—war, political instability, and martial law—while contending with exogenous shocks including the 1973 oil crisis and three major droughts. In the agricultural sector, a new round of land reforms was introduced in 1972, as were several other initiatives focused on strengthening the rural economy. These included the People's Works Program, which was a revision of the previous social protection initiatives, and the Integrated Rural Development Program, which was designed to simultaneously increase smallholder productivity, expand rural industrialization and employment, and improve access to public services such as healthcare and education. Yet the agricultural sector grew during this period at a rate of only slightly less than 2 percent, while growth rates for the production of major crops fell to less than 1 percent, a decline only partly offset by growth in the production of minor crops and livestock.

In 1977 a third attempt was made at land reform under the direction of the Pakistan Peoples Party (PPP). However, this civil government was removed from power shortly after the land reforms were introduced, resulting in limited changes in land tenure patterns. With a military government then in place, Pakistan resumed the use of five-year plans and placed agriculture high on the agenda of its Fifth Five-Year Plan (1978–1983). Recognizing that aggregate production goals—crop yields and outputs, measured in tons and percentages—were insufficient to address rural development, the new five-year plan introduced two new measures of food security: nutrition and diversification. Drawing partly on the results of the 1976–1977 Micro-Nutrient Survey, which found that 60 percent of children under five years old were malnourished in Pakistan (GoP 2011a), the new plan gave careful consideration to the role of fruits, vegetables, and oilseeds for both consumption and export purposes. Unfortunately, the ambitious plan target of a 6 percent growth rate in the agricultural sector was paired with a relatively small actual allocation from the federal development budget.

In 1980 Pakistan's first explicit policy statement on agriculture—the National Agriculture Policy—established food self-sufficiency as a national priority. The policy affirmed the importance of modern inputs, irrigation, extension services, and mechanization to Pakistan's agricultural sector. It also emphasized the need for improvements in the institutional landscape designed to implement and coordinate agricultural and rural development policies in the country. The National Agricultural Policy was followed closely by the establishment of the National Agricultural Prices Commission, which provided the government with a critical mechanism with which to manage

weather- and market-induced risk and uncertainty in agricultural markets through various forms of price interventions.

The National Agricultural Policy and the National Agricultural Prices Commission—aided by several years of favorable weather—contributed to a number of important achievements during the decade that followed. The policy, as part of a wider agenda of economic liberalization, led to the withdrawal of distortionary government interventions in most commodity markets in Pakistan during the 1980s. This included the removal of price subsidies on inputs and the implementation of price supports for import-substituting crops. It also led to a shift from rules that required compulsory use of nitrogenous fertilizers to voluntary use. These changes made some headway toward addressing what was increasingly recognized as the elite capture of subsidies and price interventions by large-scale farmers at the expense of small-scale farmers. However, distortions remained in the wheat market, where policies of price supports persisted, at significant cost to the government, and in the fertilizer market, most notably through subsidies provided to producers in the form of interventions in gas pricing.

In a related development, the Pakistan Water Apportionment Accord of 1991 made significant headway in setting down long-term rules to govern water allocations from the Indus River basin across Punjab, Sindh, KPK, and Balochistan. The 1991 accord represents an important political compromise across the provinces in support of agriculture, although it also raised issues with respect to the trade-offs between the use of water for irrigation versus for energy, the relative productivity of water across provinces, and the absence of infrastructure in KPK and Balochistan to make effective use of their respective allocations (Briscoe et al. 2005).

Efforts to further improve the trajectory of Pakistan's agricultural sector were tackled by successive commissions and panels, which in turn informed a series of new policy initiatives, although many of these were not implemented. Most notable is the National Agricultural Commission of 1987, which recommended a renewed focus on social equity, national self-reliance in food, a stronger export orientation in agriculture, the introduction of more sustainable agricultural practices, and higher productivity, to be achieved with particular emphasis on small-scale farmers, rainfed areas, and institutional reform. While the resulting National Agricultural Policy of 1991 reiterated these aims in its action plan, neither a budget allocation nor an implementation strategy followed the document. The 2004 Agricultural Perspective and Policy, which was never formally adopted by the Government of Pakistan, likewise lacked funding and an implementation strategy, as did the Vision 2030, which the

government announced in 2007. The New Framework for Economic Growth, announced in 2011, continued the trend toward neglect of the agricultural sector, relegating agriculture to the backburner of Pakistan's economic growth and development agenda.

In coming years, major changes in the agricultural sector can be expected as a result of a recent constitutional amendment supporting decentralization. Adopted in 2010, the 18th Amendment devolves policy making and a range of other functions related to agricultural matters from the federal government to the provinces (NSPP 2012). It has already led to the demise of the Ministry of Food, Agriculture, and Livestock at the federal level, the establishment of the Ministry of National Food Security and Research (MNFSR), and a fair amount of confusion over the allocation of organizations and functions between the federal and provincial governments. The long-term results for policy design, coordination, and implementation remain to be seen, although both the provinces and the federal government are working to craft strategies to address matters of agriculture and food security that have been reorganized as a result of the 18th Amendment. It is still too early to fully comprehend the impacts and necessary responses to the amendment, and these issues are examined in detail throughout the book.

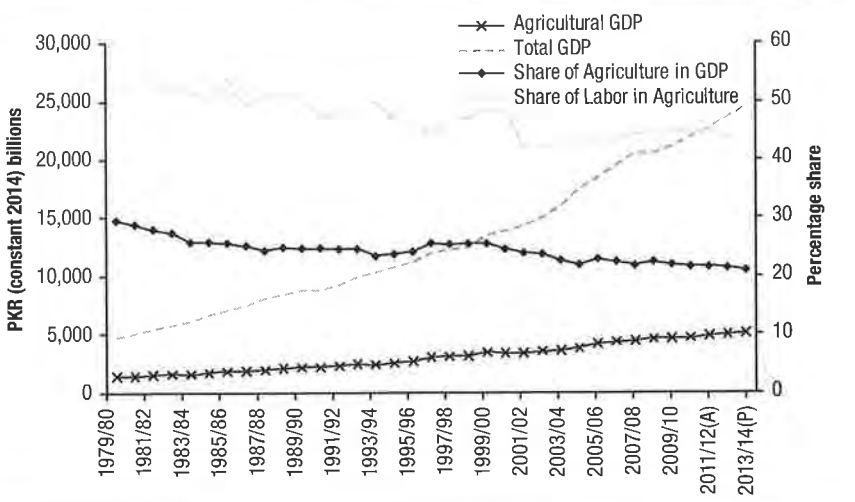
In retrospect, while the record on implementation has been mixed, there has been no shortage of public policy designed to develop Pakistan's agricultural sector. During the 1970s and 1980s, Pakistan demonstrated that a combination of strategic development policies and appropriate agricultural technologies could drive growth and development. Several notable successes contributed to rapid growth of agriculture and the rural economy, including the Indus Waters Treaty and the Green Revolution. But the historical record also suggests that over the past two decades, policy reforms have struggled to strengthen Pakistan's agricultural sector and rural economy.

Development, Growth, and Poverty Reduction

Agricultural productivity growth has driven Pakistan's economic growth and development in the past, particularly when public policy has been supportive of the agricultural sector and the wider rural economy. Chapter 2 expands on this point. However, the past two decades have seen a slowdown in both sector growth and improvements in the social indicators of rural development, and this section explores those outcomes.

Pakistan's economy grew by 6.3 percent per year during the 1980s, boosted substantially by agricultural-sector growth of about 4.0 percent per year.

FIGURE 1.2 GDP, agricultural GDP, and share of labor in agricultural GDP, FY1980–FY2014



Source: Authors, based on data from GoP (various years), *Pakistan Economic Survey.*
Notes: PKR = Pakistani rupees; A = actual; P = provisional.

Moreover, during the 1980s, per capita income rose by 2.8 percent per year. In the 1990s, growth decelerated but was irregular, punctuated by occasional booms and busts. Real GDP growth between 1990 and 2000 slowed to 3.9 percent per year, increasing only slightly between 2000 and 2012 to 4.1 percent per year (Figure 1.2, Table 1.3). Per capita income growth followed a similar pattern, decreasing from 2.8 percent to 1.3 percent per year in the 1990s before rising to 2.2 percent per year during the period 2000–2012. In 2012 GDP per capita (measured in constant [2005] US dollars) averaged US$773, which was about 47 percent higher than the US$525 per capita GDP attained in 1990 (Table 1.3).

The agricultural-sector growth rate during the 1990s remained relatively unchanged from the 1980s, at 4.4 percent. But while the economy showed a slight recovery in the 2000–2012 period, growth in the agricultural sector slowed to just 2.6 percent per year (Table 1.3).

This economic roller coaster has done little to improve overall economic welfare in the country. There is evidence that the poverty headcount ratio fell from 66.5 percent in 1987 to 48.1 percent in 1997, and further to 35.9 percent in 2002, although rural poverty consistently remained higher than urban poverty (World Bank 2014; Figure 1.3). Alternative figures presented in this book suggest otherwise, indicating how controversial poverty estimates are in Pakistan. Recent figures on poverty reduction point to *increases* in poverty

TABLE 1.3 Selected economic variables, 1980–2012

Indicator	Year				Annual growth rate (%)		
	1980	1990	2000	2012	1980–1990	1990–2000	2000–2012
Population (millions)	80.0	111.1	143.8	179.2	3.3	2.6	1.8
GDP (constant 2005, million US$)	31,707	58,314	85,822	138,472	6.3	3.9	4.1
GDP per capita (constant 2005, US$)	396.4	524.9	596.7	772.9	2.8	1.3	2.2
GDP (constant 2005, billion PKR)	2,241	4,121	6,065	9,785	6.3	3.9	4.1
Agriculture GDP (constant 2005, billion PKR)	657	973	1,501	2,045	4.0	4.4	2.6
Share of agriculture (% of GDP)	29.3	23.6	24.8	20.9	–2.1	0.5	–1.4
Share of industry (% of GDP)	15.0	17.2	17.6	20.3	1.4	0.2	1.2
Share of manufacturing (% of GDP)	8.5	10.1	10.1	12.8	1.8	–0.1	2.0
Share of services (% of GDP)	47.2	48.7	51.3	56.1	0.3	0.5	0.7
Gross domestic savings (% of GDP)	6.9	11.1	16.0	7.0	4.9	3.7	–6.7
Gross capital formation (% of GDP)	18.5	18.9	17.2	14.9	0.2	–0.9	–1.2
Exports of goods and services (% of GDP)	12.5	15.5	13.4	12.3	2.2	–1.4	–0.7
Imports of goods and services (% of GDP)	24.1	23.4	14.7	20.3	–0.3	–4.5	2.7
Official exchange rate (PKR/US$)	9.9	21.7	53.6	93.4	8.2	9.5	4.7
Consumer price index	16.48	32.26	77.83	221.91	7.0	9.2	9.1

Source: Authors, based on data from World Bank (2014).

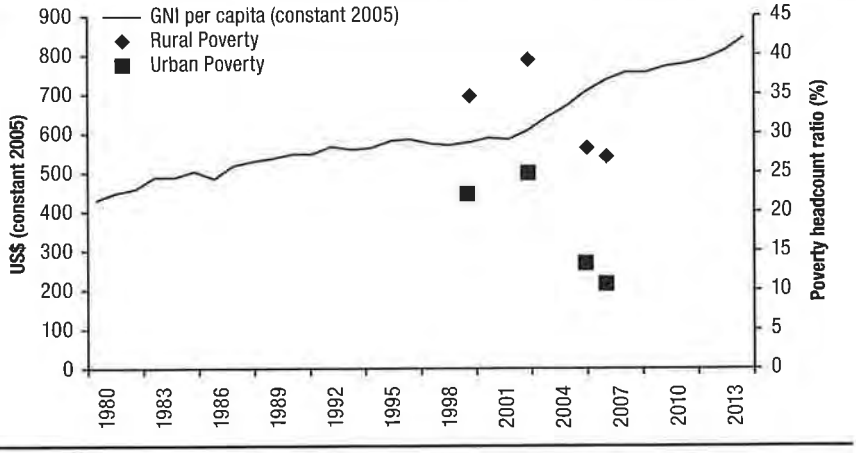
Note: Sectoral shares of GDP are calculated by the authors based on constant GDP data from World Bank (2014). For example, agriculture's share in GDP is calculated by taking constant (2005) agricultural GDP/constant (2005) GDP.

during the 2000s, along with high levels of food insecurity and malnutrition, issues that are explored in greater detail in Chapter 3. But only in recent years has the Government of Pakistan begun to realize that progress has not been made on the increases in employment and income at levels that will be required to reduce poverty significantly (see, for example, GoP, various years, *Pakistan Economic Survey*).

Moreover, public expenditures on agriculture as a ratio of Poverty Reduction Strategy Programs have generally been declining over time with significant year-on-year fluctuations (Figure 1.4). On average, between 2007/2008 and 2012/2013, the ratio of agricultural expenditures to total poverty expenditures is 5.8 percent and agricultural expenditures to total subsidies is 9.5 percent (GoP, various years, *Pakistan Economic Survey*).

There are several possible explanations for the slowdown in economic growth compared to the 1980s, including a decline in overall investment, a lack of growth in the nonfarm rural economy, and persistent inequality in the

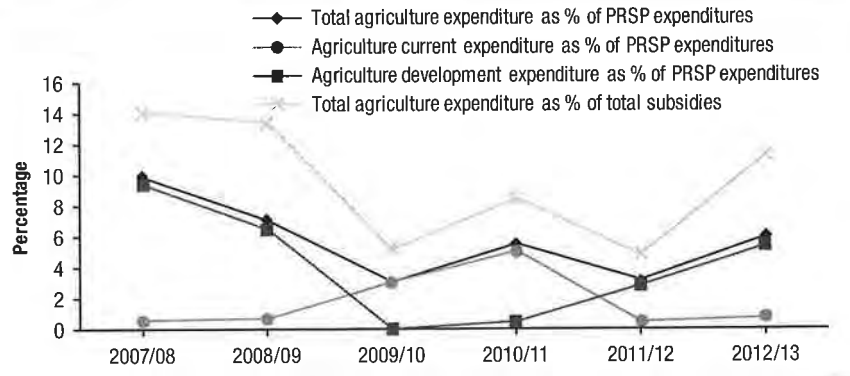
FIGURE 1.3 Real gross national income per capita and poverty in Pakistan, 1980–2013



Source: Authors, based on data from World Bank (2014); Cheema (2005).

Note: The poverty headcount ratio is the proportion of people living below the adult equivalent of a US$1.25/day expenditure level based on purchasing power parity exchange rates. The rural poverty and urban poverty rates reported here are measured at their respective poverty lines. Alternative rural poverty estimates are discussed in detail in Chapter 3. GNI = gross national income

FIGURE 1.4 Share of agriculture expenditure in total poverty expenditure, 2007/2008–2012/2013



Source: Authors, based on data from GoP (various years), *Federal Budget Publications.*

Note: PRSP = Poverty Reduction Strategy Paper.

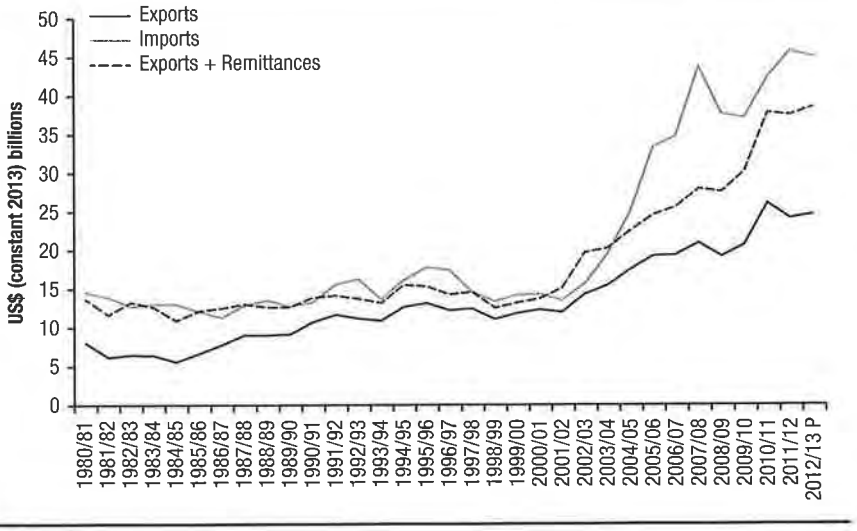
agricultural sector. At the national level, overall investment decreased from 18.9 percent of GDP in 1990 to 14.9 percent in 2012. Gross domestic savings declined even more sharply, falling from 11.1 percent of GDP in 1990 to 7.0 percent of GDP in 2012. Only an increase in foreign savings (as indicated by the widening gap between foreign revenues, that is, exports plus remittances, less imports) has prevented an even sharper decline in investment in Pakistan (Figure 1.5).

The slowdown may also hinge on the rate at which the rural nonfarm economy is expanding to provide opportunities for the diversification of rural labor into higher-productivity activities. This implies diversification of rural labor out of wheat and cotton production and other on-farm activities, or diversification out of agriculture entirely and into rural enterprises. There are few in-depth studies of Pakistan's nonfarm rural economy, but rural investment climate and labor force surveys suggest that improvements in rural enterprise financing, infrastructure (particularly electricity), and control of corruption are essential to accelerate the growth of Pakistan's rural nonfarm sector (World Bank 2007). These issues are examined throughout the book.

Yet another cause of the slowdown may be persistent inequality in land ownership and the increasing prevalence of highly fragmented, suboptimal farm sizes (discussed in Chapter 2). Land reform efforts notwithstanding, the distribution of landholdings remains highly unequal in Pakistan, with the proportion of farms of less than 5 acres increasing over time. The share of farms smaller than 5 acres increased from 19 percent of all farms in 1960 to 65 percent in 2010. In addition, the average size of these smallholdings has fallen from 2.2 acres to 1.9 acres, a size that is likely to be economically unviable. At the other end of the spectrum, farms larger than 25 acres account for only 3.8 percent of farms but for 34 percent of total area in 2010. Fragmentation and the decline in average farm size has major implications for poverty levels; most rural households that have access to less than 5 acres of land are categorized as "poor," according to the 2010–2011 Household Integrated Economic Survey (HIES) (GoP 2011b).

The links between land fragmentation, productivity, population growth, and poverty have been a focus of policy making and research for decades in Pakistan. Chapter 2 discusses the structure of land ownership, growing fragmentation, and the impediments to effective land markets. While Binswanger (1994) cautions that the influence of fragmentation on productivity can be overstated, there is sufficient evidence from the extensive body of past work to indicate that inequality of landownership and the political economy factors

FIGURE 1.5 Exports, imports, and exports plus remittances in Pakistan, 1980/1981–2012/2013



Source: Authors, based on GoP (various years), *Pakistan Economic Survey*.
Note: P = provisional.

that sustain this inequality remain an impediment to Pakistan's development (Qureshi and Qureshi 2004; GoP 1988; Heston and Kumar 1983).

Other indicators generally paint a picture of modest economic and social progress in Pakistan over the past two decades (Table 1.4), despite important changes. Notably, using the pre-2001 administrative definitions of urban areas, the proportion of the population living in urban areas has grown from 28.1 percent in 1980 to 36.5 percent in 2012. A broader definition of urbanization—a measure of population density and travel time to major urban centers—shows a near doubling of the urbanization figures, to about two-thirds of the population, growth that has been facilitated by the increase in paved roads. Nevertheless, poverty remains concentrated in Pakistan's rural areas. Several chapters of this book discuss the impact of the growing urban sector on rural development. Food insecurity and malnutrition, discussed in more detail in Chapter 3, remain serious problems, as is access to public services, discussed in Chapter 8.

The limitations of progress are evident when we measure it against the achievements of Pakistan's South Asian neighbors, many of which do not enjoy the same rich natural endowments of fertile land and abundant water resources. Most revealing is the comparison of the growth in per capita

TABLE 1.4 Selected economic and social indicators, 1980–2012

	Year				Annualized growth rate (%)		
Indicator	1980	1990	2000	2012	1980–1990	1990–2000	2000–2012
Infrastructure							
Paved roads (thousand kilometers)	—	169.2	248.3	262.6[a]	—	3.9	0.5
Urban population (millions)	22.4	34.0	47.7	65.5	4.2	3.4	2.9
Urbanization rate (% of population)	28.1	30.6	33.1	36.5	0.9	0.8	0.9
Life expectancy at birth							
Females	58.5	61.9	64.7	67.3	0.6	0.4	0.4
Males	57.7	60.5	63.1	65.6	0.5	0.4	0.3
Total	58.1	61.2	63.9	66.4	0.5	0.4	0.4
Adult literacy rate[b]	25.7	42.7	49.9	54.9	3.0	2.2	2.4
Poverty headcount ratio at US$1.25/day (PPP)[c]	66.5	48.1	35.9	21.0	−2.9	−5.7	−12.5
Poverty headcount ratio at US$2/day (PPP)[c]	89.2	83.3	73.9	60.2	−0.6	−2.4	−5.0
Personal remittances received (current US$) (millions)	2,048	2,006	1,075	14,007	−0.2	−5.5	26.3
Personal remittances received (% GDP)	8.6	5.0	1.5	6.2	−4.8	−10.6	14.1

Source: Authors, based on data from World Bank (2014).

Note: — = Data not available. PPP = purchasing power parity exchange rates.

[a] Paved road data are from 2011, the latest year of available data.

[b] Literacy rates are for 1981, 1998, 2005, and 2009.

[c] Poverty rates are for 1987, 1997, 2002, and 2008.

incomes (Table 1.5). Between 2000 and 2010, per capita GDP growth in Pakistan was only 2.3 percent per year, while India, Bangladesh, and Sri Lanka achieved annual per capita GDP growth rates of 6.0, 4.4, and 4.4 percent, respectively.

Pakistan also performs poorly on social indicators when it is compared with its neighbors. The World Bank (2014) estimates that approximately 20 percent of Pakistan's population was undernourished in 2010–2012, compared with 17–18 percent of the populations in Bangladesh, India, and Nepal. The starkest difference in indicators is observed for the mortality rate of children under five years of age, which is closely associated with access to water, sanitation, and healthcare. In Pakistan in 2013, 69 children per 1,000 live births die before the age of five, as compared with 41 children in India, 33 children in Bangladesh, and only 8 children in Sri Lanka. Pakistan fares better than its South Asian neighbors only in terms of the percentage of

TABLE 1.5 Selected social and economic indicators for Pakistan and South Asia

Indicator	Pakistan	India	Bangladesh	Nepal	Sri Lanka
Population (millions)	179.2	1,236.7	154.7	27.5	20.3
Population growth rate (2000–2010, %)	1.9	1.5	1.3	1.5	0.8
GDP per capita (2012, in constant 2005 US$)	772.9	1,123.2	597.0	398.8	1,884.2
GDP per capita growth rate (2000–2010, %)	2.3	6.0	4.4	2.4	4.4
Agriculture, value added (2012, as % of GDP)	24.4	17.5	17.7	37.0	11.1
Agricultural GDP growth rate (2000–2010, %)	3.5	5.0	2.5	2.8	0.6
Poverty headcount ratio at US$1.25 a day (2012, in PPP terms)[a]	21.0	32.7	43.3	24.8	4.1
Global Hunger Index value (2013)	19.3	21.3	19.4	17.3	15.6
Undernourished population (2010–2012, %)	19.9	17.5	16.8	18	24
Underweight children under five years old (2008–2012, %)	30.9	40.2	36.8	29.1	21.6
Under-five mortality rate (2013, per 1,000 live births)	69	41	33	32	8

Source: Authors, based on data from World Bank (2014); von Grebmer et al. (2013).

Note: The Global Hunger Index (GHI) is a multidimensional indicator of hunger that combines three component measures into one index. The first component is undernourishment, which measures the proportion of undernourished people (insufficient caloric intake) as a percentage of the total population. Underweight children measures the proportion of children under the age of five who have low weight for their age, reflecting wasting (low weight for height), stunted growth (low height for age), or both. The final component is under-five mortality rate. Beginning 2014, the GHI explicitly includes stunting and wasting as individual components.

[a] 2008 data for Pakistan; 2010 data for remaining countries. Alternative estimates of poverty in Pakistan are explored in depth in Chapter 3.

underweight children under five years old: the rate for Pakistan (31 percent) is lower than that for Bangladesh (37 percent) and India (40 percent), though it is still higher than that for Sri Lanka (22 percent).

These data strongly suggest that Pakistan's agricultural sector has not been contributing to growth and development, notably with respect to poverty reduction, as it did prior to the 1990s. Nevertheless, there are some positive examples of the sector's potential for progress—even in the absence of policy support—that are worth highlighting here. At a macroeconomic level, evidence suggests that the transmission of volatility of growth in agricultural GDP to the wider economy has dampened as the economy has diversified into industry and services (World Bank 2007). At the farm level, there are also success stories in which small-scale farmers have reaped significant gains from the production and marketing of higher-value agricultural products for both domestic and foreign markets. Three examples stand out.

First is the success of hybrid maize. Prior to the 1990s, low-yielding maize varieties were cultivated in limited areas in the barani (rainfed) agroecological

zones of KPK and northern Punjab, and in other parts of Punjab, primarily for private-sector interests in the corn oil business. During the 1990s, higher-yielding hybrid maize was introduced in new areas of central Punjab, giving life to the livestock and poultry feed industries, and supplying corn for human consumption in affluent urban areas. Yet the rapid growth of both maize area and yield occurred with little support from the public sector and no government intervention in its pricing. Maize also brought additional benefits such as a lower environmental footprint than the sugarcane crop that it replaces in central Punjab, while also improving farmers' access to competitive markets and market prices that were generally elusive because of long-standing oligopsonies in the milling of sugarcane (Riaz 2006).

Second is the success of high-value agriculture, specifically improved practices in vegetable cultivation and value-addition in citrus cultivation. The introduction of plastic-tunnel farming, combined with more intensive husbandry and marketing practices, has allowed farmers in many parts of Punjab to secure higher returns on cucumber, tomato, and sweet pepper production. Small-scale processors of citrus who grade, sort, wax, and pack citrus products—specifically, the kinnow variety that is grown in orchards dotting the Sargodha and Bhalwal areas of Punjab—have generated similar returns to farmers, exporting to markets in Central Asia, the Middle East, and the Far East (Riaz 2006).

Third is the rapid growth of small-scale commercial dairy farming. This success is exemplified by the Idara-e-Kissan Halla Dairy Cooperative, which brings together approximately 80,000 members, the majority of whom are female. The cooperative provides veterinary services for its members, helps to increase livestock productivity, ensures product quality, and markets dairy products for Pakistan's growing consumer market. Incentive, compatibility, and accountability are the main factors responsible for this success. The cooperative employs its own veterinary specialists, and its members provide oversight of the service delivery (Riaz 2008).

These success stories—just a few of the many inspiring narratives that typify Pakistan's farmers and rural entrepreneurs—highlight the potential of Pakistan's agricultural sector and the productive and innovative capabilities of its people. They also suggest that as was the case with maize, some successes are possible in the absence of effective government policy or government interventions in the market. That said, an enabling policy environment could encourage more successes that engage a wider and deeper share of the agricultural sector and rural economy. With policies that explicitly focus on that

enabling environment, agriculture can potentially make a greater contribution to economic growth and poverty reduction in Pakistan.

Main Messages: Managing and Building on Agricultural Growth

While these success stories are cause for optimism, the central question is whether Pakistan's agricultural sector and rural economy can once again play a significant role in the economy, particularly with respect to poverty reduction. The analyses conducted for this book point to the potential and possibility, but they also highlight the limits imposed by a changing economy.

First and foremost, Pakistan's agricultural sector is changing in terms of both structure and composition. While agriculture is still the foundation of Pakistan's economy, its share of total output, and thus its capacity to drive growth and development, is diminishing. Although a declining share of agriculture in both employment and in GDP is a normal pattern of economic development, historically the fastest growing countries have also achieved steady growth in agricultural GDP at the same time. In these countries, because nonagricultural growth occurred at a faster rate than agricultural growth, the share of agriculture in GDP fell even while agricultural incomes rose. Moreover, given the large share of agriculture in total GDP, it will be extremely difficult for Pakistan to achieve high overall growth without substantial agricultural growth and the resulting positive growth linkage effects on nonagricultural sectors. A slow pace of agricultural growth could lead to other problems as well: without continued growth in agricultural and rural nonfarm incomes, an excessively rapid rural-to-urban migration could result in large-scale urban unemployment, urban congestion, and political instability. The challenge for Pakistan's development strategy is how to take advantage of opportunities to continuously increase agricultural productivity and incomes, thereby facilitating a smooth spatial and structural transformation of the overall economy.

Second, agriculture is beset by increasingly acute trade-offs—between productivity growth and resource degradation, between water and energy, and between urban consumers' demands for diverse foods and poorly diversified farms. A shift to a higher, more equitable, and more sustainable growth trajectory for Pakistan's economy requires careful consideration of these trade-offs. Achieving such a growth trajectory is feasible if policy choices build on a foundation of balanced growth and development in the agricultural

sector and the rural economy. The country's agroclimatic diversity and natural resource endowments continue to favor this trajectory, but it can be achieved only through intensive efforts to manage land, soil, water, and energy more judiciously.

Third, markets can play a critical role in providing farmers with access to the land, inputs, science, and price incentives required to accelerate productivity growth, provided that policies and regulations governing markets for seed, fertilizer, land, and commodities such as wheat are strengthened to provide more appropriate signals. Even greater potential for balanced growth and development can be realized if more policy attention is paid to land tenure issues and rural enterprise development to encourage growth in the rural economy.

Fourth, agricultural-productivity growth and increased rural economic activity will not, in themselves, be sufficient to eliminate rural poverty in Pakistan. Declining real rural wages, consumption patterns skewed toward cheaper, less nutritious calorie sources, and weak social protection mechanisms to insulate vulnerable households from shocks all contribute to rural Pakistan's persistently high malnutrition levels, especially among children. Greater attention needs to be given to the provision of rural public services, especially with respect to safety nets, healthcare, education, community development, and women's empowerment.

Finally, bold policy measures emerging from devolution under the 18th Amendment to the constitution can play a central role in strengthening the provision of the public goods and services that are critical to shifting Pakistan's economy to this higher, more equitable, and more sustainable growth trajectory. The challenge, however, will be to ensure on a continuing basis greater political and community buy-in and effective implementation—both pacing and sequencing—of the myriad reforms, regulations, and investments that need to follow from the 18th Amendment.

The Critical Importance of Data and Analysis

Because this book is a nuanced exploration of poverty and agriculture in Pakistan—and because works like this are relatively rare in the literature on Pakistan—we believe that it offers a unique contribution not only in terms of subject matter but also in the analytical perspectives we take on the issues discussed. As such, it is important to point out the unique manner in which the book combines a range of data, data sources, and methods to illustrate the key messages set forth above.

First, the book draws on a range of analytical tools and methods to capture the multifaceted nature of the agricultural sector and rural poverty. It makes use of analytical tools of geography (Chapters 2 and 12) and microeconomics (Chapters 3, 8, and 9) to characterize and highlight the impacts of public policies and investments on Pakistan's agricultural sector and rural population in terms of productivity, poverty, gender inequality, and access to public services. The book extends its microeconomic analysis into a discussion of the social and behavioral dimensions of rural development, such as the role of aspirations in motivating Pakistan's youthful rural population (Chapter 11). The book also extends its reach with political economy analyses that deconstruct the evolution and impact of policies in specific elements of the economy, such as the seed industry (Chapter 5) and the wider governance landscape (Chapter 9). Finally, the book employs a diverse set of economic modeling approaches, ranging from microsimulations to computable general equilibrium in order to quantify alternative scenarios associated with prospective reforms to policies on water and irrigation (Chapter 4), fertilizer (Chapter 6), markets and trade (Chapter 7), and the overall economy (Chapter 12).

Second, the book draws on a diversity of data sources. Frequently referenced sources include publications and datasets from the Government of Pakistan—namely, successive years and rounds of the Pakistan Economic Survey, the Pakistan Agriculture Census, and the Pakistan Household Integrated Economic Survey.[1] In addition to these sources, several chapters draw on data from the first survey rounds of the Pakistan Rural Household Panel Survey (RHPS) that was conducted in 2012 (Nazli and Haider 2012) (Annex A). The survey represents the first rounds in the recent longer-term longitudinal survey of income-poverty dynamics, which expands on previous efforts undertaken in Pakistan during the late 1980s and early 1990s.

The RHPS provides a unique panel dataset that expands the opportunities to analyze rural welfare across multiple dimensions. Unlike many other surveys conducted in Pakistan, the RHPS collects comprehensive information on agricultural production, including detailed information on inputs, outputs, and expenditures at the crop and plot level. These data allow for in-depth study of farming systems, rural factor markets, nonfarm linkages, and farm household behavior at a micro level. The RHPS also collects

1 Since 1998/1999 the name has been changed from the Household Income and Expenditure Survey to the Household Integrated Economic Survey. The Federal Bureau of Statistics was renamed the Pakistan Bureau of Statistics in 2013. In this book, we use the acronym *HIES* to refer to both the previous Household Income and Expenditure Surveys and the renamed Household Integrated Economic Survey.

gender-disaggregated data from multiple sources within the household, including, but not limited to, the female spouse of the household head. Topics covered include educational attainment, health status, mobility, employment, and social connectivity, all of which allow for the study of gender roles in farm households, markets, and rural communities. Finally, the RHPS is designed to measure poverty as a multifaceted issue by including not only consumption and expenditure variables but also measures of insecurity, powerlessness, exclusion, and aspirations. Similarly, the RHPS collects data on conflict, governance, and political participation that allow for in-depth analysis of the economic and social consequences of the current political and security situation.

Throughout the book, the RHPS is referred to by year and round and cited as "IFPRI/IDS (various years)." Where relevant, reference to the 2012 RHPS includes mention of the specific survey round from which the data were drawn. Note, however, that the RHPS is not a nationally representative household survey, so caution is always advised in interpreting both data and analysis presented in the book.

Layout of the Book

This book proceeds as follows. The first section introduces the topics of food security, rural development, and agriculture in Pakistan, placing them in the context of the country's history. Chapter 2 introduces Pakistan's agricultural sector, addressing its agroclimatic diversity, the composition and growth of the agricultural sector, drivers of the growth of agricultural productivity, and the persistent challenges posed by land tenure patterns and landholding fragmentation. The analysis helps to explain how the patterns and trends in public investments, technological change, and market expansion influence national and local trajectories in growth, development, and poverty reduction. Chapter 3 turns to the human dimensions of rural development in Pakistan with an in-depth analysis of consumption, nutrition, and poverty trends. The analysis highlights not only the lack of substantive progress on poverty reduction but also the fundamental issue of whether poverty and poverty trends are being measured accurately and are informing policy decisions effectively. The critical role of food security in defining and shaping the outcomes of poverty is also highlighted.

The second section focuses on the role of major agricultural inputs and markets in agricultural production. Chapter 4 provides an in-depth look at water in Pakistan, particularly the supply and management of scarce groundwater and surface water resources in the Indus Basin Irrigation System

(IBIS)—the world's largest contiguous irrigation system and the lifeline of Pakistan's agricultural sector. IBIS faces major challenges: insufficient investment in infrastructure and management; controversial water allocation across provinces, communities, and farms; competition over water use for agriculture, industry, urban consumption, and energy; diminishing water supply in many regions; and fluctuations in water supply resulting from short-term variability of rainfall and long-term climate change. These issues demand that particular attention be given to both (1) the effect of overutilization of finite groundwater resources on agricultural productivity, and (2) the costs and benefits of major infrastructure investments, such as the Diamer-Bhasha Dam. Findings provide a complex but insightful picture of the economic trade-offs of alternative policies and investments designed to improve the efficiency and management of Pakistan's groundwater and surface water resources.

Chapter 5 analyzes Pakistan's seed system—an important topic given that seed is the very embodiment of technological change in agriculture. The legislative and institutional framework governing seed provision, cultivar improvement, and biotechnology in Pakistan is limiting the continuous flow of good-quality planting material and new technological options to farmers, with significant implications for efforts to enhance on-farm productivity. As several new policy initiatives slowly wind their way through government, more attention is needed to strengthen not only the wider policy framework but also the rules, regulations, and organizational capacities required to improve farmers' access to quality seed and to encourage appropriate roles for both the public and the private sectors in Pakistan's seed system.

Chapter 6 addresses a closely related topic, the architecture and performance of Pakistan's fertilizer industry. Valued at an estimated PKR (Pakistani rupees) 336 billion in 2011/2012 (US$3.76 billion), the industry has been operating at about 75 percent of capacity in recent years, while enjoying subsidies on both production and distribution that total approximately PKR 64 billion (US$0.72 billion).[2] Estimates of the impact of several alternative policy scenarios, including reductions in fertilizer production subsidies that are allocated through the pricing of natural gas, suggest that there is need for a far-reaching reform agenda that includes withdrawal of subsidies and increased reliance on market signals to encourage higher-capacity utilization, competition, and more balanced fertilizer application by farmers.

2 The exchange rate for fiscal year 2012 was US$1 = PKR 89.34, calculated based on International Monetary Fund data (IMF 2014).

From natural resources and input markets, Chapter 7 moves to markets and trade, particularly with respect to wheat, Pakistan's primary food staple. The Government of Pakistan has long played a role in Pakistan's agricultural commodity markets, to ensure affordable prices of food staples to consumers, encourage domestic production, and limit the impacts of price volatility on the poor. While the economic reforms mentioned earlier have eliminated many of Pakistan's more traditional market intervention mechanisms, the government continues to use exchange rate, trade, and agricultural pricing policies to manage agricultural price incentives. Estimates of the impact of nominal and effective rates of protection—inclusive of the effects of input fertilizer and irrigation subsidies—on agricultural price incentives demonstrate that most major crops continue to face implicit, though somewhat decreasing, taxation that still favors the industrial sector over agriculture. The discussion focuses on pricing policies for wheat, the major staple crop, and on alternatives to reduce the costs of wheat price stabilization.

The third section expands beyond agriculture to explore dimensions of human capital formation, public goods provision, and governance in the wider rural economy, all of which play a critical role in the well-being of the rural population. Chapter 8 first takes up the topic with an exploration of five key elements of rural service provision: health and nutrition, education, electricity, water, and sanitation. An examination of provision of these five services in rural Pakistan highlights the tremendous need for improvement, particularly with respect to the governance and implementation. Chapter 9 explores these issues further with a discussion of the likely influence on the rural economy of the 18th Amendment, devolution, and greater local governance. In its recent history, Pakistan has experienced several rounds of decentralization and devolution (and bouts of recentralization) that, with widely varying degrees of success, have dispersed central government responsibilities and transferred authority, accountability, and decision making on financial and administrative matters to provincial and local governments. The 18th Amendment, promulgated in 2010, represents the most far-reaching decentralization initiative in Pakistan's history. The chapter examines the processes that followed from the 18th Amendment and assesses how reforms have affected subnational autonomy, capacity, and accountability; shifted government expenditures; and changed the perception of public services.

In this analysis of economic and social well-being, particular attention must be given to the issue of gender inequality in Pakistan, as we do in Chapter 10. On all counts, Pakistan performs poorly with respect to gender

equality, women's empowerment, and any number of other gender-related indicators. But few studies of Pakistan actually measure the multiple dimensions along which women are marginalized or disenfranchised, particularly in the country's expansive rural areas. The chapter examines women's control and influence over individual and household decisions—which is synthesized into an Index for Women's Empowerment in Agriculture—and reveals some surprising insights and sets a baseline for measuring progress achieved through economic and social policy initiatives designed to address the long-standing neglect of women in Pakistan.

Adding to the richness of these analyses, Chapter 11 frames the economic behavior of Pakistan's rural population in terms of aspirations, that is, the goals that people set and attempt to achieve. Aspirations are important to gain an understanding of the opportunities that exist to break the poverty cycle—opportunities that are often closely associated with poverty-reduction strategies, policies, and investments. Aspirations are also important to gain an understanding of an individual's willingness to take advantage of these opportunities, which is itself a function of the underlying social and psychological dimensions of human economic behavior. Given that one of the largest demographic groups in Pakistan is rural youth, an insight into individual aspirations reveals much about the future of the rural economy. The analysis focuses not only on the challenging question of measurement but also on absolute and relative aspiration levels in rural Pakistan, the cognitive processes and external factors that shape individual aspirations, the policies and institutions that might raise aspirations, and the potential benefits of higher aspiration levels. Findings point to specific subpopulations in Pakistan that are particularly vulnerable to aspiration-induced poverty traps, and they associate aspirations with a range of productivity-enhancing agricultural practices, as well as nonfarm rural enterprise activity. The analysis suggests some leverage points through which policy could increase aspirations and encourage greater human, social, and economic development in rural Pakistan.

The fourth section investigates wider perspectives on the economy to gain a better understanding of the long-term future impacts of policy on agriculture and the rural sector. To accomplish this, Chapter 12 uses a data-intensive economy-wide modeling approach to shed light on how Pakistan's economy functions and to simulate the effects of alternative policies and investments on incomes and poverty. The analysis reveals the weak contribution of Pakistan's rural nonfarm economy to the country's ongoing structural change process, which has been a significant factor in the rural economy's poor performance

in recent years. The analysis then examines the structure of the rural nonfarm economy and presents simulations that explore the implications of growth in both the agricultural and rural nonfarm sectors for the rural poor. The results suggest that while growth in agriculture is still the most effective means of improving the welfare of Pakistan's poorest rural households, the pro-poor contribution of the rural nonfarm economy—especially through rural agro-processing—cannot be overlooked.

Chapter 13 concludes the book with reflections on the prospects for improving food security, reducing poverty, and fostering economic growth in Pakistan. The chapter reiterates the common argument that underlies the chapters in the book: given the social and economic structure of Pakistan, a vibrant agricultural sector is essential for improving the welfare of the rural poor and for realizing overall growth and poverty reduction. Drawing on the evidence presented in the preceding chapters, the chapter proposes a bold policy reform agenda that follows from this.

This book covers a vast amount of analytical territory because a broad understanding of agriculture's many components is necessary to reverse the trend toward slowing growth and continuing high levels of food insecurity and poverty. Much work remains to be done in Pakistan to meet the pressing needs of the country's agricultural sector and its rural population. The task of designing legislation, regulations, and ordinances requires excruciating attention to detail. The work required to implement a reform agenda is even more challenging—it is a long and arduous process to move a good idea into proposal preparation for the Planning Commission, or to ensure that funds are disbursed for public projects transparently and effectively. Work is also needed to build an effective partnership with private-sector and civil-society actors that strengthens and sustains their contribution to agriculture's growth and wider economic development. Nevertheless, with careful attention to monitoring and evaluation of the intended and unintended consequences of policy change, Pakistan faces great scope for change. And by seizing opportunities presented by major structural changes such as the 18th Amendment to the constitution, Pakistan has a chance to reexamine and rationalize roles and responsibilities pertaining to agriculture and food security at the ministerial, secretariat, and governmental levels. We believe that this book provides new insights into how economic growth, poverty reduction, and welfare improvement in Pakistan can be achieved through pragmatic and evidence-based policies and investments in food security, rural development, and agriculture.

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Annex A: Pakistan Rural Household Panel Survey

The demographic and socioeconomic data available in Pakistan have largely been generated by censuses and household surveys. Table A1.1 provides a list of prominent household-level datasets in Pakistan. Most of these surveys are cross-sectional, in the form of district level or provincial aggregates and therefore do not provide an opportunity to study socioeconomic dynamics and trends over time. Such analyses are possible primarily through longitudinal surveys, which are costly both in terms of time and money. There is no publicly available panel dataset that provides up-to-date gender-disaggregated, individual-level data for rural Pakistan.

Tracking the same individuals over time through a panel enables researchers to account for time-invariant household- and individual-level characteristics, thereby providing an opportunity for causal analysis. The original Pakistan Rural Household Survey (PRHS) is the only known panel survey ever conducted on rural households in Pakistan. The survey was conducted by the International Food Policy Research Institute (IFPRI) from 1986 to 1991 and collected several rounds of panel data from 800 rural households, with extension of the survey subsequently conducted by the Pakistan Institute of Development Economics (PIDE) and the World Bank. More than a dozen PhD dissertations and more than 100 MSc and MPhil dissertations have been completed using this dataset. The PRHS is a rich resource for researchers, academics, and policy makers who are interested in empirical analyses on a wide range of research questions related to development issues in Pakistan.

In an effort to recapture the value of such surveys, a new panel survey—the Pakistan Rural Household Panel Survey (RHPS)—was conducted by IFPRI and Innovative Development Strategies (Pvt.) Ltd. (IDS), under the auspices of the Pakistan Strategy Support Program (PSSP) in 2012. The aim of the survey was to collect information on poverty dynamics and microlevel constraints on income generation and economic growth for rural households in Pakistan. The survey covers topics that are standard to most household income and expenditure surveys in developing countries, while extending its coverage to health and nutrition; agricultural production; natural resource management; gender and labor issues; and topics related to security, governance, and access to public services. The RHPS builds on several other panel surveys conducted in Pakistan. See Nazli and Haider (2012) for complete details.

The first RHPS round (referred to in subsequent chapters as "RHPS Round 1") was conducted in March 2012 in Punjab, Sindh, and KPK provinces. The sample universe of RHPS Round 1 included all households in rural

Punjab, Sindh, and KPK, although certain districts in KPK were not included for security reasons. Similarly, Balochistan and the Federally Administered Tribal Areas were dropped from the sampling frame for security reasons, while Gilgit-Baltistan—Pakistan's northernmost territory—was similarly excluded for logistical reasons. This round covered 2,090 households from 76 villages in 19 districts, 12 of which are in Punjab, 5 in Sindh, and 2 in KPK. A sample of households that participated in the earlier (1986–1991) PRHS were also traced to provide a basis for long-term assessment of family circumstances and poverty dynamics.

To ensure that the sampling frame captured Pakistan's rural population as adequately as possible, the RHPS uses data on enumeration blocks provided by the 1988 Population Census, as well as population projections to the year 2030, to identify revenue villages (*mouzas*) for possible inclusion in the sample. All enumeration blocks classified as "urban" in the 1998 population census were removed from consideration. In an effort to reduce the possible sampling of *mouzas* that were originally rural in 1998 but had become largely urban by 2011, all enumeration blocks where the projected population in 2011 exceeded 25,000 were also removed from consideration.

Next, the RHPS used a multistage, stratified sampling technique to capture variation in Pakistan's rural population. In the first stage, probability proportionate to size was used to select districts. This method ensures that districts with more rural households have a greater chance of being selected. The proportion of rural households in each province determined the number of districts chosen from the province. Across the three provinces, 19 districts were selected (12 from Punjab, 5 from Sindh, and 2 from KPK). In each district, 4 *mouzas* were selected, resulting in a total of 76 *mouzas*: 48 from Punjab, 20 from Sindh, and 8 from KPK. The equal probability systematic selection method was used so that *mouzas* with smaller populations had the same probability of being selected as highly populated *mouzas*. One enumeration block was randomly selected from each *mouza,* and a complete household listing was conducted to randomly select 28 households from each block. In the end, 2,124 households were randomly selected, and, with 34 refusals to participate, the final sample totaled 2,090 households.

In November 2012, a follow-up survey round (hereinafter referred to as "RHPS Round 1.5") was conducted on a subsample of households from the original 2,090 households. The subsample consisted of 981 households (47 percent of the original sample) that cultivated land at any point during the year prior to the survey. These households that were specifically engaged in production were surveyed with a questionnaire on agricultural production

for each crop and for each individual plot under cultivation during the kharif 2011 and rabi 2011/2012 seasons. While the RHPS Round 1.5 sample is not representative of households engaged in agricultural production in Pakistan because it is extracted from a larger representative sample of rural households, it does capture a constructive level and degree of variation with which to conduct several analyses that are presented in subsequent chapters.

Subsequent rounds of the RHPS were conducted to build the panel further. Specifically, RHPS Round 2 was conducted from April to July 2013, followed by Round 3 from May to August 2014. Despite some attrition among respondents, the sample sizes for these rounds remained representative of the population of interest, with 2,002 and 1,876 households, respectively. In addition to the primary respondents for the household survey, a total of 3,254 women were interviewed for a module on "women's position and opinion" in RHPS Round 3. Respondents included not only the female household head or spouse of the head but also the eldest female and the youngest female over 15 years of age in the household.

In an effort to ensure broad access and use of the RHPS data among researchers and other interested stakeholders, IFPRI and IDS are making the data for successive rounds available in the public domain. At present RHPS Rounds 1 and 1.5 data from 2012 have been made available via IFPRI on the Harvard Dataverse, a global data sharing platform (see IFPRI/IDS 2012). Additional rounds will become available in due course.

TABLE A1.1 Prominent household-level datasets, Pakistan

	Survey	Organization	Years
1.	Labor Force Survey (LFS) **Note:** Started in 1963; revised in 1990; 1995; 2001/02; 2005.	Government of Pakistan; Federal Bureau of Statistics	2005–06 2006–07 2007–08 2008–09 2009–10 2010–11 2012–13
2.	Time Use Survey (TUS)	Government of Pakistan; Federal Bureau of Statistics	2007
3.	Household Integrated Economic Survey (HIES) **Note:** Started in 1963; revised in 1990; 1998/99	Government of Pakistan; Federal Bureau of Statistics	1990–91 1992–93 1993–94 1996–97
4.	Pakistan Integrated Household Survey (PIHS)	Government of Pakistan; Federal Bureau of Statistics; World Bank	1991 1995–96 1996–97
5.	Pakistan Integrated Household Survey(PIHS)–HIES **Note:** HIES integrated with PIHS in 1998/99 and 2001/02.	Government of Pakistan; Federal Bureau of Statistics	1998–99 2001–02
6.	Pakistan Socioeconomic Survey (PSES)	Pakistan Institute of Development Economics	1998–99
7.	Pakistan Social and Living Standards Measurement Survey–Household Integrated Economic Survey (PSLM-HIES) **Note:** HIES-PIHS was renamed PSLM-HIES in 2004	Government of Pakistan; Federal Bureau of Statistics	2004–05 2005–06 2007–08 2010–11 2011–12
8.	Pakistan Social and Living Standards Measurement Survey (PSLM)–Core Welfare Indicators Questionnaire	Government of Pakistan; Federal Bureau of Statistics	2004–05

Primary modules	Unit of analysis	Sample size (n)	Level
Household composition and demographics, activity of all household members (10 years and over), Underemployment, Paid employment, Occupational injuries and diseases, Unemployment	Household	32,744 32,778 36,272 36,400 36,400 36,464 35,488	National
Household information and demographics, Time-use pattern	Household	19,600	National
Household composition and demographics, Employment, Household expenditures (monthly/yearly; durable/nondurable), Assets, Transfers, Income, Land utilization, Crops harvested, Livestock, Labor, Revenues and expenses (mining, hotels and restaurants, transport, trade, construction); *submodules for agricultural and nonagricultural establishments*	Household	6,393 14,594 14,668 15,453	National
Household composition and demographics, Employment and income, Education, Expenditure, Health and child survival, Immunization, Consumption, Farming and livestock, Transfer and remittance, Migration, Marriage history, Housing, Household access to facilities, Facilities, Community and price survey instrument	Household	4,794 12,381 12,622	National
Household information, Occupation, Education, Household expenditure, Income, Transfers, Financial assets and liabilities, Land utilization and crop harvesting, Livestock/poultry/forestry, Immunization, Pregnancy history, Family planning, Pre- and postnatal care; *submodules for agricultural and nonagricultural establishments*	Household	16,341 15,807	National
Household composition, Labor force and employment, Income and expenditure, Birth history of women ages 15–49 years, Nutritional and immunization status of children and pregnant and lactating women, Health and healthcare status, Housing conditions, Assets; *submodules for agricultural and nonagricultural establishments*	Household	3,564	National
Household composition and demographics, Employment, Household expenditures (monthly/yearly; durable/nondurable), Assets, Transfers, Income, Land utilization, Crops harvested, Livestock, Labor, Revenues and expenses (mining, hotels and restaurants, transport, trade, construction), Immunization, Maternal history, Family planning, Women in decision making, Pre- and postnatal care; *submodules for agricultural and nonagricultural establishments*		14,708	National
Household information, Employment, Education, Health, Assets, Diarrhea, Immunization, Pregnancy and maternal history, Pre- and postnatal care, Housing, Consumption expenditure, Household borrowing, Facilities and services		77,000	District

(continued)

TABLE A1.1 Prominent household-level datasets, Pakistan *(continued)*

	Survey	Organization	Years
9.	Pakistan Panel Survey (PPS)	International Food Policy Research Institute	1986–91 *(12–15 rounds over July 1986–September 1991)*
10.	Pakistan Rural Household Survey (PRHS)	Pakistan Institute of Development Economics; World Bank	2001 2004 *(continuation of PPS)*
11.	Pakistan Panel Household Survey (PPHS)	Pakistan Institute of Development Economics; World Bank	2010 *(Round 3 of PRHS)*
12.	National Nutrition Survey	Pakistan Institute of Development Economics	2001–02
13.	Pakistan Demographic Survey (PDS)	Government of Pakistan; Federal Bureau of Statistics	2003
14.	Pakistan Reproductive Health and Family Planning Survey (PRHFPS)	National Institute of Population Studies	2000
15.	Child Labor Survey (CLS)	Government of Pakistan; Federal Bureau of Statistics; International Labor Organization (ILO)	1995–96 1997–98
16.	Pakistan Fertility and Family Planning Survey (PFFPS)	National Institute of Population Studies	1996–97
17.	Status of Women Reproductive Health and Family Planning Survey (SWRHFPS)	National Institute of Population Studies	2003
18.	Pakistan Demographic and Health Survey (PDHS)	United States Agency for International Development (USAID; National Institute of Population Studies (NIPS)	1990–91 2006–07 2012–13

Source: PBS (2015a, 2015b); PIDE (2013); LUMS (2015); CERP (2013).

Note: The sample sizes stated in the table may vary between different data sources.

[a] Rural areas of four districts; Balochistan excluded; [b] Rural areas of 16 districts in round 1 and 10 districts in round 2; National (Round 1); [c] Rural and urban areas of 16 districts; National.

Primary modules	Unit of analysis	Sample size (n)	Level
Household composition, Land ownership and tenure arrangements, Crop production and distribution, Farm and nonfarm expenditures, Labor use, Assets, Credit, Livestock/poultry, Fertility, Health and nutrition, Income and transfers, Anthropometrics	Household	800	See note[a]
Household composition, Education, Agriculture, Nonfarm enterprise, Employment, Migration, Credit	Household	2,721 1,907	See note[b]
Household composition, Education, Agriculture, Nonfarm enterprise, Employment, Migration, Consumption, Health, Shocks and coping strategies, Security, Subjective welfare, Assets, Business and enterprise, Transfers	Household	4,142	See note[c]
Household demographic and socioeconomic information, Sanitation, Knowledge and practice on iodine deficiency disorders (IDD) and iodized salt consumption, Nutrition and health information (mother and preschool children), Clinical examination and anthropometric measurements (mother and preschool children)	Household	10,656	National
Household composition and detailed demographics	Household	30,947	National
Household composition, Household conditions, Female questionnaire: Reproduction, Adolescents, Healthcare during last pregnancy, Delivery postnatal care and breastfeeding, Current health status, Contraception, Fertility preference, Socioeconomic factors	Household	6,857	National
Household composition and demographic information, Household activities, Current activities of persons (15 and over), Current activity of each child (5–14 years), Perception of parents/guardians, Children questionnaire (5–14 years), Household income and expenditure, Housing conditions	Household	10,460 18,960	National
Household composition, Housing conditions; Female questionnaire: Education, Reproduction, Contraception, Pregnancy and breast-feeding, Marriage, Fertility preferences, Socioeconomic factors	Household	7,325	National
Household composition, Education, Housing conditions, Female questionnaire: Reproduction, Women's status, Reproductive health, Contraception, Fertility preferences	Household	9,401	National
Household composition, Facilities, Household characteristics, Fertility levels, Reproduction, Marriage, Fertility preferences, Awareness and use of family-planning methods, Child feeding practices, Childhood mortality, Maternal and child health, Nutritional status, awareness and attitudes regarding HIV/AIDS, Knowledge about tuberculosis/hepatitis, Domestic violence	Household	8,019 102,060 13,944	National