Chapter 12

AGRICULTURAL GROWTH, POVERTY, AND THE RURAL NONFARM ECONOMY: A SPATIAL ECONOMY-WIDE ANALYSIS

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Introduction

Pakistan's economy did not perform particularly well over the past decade. Per capita gross domestic product (GDP) grew at only 1.3 percent per year between 2005/2006 and 2013/2014 (PBS 2014). New research presented in this book suggests that the welfare of poorer households was virtually unchanged over this period (see Chapter 3). Various domestic factors contributed to these trends. First, agricultural GDP grew at 2.4 percent per year, which was only slightly above Pakistan's annual population growth rate of 2.3 percent. At the same time, energy demand outpaced supply, leading to widespread electricity shortages that hampered growth in the nonfarm economy (HDIP 2012). External factors that were largely beyond the control of the government also played a role. Foreign capital inflows had virtually ceased by the end of the decade, although this was offset by a surge in foreign remittances to households (SBP 2014). The rapid rise and subsequent fall in world food and energy prices late in the 2000–2009 decade also contributed to Pakistan's variable growth performance. Finally, the ongoing conflict in parts of the country has imposed a sizable economic cost (GoP 2014). Thus, numerous drivers were behind Pakistan's poor growth and poverty performance, of which slow agricultural growth was only one.

Agriculture undeniably plays a crucial role in Pakistan's economy. Farming is a major income source for most the country's poor households, so slow agricultural growth over the past decade is one obvious explanation for the persistence of rural poverty. However, numerous studies also emphasize the importance of the rural *nonfarm* economy (RNFE) and its contribution to rural households' livelihoods in Pakistan (see, for example, Arif, Nazli, and Haq 2000; Davis et al. 2010; Chaudhry, Malik, and Ashraf 2006; Dorosh,

Niazi, and Nazli 2003; Kurosaki 2006). Lanjouw and Lanjouw (2001) caution against the traditional view of the RNFE as a low-productivity sector whose contribution to the broader economy inevitably declines as development progresses. Instead, the authors cite evidence from numerous developing countries showing how growth in the RNFE can actively contribute to rural poverty reduction. Haggblade, Hazell, and Reardon (2010) provide a more recent review of the literature and conclude that the RNFE not only supports agricultural modernization during the early stages of development (by providing necessary inputs and services) but can also act as a continuing engine of rural economic growth. In fact many of the benefits from agricultural growth materialize from within the RNFE, which can generate sizable income and production multiplier effects that reach back into the agricultural sector (Haggblade, Hazell, and Dorosh 2007). Of course, the RNFE is not a panacea for rural development, and smallholder farmers must overcome numerous barriers to entry, sometimes with support from governments, before the benefits of the RNFE are fully realized (Reardon et al. 2000). Education, for instance, is found to be necessary for accessing decent rural nonfarm jobs in Pakistan (Kurosaki and Khan 2006). Nevertheless, there is strong evidence suggesting that the RNFE could play an instrumental role in promoting rural development in the country.

Our analysis, presented below, indicates that half of the new nonfarm jobs created in Pakistan between 2005/2006 and 2013/2014 were in the RNFE. However, this mainly reflects the size of the RNFE rather than its current dynamism. In fact, after rapidly expanding in the 1980s and 1990s, the RNFE has recently lagged behind agriculture in creating new jobs, leading to a rising share of farm employment over the past decade. In order to reverse this trend, Malik (2008) calls for a reframing of Pakistan's national development strategy so that it gives greater recognition to the potential contribution of the RNFE. This is supported by Kousar and Abdulai (2013), who find that participation in the rural nonfarm sector significantly increases per capita expenditures and reduces poverty in rural Pakistan. Various studies identify areas where institutional reforms and policy interventions could promote the expansion of the RNFE, including improving access to education and credit and market infrastructure (see Mohammad 1999; SPDC 2012; Sur and Zhang 2006; World Bank 2007). Financing and implementing these interventions would, however, require a shift in Pakistan's national strategy, which has traditionally focused on agricultural growth and urban development, with less attention given to the RNFE.

This chapter has three objectives. The first is to review recent growth patterns in Pakistan and to identify the contribution of the RNFE to structural

change processes. This is done in the section "Agriculture and Structural Change in Pakistan" using structural decomposition analysis and recent data from labor force surveys. We find that economic growth over the past decade was *not* associated with positive structural change (that is, there was no reallocation of workers from low- to higher-productivity sectors). Our analysis suggests that the weak expansion of the RNFE may have contributed to this lackluster performance.

The second objective is to empirically examine the structure of the RNFE. The section "Pakistan's Rural Nonfarm Economy" describes a new economy-wide database, or social accounting matrix (SAM), that distinguishes between both producers and households in peri-urban and more remote rural areas. This database, which includes estimates (constructed from national accounts, household surveys, and other information) of various types of households' sources of income, forms the basis for a new economy-wide model of Pakistan described in the section "Measuring Growth and Poverty Linkages." The model provides a simulation laboratory for experimenting with alternative sources of economic growth.

The chapter's final objective is to evaluate the implications of growth in agricultural and rural nonfarm sectors for poverty reduction in Pakistan. The economy-wide model is used to compare the welfare gains for poor households from growth driven by agriculture (that is, crops or livestock) with these households' gains from growth driven by nonagriculture (that is, manufacturing or services). Taking advantage of the spatial dimensions of the new SAM, the scenarios also contrast the welfare effects of growth in peri-urban and rural areas. Finally, we consider how improvements in Pakistan's energy supply and urban economic growth might also benefit the poor.

Overall, our findings suggest that growth in agriculture is still most effective at raising the incomes of Pakistan's poorest rural households. However, the RNFE is only slightly behind agriculture in the "pro-poorness" of its growth. Moreover, rural *manufacturing* growth (that is, agro-processing) is even more effective than agriculture in raising incomes among the poor, especially in more remote rural areas. Our analysis therefore supports efforts to raise the profile of the RNFE in Pakistan's national development strategies and policies.

Agriculture and Structural Change in Pakistan

Agriculture has lagged behind the rest of the economy over the past decade. Agricultural GDP per capita was virtually unchanged between 2005/2006 and

TABLE 12.1 Employment and labor productivity in Pakistan, 2005/2006–2013/2014

Indicator	Value		Annual growth rate or total point change (%)
	2005/2006	2013/2014	
Population (millions)	**155.4**	**185.3**	**2.23**
Rural population share (%)	66.5	65.3	–1.18
National youth (10–24 years) share (%)	33.2	32.9	–0.29
Youth in rural areas (%)	32.1	32.1	0.02
Total employment (millions)	**47.0**	**56.5**	**2.35**
Rural employment share (%)	69.2	69.1	–0.04
Informal sector share (%)	72.9	73.6	0.70
Rural nonfarm employment (millions)	**13.0**	**15.5**	**2.19**
Share of total rural employment (%)	40.1	39.7	–0.47
Employment share (%)	**100.0**	**100.0**	**0.00**
Agriculture	43.4	43.5	0.11
Industry	20.7	22.5	1.75
Services	35.9	34.1	–1.85
Value added per worker (US$)	**2,325**	**2,560**	**1.21**
Agriculture	1,233	1,239	0.06
Industry	17,875	16,110	0.65
Services	11,746	14,508	–1.63
Value added per capita (US$)	702.4	780.7	1.33

Source: Authors' calculations using the 2005/2006 and 2013/2014 Labor Force Surveys (PBS 2012, 2015) and national accounts data (PBS 2013a, 2014).

Note: US dollars are measured in constant 2005/2006 prices.

2013/2014 compared to 1.2 and 1.8 percent growth in industry and services, respectively. The main drivers of nonagricultural growth during this period were small-scale manufacturing and transportation and government services. Together, these sectors accounted for 30 percent of the increase in total GDP, which is much higher than their 20 percent share of GDP in 2005/2006. Accordingly, these sectors saw their GDP shares increase while agriculture's share steadily declined. Within agriculture, livestock grew relatively quickly at 3.3 percent per year—more than twice the growth rate of crop GDP.

Table 12.1 reports changes in employment patterns between 2005/2006 and 2013/2014. The table shows how Pakistan's population has been urbanizing at a fairly slow pace. The share of youth in the working-age population is high at nearly one-third, and this is only gradually declining from the peaks of early in the 2000–2009 decade. It is urban populations who are aging, while

the share of youth in the rural population has remained unchanged. This partly explains why the share of employment in rural areas remained constant despite ongoing urbanization. Agriculture continues to create most of the new jobs in rural areas, with the share of employment in the RNFE falling slightly. Nevertheless, employment in nonfarm activities still accounted for two out of every five rural jobs in 2013/2014, thus underscoring the importance of the RNFE for Pakistan. At the national level, the increased share of industrial-sector jobs in national employment was almost offset by a declining share of service-sectors jobs, leaving little change in the share of total jobs in agriculture. Overall, labor productivity increased modestly over the past decade, with value added per worker rising from US$2,325 in 2005/2006 to US$2,560 in 2013/2014.[1] Note that because value added includes both returns to labor (wages and salaries) and returns to land and capital (rents and profits), incomes of laborers are less than value added per worker.

This chapter is primarily concerned with how the benefits of economic growth are distributed throughout the population. One of the main channels through which economic growth affects households, particularly poorer households, is through jobs. Economic growth benefits households if it leads to higher wages within workers' existing sectors of employment or if it creates new job opportunities in sectors that command higher returns. The migration of workers from low- to higher-productivity sectors is called "positive structural change" and is a process typically associated with sustained economic development (McMillan, Rodrik, and Verduzco-Gallo 2014).

Using the data behind Table 12.1, we examine whether economic growth in Pakistan over the past decade was associated with positive structural change. We decompose changes in labor productivity (that is, GDP per worker) into two components. The first component—termed the "within sectors" component—is the sum of sectoral productivity gains weighted by initial employment shares (that is, assuming no change in sectoral employment shares over the past decade). The second "structural change" component is the additional productivity gains from reallocating workers between sectors with different levels of productivity (after accounting for productivity changes within each sector). When workers move from low to high productivity sectors or when job creation is faster in higher-productivity sectors, then structural change is said to have contributed positively to national labor productivity growth.

1 All $ in this chapter denote US dollars measured in constant prices.

TABLE 12.2 Decomposition of gains in labor productivity, 2005/2006–2013/2014

Sector	Change in value added per worker (US$)		
	Within-sectors	Between-sectors	Total change
Total for all sectors	326.6	–91.8	234.8
Agriculture	2.5	1.3	3.8
Industry	–1.4	47.3	45.9
Services	325.5	–140.4	185.1

Source: Authors' calculations using the 2005/2006 and 2013/2014 Labor Force Surveys (PBS 2012, 2015) and national accounts data (PBS 2013a, 2014).

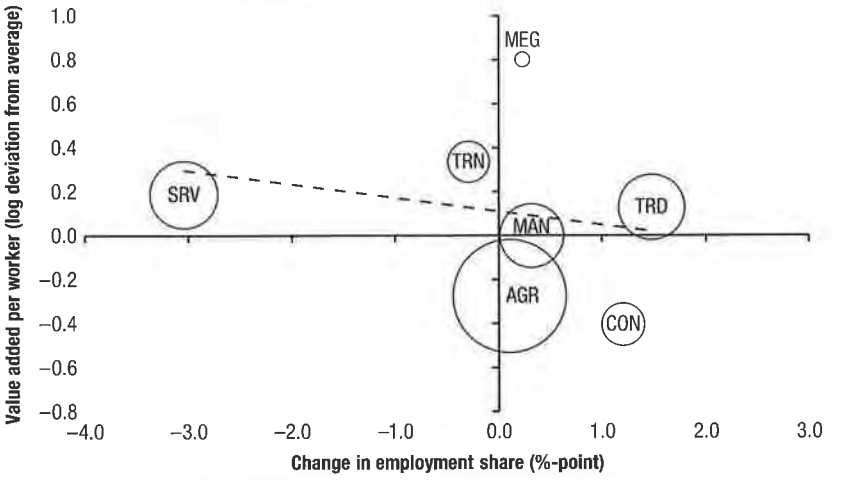
Table 12.2 reports the results from the productivity growth decomposition for the period 2005/2006–2013/2014.[2] As mentioned earlier, the total increase in value added per worker over eight years was about US$235 (final column in table). The decomposition reveals that most of this gain (US$185.1) originated from within the services sector, with a smaller contribution from industry (US$45.9) and a negligible contribution from agriculture (US$3.8). Moreover, while worker productivity rose over the past decade, this was entirely due to labor productivity gains occurring *within* sectors (US$326.6). In fact this growth period in Pakistan was associated with *negative* structural change (–US$91.8), with workers moving out of higher-productivity service sectors into lower-productivity industrial sectors. Put another way, a disproportionate share of the new jobs created over the past eight years were in industry rather than services.

Figure 12.1 provides more detailed results. The vertical axis shows initial value added per worker. A positive value means that a sector generated above-average value added per worker in 2005/2006. The horizontal axis shows the percentage point change in employment shares between 2005/2006 and 2013/2014. A negative value means that a sector's share of total employment has fallen, even if it has grown in absolute terms. Finally, the size of the circles represents a sector's initial contribution to total employment. Agriculture has the largest circle because two out of every five Pakistanis are farmers.

As indicated by their position along the vertical axis, agriculture (AGR) and construction (CON) have the lowest average value added per worker in Pakistan. The highest labor productivity is in mining, electricity, and natural

2 The data used for the decomposition comes from the 2001/2002 and 2013/2014 Labor Force Surveys (PBS 2012, 2015) and official national accounts data (PBS 2013a, 2014). The Labor Force Surveys covered all urban and rural areas in the four provinces but excluded Federally Administered Tribal Areas and military restricted areas (that is, about 2 percent of the total population).

FIGURE 12.1 Structural change in Pakistan's employment patterns, 2005/2006–2013/2014



Source: Authors' calculations using the 2005/2006 and 2013/2014 Labor Force Surveys (PBS 2012, 2015) and national accounts data (PBS 2013a, 2014).

Note: Size of circles equals sector's initial employment share. AGR = agriculture; MAN = manufacturing; MEG = mining, electricity, and gas; CON = construction; TRD = trade and hotel services; TRN = transportation and communication; SRV = public administration, health, education, and other private services.

gas (MEG). The MEG sectors are some of the most capital-intensive sectors in the economy, so the capital value added generated per worker is high.[3] The figure shows that there was a sizable reduction in the share of labor working in transportation and communications services (TRN) and the "other services" sector (SRV). The latter includes business and community services (for example, education, health, and social work). This reduction was only partly offset by an increase in employment within trade services (TRD), although this has lower value added per worker than other services. This explains the negative structural change occurring within services. In contrast, there was an increase in employment shares for all industrial sectors, including manufacturing (MAN). On average, the industrial sectors have lower labor productivity than services, so industry's rising share of employment led to negative overall structural change in the economy.

3 Note that a high value added per worker does not imply that workers' wages or salaries are high. In other words, labor productivity may be high because workers are coupled with machines with high returns or use value.

Agriculture has played a modest role in growth processes over the past decade. Its share of national employment and its average value added per worker remained virtually unchanged, suggesting that the sector's main contribution was in helping the economy absorb the growing number of young job seekers in rural areas. Data from the labor force surveys indicate that 46 percent of the increase in nonfarm jobs in Pakistan between 2005/2006 and 2013/2014 was in rural areas. Of the 6.6 million new jobs in rural areas, 2.5 million were in the RNFE.

Unfortunately, it is not possible to accurately estimate the RNFE's contribution to negative structural change in Pakistan because national accounts do not disaggregate sectoral value added across rural and urban areas. However, the labor force surveys report a disproportionate increase in rural manufacturing and construction jobs and a large decline in rural employment within "other services" (mainly within the education sector). This suggests that much of the shift in employment patterns that led to negative structural change in Pakistan occurred within the RNFE. If we assume that value added per worker in rural areas is half that of urban workers, then the RNFE accounted for about half of the negative structural change that occurred between 2005/2006 and 2013/2014. If labor productivity is the same in rural and urban areas, then the RNFE economy accounted for as much as two-thirds of the negative structural change.

In summary, not only did Pakistan's economy grow fairly slowly over the past decade, but the growth that did occur was associated with negative structural change. Most of this negative structural change is likely to have occurred within the RNFE, especially because agricultural productivity and its rate of labor absorption remained virtually unchanged. This suggests that the performance of the RNFE significantly influences national development outcomes, so the sector should not be overlooked when designing pro-poor growth strategies. In the next section, we examine the structure of the RNFE in greater detail, including its linkages to the broader economy and to the incomes of poor households.

Pakistan's Rural Nonfarm Economy

National Economic Structure

Table 12.3 describes the structure of Pakistan's economy in 2010/2011, derived from the new SAM that was purpose-built for this chapter (see below). Agriculture generated about one-quarter of national GDP, and this was fairly

TABLE 12.3 National economic structure, 2010/2011

Sectors	Share of total (%)			Exports/ output (%)	Imports/ demand (%)
	GDP	Exports	Imports		
Total GDP/exports/imports	**100.0**	**100.0**	**100.0**	**5.3**	**9.2**
Agriculture	**25.9**	**2.4**	**2.7**	**0.8**	**1.5**
Crops	12.0	1.5	2.7	1.0	3.1
Livestock	13.2	0.0	0.0	0.0	0.0
Other agriculture	0.8	0.9	0.0	8.5	0.0
Industry	**22.1**	**86.9**	**80.9**	**9.7**	**15.5**
Mining	2.9	1.9	0.0	5.8	0.0
Manufacturing	14.8	85.0	80.9	13.3	20.3
Food processing	4.6	9.5	10.4	3.8	7.9
Textiles and clothing	4.1	60.1	2.4	31.6	2.7
Other manufacturing	6.0	15.4	68.1	6.5	36.7
Other industry	4.4	0.0	0.0	0.0	0.0
Services	**51.9**	**10.7**	**16.3**	**1.8**	**3.4**

Source: Authors' calculations using the 2010/2011 Pakistan Social Accounting Matrix (IFPRI 2016).

Note: The table reports exports as a share of total output for each sector, and imports as a share of total domestic demand for each product group. Higher values mean that more of a sector's output is exported to foreign markets, or that imports satisfy a larger share of product demand in domestic markets.

evenly divided between crops and livestock. In contrast, while agriculture was responsible for almost half of all employment in 2007, four out of five of these jobs were from growing crops rather than from livestock. Finally, forestry and fishing, that is, "other agriculture," are relatively minor subsectors.

The manufacturing sector is as important as agriculture in its contribution to national GDP. That being said, one-third of manufacturing GDP comes from food processing, including foods and sugar refining. Worker productivity is fairly high in manufacturing; for example, GDP per worker is twice as high as agriculture's. As such, manufacturing's share of employment is lower than its share of GDP. The one exception is textiles, which is the most labor-intensive manufacturing subsector, although it is still only half as labor-intensive as agriculture. Manufacturing is the country's main source of exports (for example, textiles and clothing), and import demand (for example, machinery and vehicles; see "other manufacturing" in the table). Finally, while energy and construction (denoted "other industry" in the table) are crucial industrial sectors, together they account for less than 5 percent of total GDP. Nevertheless, these sectors play a broader role in the economy, that is, in supplying electricity and new capital to other sectors.

Services generate more than one-half of national GDP and one-third of employment. Trade and transportation services alone account for one-third of GDP and one-quarter of employment. Services therefore include some of the more labor-intensive economic activities in Pakistan. They also include some of the least labor-intensive subsectors, such as finance and public administration. These two subsectors are particularly skills intensive, so most of the returns to labor accrue to a relatively small number of higher-paid workers. These characteristics of production and trade are important in our analysis when measuring the effects of sector-level growth on household incomes.

Identifying Rural, Peri-urban, and Urban Areas

Rural and urban areas operate along a continuum that stretches from remote rural areas with little infrastructure and few public services to densely populated major cities with diverse economies and public and private resources. Most studies and statistics in Pakistan separate rural and urban areas. Given that there is still considerable heterogeneity within rural areas, we distinguish between peri-urban areas situated closer to urban centers and more remote rural areas.

In defining *peri-urban areas*, we follow the approach described in Kedir, Schmidt, and Waqas (2014). The authors develop an agglomeration index for 2010 using a range of GIS data, including travel time, population densities, and other nationally collected biophysical and infrastructure variables (for example, roads, railroads, and water bodies). The agglomeration index identifies urban areas by taking into account three indicators: population size of a major city, population density, and travel time to a major city. Urban, peri-urban, and rural areas are identified using a set of threshold criteria. An area is classified as *urban* if the population density is greater than 150 people per square kilometer and the area is located within one hours' travel time from a city of at least 500,000 people. *Peri-urban areas* are locations between one and three hours' travel time from a city of at least 500,000 people regardless of population density (and under one hour's travel time from a city of at least 500,000 if population density is less than 150 people per square kilometer). Finally, *rural areas* are designated as being more than three hours' travel time from a city of at least 500,000 people, regardless of population density.

Kedir, Schmidt, and Waqas (2014) estimated that 32 percent and 38 percent of Pakistan's total population in 2010 lived in urban and peri-urban areas, respectively. The former is close to the roughly 35 percent urban population share reported in the 2013/2014 Labor Force Survey (see Table 12.1). Unfortunately, the 2011/2012 *Household Integrated Expenditure*

Survey (HIES) (PBS 2013b), which is the main survey used to construct the SAM, has a tehsil as its smallest spatial unit.[4] We use the agglomeration index to estimate the share of households within each tehsil residing in rural, peri-urban, and urban areas. We then adopt the HIES definition of urban areas in order to remain consistent with other studies. For the remaining non-urban areas that official statistics call "rural," we set an 80 percent peri-urban population threshold, at which point we classify all households within a tehsil as living in a "peri-urban tehsil." So, for example, if 85 percent of a tehsil's population live in peri-urban conditions (according to the agglomeration index) then we assume that the remaining 15 percent of rural households are also peri-urban. This is clearly a rough approximation of the higher-resolution approach found in Kedir, Schmidt, and Waqas (2014). Nonetheless, we generate by this method a peri-urban population share of 40 percent, which is, by design, close to the authors' 38 percent.

Having identified peri-urban areas in HIES, we then used the survey to disaggregate the national SAM across rural, peri-urban, and urban areas. The SAM reconciles a wide range of data sources, including national accounts, trade and tax information, and agricultural and industrial census and survey data.[5] The HIES is used to disaggregate households and workers into different groups. The incomes and expenditures reported by households in the survey rarely match each other, so it is necessary to reconcile these flows. Moreover, the household survey does not capture as much of Pakistan's economy as national accounts, and this inadequate coverage explains some of the imbalances contained in the initial SAM. We use cross-entropy estimation techniques to remove these imbalances (see Robinson, Cattaneo, and El-Said 2001). This approach equates household income and expenditure flows while making as few adjustments as possible to the original survey data. The final SAM represents a "best estimate" of the structural characteristics of Pakistan's rural and urban economies.

Characteristics of the Rural Nonfarm Economy

Table 12.4 shows how the national economic structure described in Table 12.3 is now divided across rural, peri-urban, and urban areas. Note that "rural" in this table (and all subsequent tables) refers to officially defined rural areas

4 A *tehsil* is a subdistrict administrative unit, which consists of a collection of union councils and villages.

5 Dorosh, Niazi, and Nazli (2003) describe an earlier 2001/2002 SAM for Pakistan and use the model for multiplier analysis.

TABLE 12.4 Regional economic structure characteristics, 2010/2011

Indicator	National	Rural	Peri-urban	Urban
GDP (US$ billions)	**202.0**	**42.4**	**64.9**	**94.7**
Regional GDP share (%)	100.0	21.0	32.1	46.9
Total population (millions)	**130.4**	**35.5**	**51.5**	**43.3**
Regional share (%)	100.0	27.3	39.5	33.2
Population in the lowest consumption quartile (millions)	**32.6**	**12.4**	**14.3**	**5.9**
Regional share (%)	100.0	37.9	44.0	18.2
Share of region's total population (%)	25.0	34.7	27.8	13.7
GDP per capita (US$)	**1,550**	**1,194**	**1,260**	**2,185**
Share of total GDP (%)	**100.0**	**100.0**	**100.0**	**100.0**
Agriculture (%)	25.2	50.5	43.8	2.7
Crops (%)	12.0	23.7	19.6	1.5
Livestock (%)	13.2	25.7	22.8	0.9
Other agriculture (%)	0.8	1.0	1.3	0.3
Industry (%)	22.1	16.3	18.1	27.5
Manufacturing (%)	14.8	6.5	9.8	21.9
Services (%)	51.9	33.2	38.1	69.8

Source: Authors' calculations using the 2010/2011 Pakistan Social Accounting Matrix (IFPRI 2016) and Pakistan CGE model.

less those areas that we have classified as being "peri-urban." In other words, combining rural and peri-urban areas in Table 12.4 gives officially defined rural areas.

Urban areas account for almost half of national GDP in Pakistan, but only about one-third of the population. As such, average GDP per capita in urban areas is higher than the national average. In contrast, rural and peri-urban areas account for a lower share of national GDP than they do of the national population. GDP per capita is only slightly higher in peri-urban areas than in rural areas. Nevertheless, a much larger share of the *rural* population (34.7 percent) falls into the country's lowest per capita consumption quartile (that is, our definition of poor households). By comparison, only about 14 percent of the urban population are in the lowest quartile.

Despite having similar GDP per capita, the rural and peri-urban economies differ in their structural characteristics. Agriculture in the rural economy, for example, generates approximately 51 percent of total GDP compared to approximately 44 percent in peri-urban areas. The peri-urban economy, on the other hand, has a larger manufacturing sector, although even here manufacturing is much smaller than in urban areas, where it makes up a little over

TABLE 12.5 Household income and expenditure characteristics, 2010/2011

Indicators	National	Lowest quartile	Other quartiles	Rural	Peri-urban	Urban
Population (millions)	**130.4**	**32.6**	**97.8**	**35.5**	**51.5**	**43.3**
Share (%)	100.0	25.0	75.0	27.3	39.5	33.2
Income per capita (US$)	**1,615**	**526**	**1,978**	**1,044**	**1,275**	**2,487**
Consumption per capita (US$)	**1,300**	**503**	**1,565**	**917**	**1,074**	**1,882**
Total expenditure share (%)	**100**	**100**	**100**	**100**	**100**	**100**
Food (%)	38.5	56.0	37.0	48.2	43.2	32.4
Nonfood (%)	42.0	39.5	42.2	39.6	41.1	43.3
Direct taxes (%)	2.1	0.0	2.3	0.7	1.3	3.1
Savings (%)	17.4	4.4	18.5	11.5	14.5	21.2
Total income share (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Labor (%)	33.9	51.1	32.4	36.8	31.5	34.5
Farm (%)	5.3	9.3	4.9	12.5	8.5	0.8
Low education (%)	13.2	36.1	11.2	16.0	14.3	11.6
High education (%)	15.5	5.7	16.3	8.2	8.8	22.1
Cropland (%)	8.8	12.3	8.5	21.2	14.8	0.9
Livestock capital (%)	10.7	15.6	10.2	23.8	19.8	0.6
Informal nonfarm capital (%)	17.9	17.1	18.0	10.3	19.3	19.8
Formal nonfarm capital (%)	22.7	0.0	24.8	2.6	7.1	39.2
Government transfers (%)	0.7	1.8	0.6	1.3	0.7	0.5
Foreign remittances (%)	5.2	2.1	5.5	4.1	6.8	4.6

Source: Authors' calculations using the 2010/2011 Pakistan Social Accounting Matrix (IFPRI 2016).

Note: National per capita consumption spending is used to derive household expenditure quartiles. Percentages may not sum to 100 due to rounding errors.

one-fifth of total urban GDP. Most rural manufacturing is in food processing, whereas even peri-urban areas have some textiles and clothing as well as metals and machinery production. This indicates that the RNFE becomes more diverse as one moves to peri-urban and urban areas. That being said, at the regional level, the rural and peri-urban economies have much more in common with each other than they do with the urban economy. While there is some urban agriculture in Pakistan, this is a relatively small sector.

Table 12.5 describes household income and expenditure patterns at the national and regional levels. Two things should be noted from the table. First, like in Table 12.4, the total population is 130 million, which is below the 185 million reported in Table 12.1. This is because the HIES excludes certain more remote rural areas. Second, average per capita income is higher than

average per capita GDP because households are net beneficiaries of government transfers that are partially paid for by net foreign capital inflows, such as foreign aid and foreign borrowing.

Households in the lowest quartile earned and spent about US$500 per person in 2010/2011 (at market exchange rates). Almost all of this income was used for consumption spending, primarily on food products. Households in the other quartiles (that is, the second, third, and fourth) allocated a smaller share of their incomes to food and had higher average savings rates than poor households. Higher quartile households also paid direct taxes and made social contributions to the government. The differences in expenditure patterns between rural, peri-urban, and urban households largely reflect the fact that a greater share of urban households are in higher-consumption quartiles.

Income patterns show greater variation across regional household groups. Poorer and rural households are more dependent on labor incomes, particularly farm labor and less educated labor. They are more reliant on agriculture for their livelihoods, including incomes from crops and livestock. Peri-urban and urban households, on the other hand, are more likely to engage in nonfarm self-employment, as reflected in their larger income shares from informal capital returns. At the national level, incomes from nonfarm enterprises (as reflected in informal capital returns) are similar for households in the lowest and higher quartiles. Finally, even though rural and poorer households pay less in taxes to the government, a larger share of their incomes comes from government transfers (for example, state pensions and social grants). Higher-income households are more likely to receive remittance incomes from family members living and working abroad. Overall, while GDP per capita is similar for rural and peri-urban households, on average, the sources of income vary significantly across these two regions. This justifies disaggregating the SAM across rural and peri-urban areas.

Table 12.6 examines rural households' economic characteristics in greater detail. We separate households into small-scale and medium/large-scale farmers (that is, small-scale farmers cultivate less than 12.5 acres of cropland). Per capita incomes for small-scale farmers are less than half those of medium/large-scale farmers. Small-scale farmers derive a larger share of their incomes from livestock, as opposed to crops, than medium/large-scale farmers do, and they earn more of their incomes from nonfarm enterprises (that is, informal capital). We also separate out farmers who do not own their own land but instead rent cropland or are sharecroppers. These non-landowning farmers may cultivate small, medium, or large-scale farms, but as a group, they derive a larger share of their incomes from nonfarm enterprises than do landowning

TABLE 12.6 Rural and peri-urban household income and expenditure characteristics

	Farm households				Nonfarm households	
Indicator	Small-scale	Medium/ large-scale	Non-landowning	Farm wage laborer	Rural	Peri-urban
Population (millions)	**19.8**	**3.1**	**10.6**	**14.6**	**14.5**	**24.4**
Share of national population (%)	15.2	2.4	8.2	11.2	11.1	18.7
Income per capita (US$)	**1,475**	**3,228**	**1,248**	**763**	**802**	**1,127**
Consumption per capita (US$)	**1,253**	**2,449**	**1,120**	**731**	**710**	**927**
Total expenditure share (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Food (%)	46.4	37.6	50.4	54.8	47.4	38.6
Nonfood (%)	38.5	38.3	39.4	41.0	41.2	43.6
Direct taxes (%)	0.5	0.5	2.0	0.7	1.2	1.5
Savings (%)	14.6	23.7	8.2	3.5	10.2	16.3
Total income share (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Labor (%)	22.1	25.6	28.7	42.1	56.6	37.2
Farm (%)	15.5	21.6	15.1	13.7	0.0	0.0
Low education (%)	3.8	0.8	9.0	20.7	36.8	23.0
High education (%)	2.7	3.2	4.7	7.7	19.8	14.2
Cropland (%)	27.6	45.7	37.4	0.0	0.0	0.0
Livestock capital (%)	38.8	25.4	21.3	45.7	0.0	0.0
Informal nonfarm capital (%)	5.7	0.9	8.6	9.0	24.7	35.3
Formal nonfarm capital (%)	0.0	0.0	0.0	0.0	8.3	16.9
Government transfers (%)	0.6	0.3	0.8	1.3	2.2	0.9
Foreign remittances (%)	5.2	2.1	3.2	1.9	8.2	9.7

Source: Authors' calculations using the 2010/2011 Pakistan Social Accounting Matrix (IFPRI 2016).

Note: Share of national population derived from national population estimate of 130.4 million. National per capita consumption spending is used to derive household expenditure quartiles.

farmers. Finally, about 11 percent of Pakistan's population are in rural households that do not cultivate land but instead work as wage laborers on other households' farmland. Wage laborer households do not earn cropland returns, but they do earn farm labor incomes. They are, however, most dependent on livestock earnings and on low-educated nonfarm labor wages. Overall, per capita incomes decline for farmers with greater dependence on rented lands or farm wages.

Finally, we compare nonfarm households in rural and peri-urban areas. Rural nonfarm households have lower average per capita incomes than farm households have, which is consistent with findings from other studies (see,

for example, Kousar and Abdulai 2013). Rural nonfarm households are more dependent on labor incomes than peri-urban nonfarm households are. Peri-urban households, on the other hand, generate more of their incomes from nonfarm enterprises, which is consistent with there being fewer barriers to entry in the nonfarm sector within peri-urban areas, possibly due to improved access to input, output, and financial markets (see SPDC 2012). Nonfarm households in both areas earn a greater share of their incomes from foreign remittances than do farm households. Evidence suggests that these remittances may help overcome certain barriers to entry into the RNFE, such as by helping households acquire productive assets (see Adams 1998).

The new spatial SAM reveals considerable heterogeneity within rural areas. While our treatment of the rural-urban continuum is still somewhat coarse, the distinction between "rural" and "peri-urban" reveals notable differences between farm and nonfarm households in these areas. In the previous section, we found that the RNFE has been a major source of recent employment patterns and structural change in Pakistan. Two-thirds of the expansion of industrial employment over the past decade, for example, occurred within the RNFE. In this section, we found that this industrial expansion is more likely to have occurred in peri-urban areas, where industry is a more important economic activity. What is not clear is to what extent slow nonfarm growth and negative structural change explains the persistence of rural poverty over the past decade. Conversely, it is difficult to determine what the implications of a renewed expansion of the RNFE would be for future poverty reduction and agricultural development, and hence whether greater attention should be paid to the RNFE in Pakistan's national strategies and policies. The sections that follow develop an economy-wide model of Pakistan and use this to answer these questions.

Measuring Growth and Poverty Linkages

Economic growth is measured by GDP, whereas poverty is determined by the level and distribution of household consumption. The well-known national accounting identity below provides a useful framework for explaining GDP and consumption linkages. The key point to note is that GDP not only consists of private consumption C but also investment demand I, government consumption G, and the foreign trade balance (that is, exports X less imports M). It is clear from the identity that an increase in GDP need not lead to a proportional increase in private consumption. The extent to which GDP growth affects private consumption is determined top-down by the mechanisms that

govern macroeconomic balances (that is, changes in aggregate consumption, investment, and trade). Of course, the macroeconomic aggregates are themselves determined bottom-up by a country's unique economic structures and the behavior of its economic agents (for example, individual producers and consumers and the government). One of the main features of the Pakistani model is that it tracks changes in economic outcomes at both the micro- and macroeconomic levels.

$$GDP = (C + I + G) + (X - M)$$

We first describe how GDP is determined in the model.[6] Using information from the 2010/2011 SAM, the model separates Pakistan's economy into 64 sectors and three regions (that is, rural, peri-urban, or urban). Producers in each sector and region use a unique combination of land, labor, capital, and intermediate inputs.[7] Resources are assumed to be in limited supply, so in order to increase production, producers must compete with one another by, for example, offering higher wages to workers. We assume that regional labor markets are segmented by education levels, that is, workers who have completed secondary schooling are in the "high skilled" labor market, and those without secondary schooling are in the "low skilled" market. Workers within regional markets can migrate across sectors within, but not between, the farm and nonfarm economies. This reflects seasonal labor constraints for farm households but allows farmers to allocate their time to nonfarm activities outside of the growing season. Agricultural land is separated into lands operated by small-scale farmers (less than 12.5 acres), medium-scale farmers (between 12.5 and 50 acres), and large-scale farmers (more than 50 acres). Note that the model distinguishes between farmers who operate their own lands and those who rent others' lands or who are sharecroppers. Farmers can reallocate their lands between crops. Finally, the model distinguishes between formal and informal sector capital because these have different implications for distributional outcomes (Tables 12.5 and 12.6). The level of aggregate GDP is therefore the result of complex interactions between sectoral and regional resource constraints and producer technologies and behavior.

We next consider how private consumption C is determined in the model. Households or consumers are the main recipients of land, labor, and capital

6 For a detailed specification and discussion of the core model, see Diao and Thurlow (2012). Table A12.1 in Annex A describes in detail the model's sectors, factors, and households.

7 Producers substitute between factors based on relative prices. This behavior is governed by a constant elasticity of substitution (CES) function, with intermediate demand derived from fixed shares within a Leontief function.

incomes. Households also have other sources of income, such as foreign remittances or social transfers from the government. Households use their incomes to pay taxes, consume goods and services, and save. The model separates all households in the country into groups using information from the 2010/2011 HIES. Households are separated into rural, peri-urban, and urban areas and according to whether they are crop farmers or not. Farmers are further divided into small and medium/large-scale farms, landless (non-landowning) farmers, and those who work on other people's farms. Finally, households are grouped according to per capita consumption quartiles. Each of the 28 representative household groups in the model has unique income and expenditure patterns, reflecting differences in their factor endowments, income levels, and consumer preferences.[8]

So far we have explained the derivation of GDP and private consumption. Next we consider how the model tracks the other components in the national accounting identity. Government consumption G depends on tax revenue collections. The government in the model collects indirect taxes imposed on the sale of goods and services and direct taxes imposed on household incomes and formal corporate profits. These revenues are used to finance the public consumption of goods and services, including administration, health, and education services. Any remaining revenues are used to finance public investments. The government may also borrow from domestic banks and other sources in order to finance public investments.

The model captures changes in imports M and exports X by allowing producers and consumers to shift between domestic and foreign goods depending on changes in relative prices. If the world price of a good falls relative to its domestic equivalent, then consumers increase their demand for the foreign good. Conversely, falling world prices prompts producers to supply more to domestic markets.[9] Pakistan is a small economy, so we assume that domestic decisions do not affect world prices.

The "current account" tracks the supply and demand of foreign exchange. For the current account to be balanced, total import payments M must equal the sum of total export earnings X plus any foreign remittance incomes or capital inflows. The current account is measured in foreign rather than local currency. In order to capture the scarcity of foreign exchange in Pakistan, we

8 Households' consumption behavior is governed by a linear expenditure system of demand with nonunitary income elasticities estimated from household survey data.

9 Import demand is governed by a CES Armington function and exports by a constant elasticity of transformation (CET) function. Elasticities of substitution between domestic and foreign goods are taken from Dimaranan (2006).

assume that foreign capital inflows are fixed and the real exchange rate adjusts to equate the supply and demand of foreign exchange.

The final component in the national accounting identity is investment demand I. Standard accounting rules dictate that total investment must equal total savings in equilibrium. The latter includes private, public, and foreign savings (that is, capital inflows). We want to minimize any biases resulting from assumptions about the behavior of the macroeconomic aggregates in the accounting identity. For example, we do not want GDP growth to benefit only private consumers because this is likely to overestimate household welfare gains. We therefore assume that any changes in the nominal value of absorption (that is, $C + I + G$) is evenly distributed across absorption's three components. This is a distribution-neutral assumption governing the model's macroeconomic adjustment mechanisms or "closures."

The Pakistani model is recursive dynamic and is run annually over a five-year period. Between years, the model is updated to reflect growth in the population, land and labor supply, and productivity. More importantly, the previous period's investment determines the availability of new capital, after accounting for depreciation. New capital stocks are allocated to sectors based on their relative profitability. Sectors with above-average profits receive a larger share of new capital than their existing share of capital stocks (see Diao and Thurlow 2012). Once invested, new capital becomes locked in place and cannot be repurposed for use in other sectors.

In summary, the Pakistani model provides a comprehensive and consistent framework that links sector-level economic growth to household-level incomes and consumption spending. The model provides a simulation laboratory for experimenting with alternative sources of growth and allows researchers to trace the effects of national growth on household incomes and welfare.

Growth and Poverty Scenarios

Baseline and Alternative Scenarios

We first establish a baseline growth scenario. Following the growth patterns described in "Agriculture and Structural Change in Pakistan," we assume that population and labor supply grow at just over 2 percent per year. *Pakistan Economic Surveys* (see GoP 2014) suggest that the total cultivated land area remained virtually unchanged after 2005/2006, so we impose a zero land expansion rate on the model. We also control the amount of capital in the energy sector so that it tracks the observed supply of electricity, which grew

TABLE 12.7 Required GDP growth-rate acceleration, for each sector/regional growth scenario, in order to achieve national GDP target (percentage-point increase over baseline scenario outcomes)

Sectors leading the growth acceleration	Regions leading the growth acceleration			
	All Pakistan	Rural areas	Peri-urban areas	Urban areas
All	0.20	0.98	0.65	0.43
Farm sectors	0.73	1.82	1.37	n.a.
Crops	n.a.	4.68	4.14	n.a.
Livestock	n.a.	4.01	2.67	n.a.
Nonfarm sectors	0.26	2.00	1.15	n.a.
Manufacturing	n.a.	16.96	8.44	n.a.
Services	n.a.	4.28	2.43	n.a.
Electricity sector	1.94	n.a.	n.a.	n.a.

Source: Pakistan CGE model results.

Note: GDP = gross domestic product; n.a. = not applicable.

more slowly than the population. In the absence of supporting data, we assume that national capital stocks grow at a 3 percent per year rate after applying a 5 percent annual depreciation rate. Finally, total factor productivity (TFP) grows faster in the nonagricultural sectors, that is, at 1 and 2 percent per year in industry and services, respectively, compared to only 0.5 percent per year in agriculture.

The baseline scenario produces total GDP growth of 4 percent per year, which is similar to observed economic patterns during 2005/2006–2013/2014. It is worth noting that the baseline is only of marginal interest for our analysis, because it merely provides a common reference point for analysis of subsequent scenarios. Nevertheless, our baseline broadly conforms to Pakistan's recent economic trends, including slower-than-average agricultural growth.

We accelerate economic growth from the baseline trajectory by increasing TFP in different sectors (for example, agriculture or manufacturing) and regions (for example, rural or peri-urban areas). This does not imply that growth is restricted to these sectors, because there are spillover effects resulting from production and consumption linkages (Haggblade, Hazell, and Dorosh 2007). We therefore refer to these simulations as being "led" by a specific sector, for example, manufacturing-led growth. In order to control for the different size of each sector, we target the same percentage increase in total GDP per capita in all growth scenarios, that is, a 0.2 percentage point increase in the average annual growth rate of total GDP over the five-year simulation period.

Table 12.7 reports the required increases in the GDP growth rates *of the targeted sectors and regions*, that is, the sectors and regions that are leading the growth acceleration. Each entry in the table corresponds to a separate growth scenario. The rows identify the targeted sectors, and the columns are the targeted regions. For example, when the target is all sectors and regions, the total increase in the combined GDP growth rate of these targeted sectors/regions is 0.2 percentage points (over and above baseline growth). When the target is only farm sectors (in all regions), these sectors must grow at a faster rate of more than 0.7 percentage points in order to achieve the same 0.2 percentage point increase in the *national* GDP growth rate. This is because farming accounts for only one-quarter of total GDP in Pakistan (see Table 12.4). The required growth acceleration increases as we move from targeting national- to regional-level sectors and as we move from agriculture to smaller sectors. Again, all scenarios generate the same absolute increase in national GDP over the simulation period, which is important for making comparisons across growth scenarios.

Comparing Farm and Nonfarm Growth

Table 12.8 reports detailed results for the four national-level growth scenarios. The first scenario uniformly increases TFP growth in all sectors in order to achieve the targeted 0.2 percentage point acceleration in the total GDP growth rate (relative to the baseline). As expected, balanced sectoral growth implies similar 0.2 percentage point increases for most economic indicators. This becomes the reference scenario for comparing subsequent uneven sectoral and regional growth scenarios.

In the second and third scenarios in Table 12.8, we increase TFP growth in the farm and the nonfarm sectors. In the farm-led growth scenario, there is a 0.73 percentage point increase in agricultural growth rate with some small spillover or linkage effects to nonagricultural sectors. In the nonfarm-led growth scenario, there is a 0.26 percentage point increase in the industrial and services GDP growth rate, with only small spillover effects for agriculture. The nonfarm sector generates most of Pakistan's exports, so faster nonfarm productivity growth increases exports and causes the real exchange rate to appreciate (fewer foreign currency units are required per rupee). This makes imports more attractive for domestic consumers, particularly for non-poor households whose consumption baskets tend to be more import intensive. In contrast, faster farm productivity growth faces marketing constraints, which cause agricultural prices to fall, thus reducing returns to cropland and livestock assets. Falling food prices benefit both poor and non-poor

TABLE 12.8 Results from national-level scenarios

Indicators	Baseline growth rate (%)	Deviation from baseline growth rate (%-point)			
		All sectors	Farm sectors	Nonfarm sectors	Electricity sector
GDP at market prices	**3.95**	**0.20**	**0.20**	**0.20**	**0.17**
Private consumption	3.58	0.20	0.24	0.18	0.18
Public consumption	5.01	0.20	−0.19	0.33	0.15
Investment demand	3.53	0.19	0.19	0.18	0.13
Exports	5.84	0.22	0.04	0.29	0.51
Imports	4.17	0.20	0.03	0.25	0.45
GDP at factor cost	**3.95**	**0.20**	**0.20**	**0.20**	**0.20**
Agriculture	2.35	0.19	0.73	0.01	0.02
Industry	4.43	0.21	0.05	0.26	0.47
Services	4.50	0.20	0.02	0.26	0.17
Real exchange rate	**−0.02**	**0.00**	**0.19**	**−0.07**	**0.09**
Labor wages	**3.13**	**0.19**	**0.39**	**0.12**	**0.13**
Cropland returns	4.66	0.19	−0.45	0.38	0.30
Livestock returns	5.49	0.22	−0.30	0.38	0.23
Capital returns	3.49	0.20	0.47	0.11	−0.06
Household consumption	**3.58**	**0.20**	**0.24**	**0.18**	**0.18**
Lowest quartile	3.63	0.20	0.22	0.19	0.27
Other quartiles	3.58	0.20	0.24	0.18	0.17

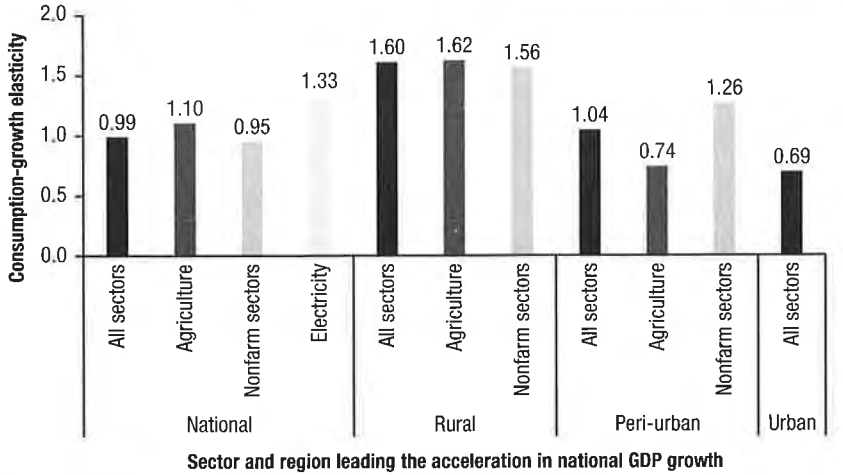
Source: Pakistan CGE model results.

Note: GDP = gross domestic product.

households. Overall, we find that farm-led growth is more effective than nonfarm-led growth at raising household consumption spending, including for poorer households.

Finally, given the crucial role of the electricity sector in economic growth, we simulate the effects of increasing electricity generation in Pakistan. According to the *Pakistan Economic Survey* (GoP 2014), a total of 16,600 megawatts (MW) of new system capacity is planned for the period 2013/2014–2018/2019. This is a large expansion given that total capacity in 2012/2013 was 22,800 MW. Our simulated increase in electricity generation is modest by comparison. Nonetheless, the results indicate that improved electricity production is strongly pro-poor, even though more energy-intensive industry and services benefit more than agriculture. Faster overall economic growth under the electricity generation scenario raises demand for

FIGURE 12.2 The poverty-reducing effects of growth led by different sectors or regions



Source: Pakistan CGE model results.

Note: Consumption-growth elasticity is the ratio of average poor household consumption growth to national GDP growth. GDP = gross domestic product.

agricultural products, leading to higher cropland and livestock returns and hence higher incomes for poorer farm households. Overall, however, it is the impact on nonfarm wages and the lower price of electricity that causes poor household incomes to increase by more than what would be expected given the relatively small increase in private consumption. On average, electricity accounts for just over 7 percent of total consumption spending—a share that is fairly constant throughout the income distribution (PBS 2013b). When electricity supply grows more rapidly, it causes energy prices to fall and labor wages in industry and services to rise. This increases real incomes and consumption, particularly for poorer households. Electricity investments are therefore one means of stimulating growth in the RNFE and reducing poverty.

Comparing Rural and Peri-urban Growth

Finally, we examine the implications of productivity growth by region, that is, urban, peri-urban, and rural. Figure 12.2 reports consumption-growth elasticities for households in the lowest per capita consumption quartile. For example, the 0.99 elasticity for the national all sectors scenario means that a 1 percent increase in total GDP driven by all sectors and regions leads to a

0.99 percent increase in the consumption levels of all households within the lowest consumption quartile. This elasticity is higher for national farm (agriculture)-led growth than for national nonfarm-led growth (that is, 1.10 = 0.22 / 0.20 is greater than 0.95 = 0.19 / 0.20), which is consistent with the finding in Table 12.8 that farm-led growth generates larger consumption gains for poorer households. Overall, however, the elasticity for electricity-led growth is higher than for either farm-led or nonfarm-led growth. This suggests that while agricultural growth is important for reducing poverty in Pakistan, it is not likely to be the most effective means of reducing national poverty. Note, however, that this calculation does not include the costs of achieving accelerated productivity growth, which is likely to vary across sectors and by region.

Table 12.9 reports results for more detailed subsector-led growth scenarios and for specific household groups. Growth driven from within rural areas is far more effective than growth driven from urban or peri-urban areas at raising incomes of poorer households. Crop-led growth in rural areas, for example, has an elasticity of 1.91, which is twice the elasticity of national nonfarm-led growth. Livestock-led growth in rural areas is found to be more effective than crop-led growth in raising the incomes of poorer rural farm households. Not surprisingly, rural farm-led growth in general mainly benefits rural households, particularly rural farm households. However, higher rural farm productivity reduces farm goods prices in national markets, and this reduces incomes for peri-urban farmers. The reverse is true for peri-urban agriculture-led growth, which causes a decline in rural farmers' consumption levels.

Importantly, our results suggest that while agriculture-led growth is more effective at the national level at reducing poverty than comparable nonfarm-led growth, this is not the case within peri-urban areas. In these areas, a 1 percent increase in nonfarm GDP raises poor households' incomes by 1.26 percent, which is well above the 0.74 percent from similar growth led by agriculture. If we consider specific subsectors, we find that in peri-urban areas both manufacturing- and services-led growth is more pro-poor for farm households than either crop- or livestock-led growth. Within rural areas, however, services-led growth has similar and even greater poverty-reducing effects compared to agriculture-led growth. Only faster productivity growth in manufacturing is far more beneficial for rural farm households than is agricultural-led growth, including crop-led growth. This is because farm households benefit from rising nonfarm wages and from increased nonfarm households' demand for farm goods. A similar result is obtained from urban-led growth, albeit with smaller gains for farm households and even losses for nonfarm households in rural and peri-urban areas. Finally, growth

TABLE 12.9 Elasticity between national GDP growth and poor household consumption growth

Sector or region leading the growth acceleration	Households in the lowest per capita consumption quartile					
	All households	Rural households		Peri-urban households		Urban households
		Farm	Nonfarm	Farm	Nonfarm	
All Pakistan	**0.99**	**1.03**	**0.93**	**1.02**	**0.94**	**0.98**
Farm sectors	1.10	−0.82	2.89	−0.18	2.96	2.41
Nonfarm sectors	0.95	1.61	0.29	1.40	0.28	0.51
Electricity sector	1.33	1.34	0.81	1.53	1.25	1.48
Rural areas	**1.60**	**3.11**	**4.54**	**−0.89**	**1.14**	**0.89**
Farm sectors	1.62	3.47	2.90	−2.93	2.97	2.12
Crops	1.91	3.03	3.78	−2.70	3.83	2.58
Livestock	1.25	3.25	2.04	−2.77	2.13	1.74
Nonfarm sectors	1.56	2.58	5.97	1.10	−0.59	−0.26
Manufacturing	2.43	4.84	1.16	3.78	−0.07	0.47
Services	1.64	3.02	6.60	1.25	−0.95	−0.76
Peri-urban areas	**1.04**	**−0.83**	**0.77**	**2.14**	**2.81**	**0.71**
Farm sectors	0.74	−3.88	2.86	2.09	2.94	2.10
Crops	1.16	−3.75	3.60	2.38	3.68	2.53
Livestock	0.41	−3.71	2.19	1.62	2.29	1.79
Nonfarm sectors	1.26	1.39	−0.73	2.09	2.69	−0.26
Manufacturing	2.47	4.68	0.18	4.00	0.68	0.51
Services	1.29	1.65	−0.78	2.29	2.63	−0.65
Urban areas	**0.69**	**1.35**	**−0.52**	**1.09**	**−0.39**	**1.18**

Source: Pakistan CGE model results.

Note: GDP = gross domestic product.

in rural services is more effective at improving consumption levels for poorer nonfarm rural households than for farm rural households. This suggests that there are trade-offs between policies targeting sectors within the RNFE, just as there are trade-offs between targeting rural or peri-urban areas. Overall, our results suggest that policies should prioritize rural areas and that growth in rural manufacturing (agro-processing) is the most effective means of reducing poverty.

Conclusions

In spite of continued urbanization and a rising share of nonagriculture in overall GDP, agricultural growth remains crucial for reducing rural poverty in Pakistan, particularly for the one-quarter of the population living relatively far from major urban centers. Increased crop and (especially) livestock productivity have strong poverty-reducing effects in more remote rural areas. Moreover, productivity growth in the RNFE (for example, agro-processing) is also highly pro-poor, suggesting that greater attention should be given to spurring growth in this subsector. Agricultural productivity growth also reduces poverty in peri-urban areas, but here, the rural nonfarm economy is larger, and poor households in these areas gain more from productivity growth in RNFE sectors than from productivity gains in agriculture.

Greater emphasis on the RNFE in Pakistan's national development strategy can help reverse the negative structural change that Pakistan experienced between 2005/2006 and 2013/2014, where employment grew faster in sectors with low average labor productivity (for example, agriculture and services) than in sectors with higher average labor productivity. Without efforts to stimulate job creation and income opportunities in the RNFE, Pakistan will find it difficult to achieve more rapid economic growth, positive structural change, and overall poverty reduction.

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Annex A

TABLE A12.1 Model structure

Regions	Rural areas; Peri-urban areas; Urban areas
Sectors (by region) and national products	*Agriculture:* Wheat (irrigated); Wheat (nonirrigated); Paddy rice (IRRI); Paddy rice (basmati); Cotton; Sugarcane; Maize; Oilseeds; Other crops; Potatoes; Vegetables; Fruits and nuts; Cattle, sheep, and goats; Raw milk; Poultry; Forestry; Fishing
	Industry: Crude oil; Natural gas; Coal; Other mining; Meat processing; Dairy processing; Vegetables and oils; Wheat milling; Rice husking and milling (IRRI); Rice husking and milling (basmati); Sugar refining; Other foods, beverages, and tobacco; Cotton ginning; Spinning of fibers; Cotton weaving; Knitted textiles; Clothing; Other textiles; Leather and footwear; Wood products; Petroleum products; Fertilizers and pesticides; Other chemicals; Cement; Nonmetal products; Basic metals; Metal products; Appliances; Machinery; Vehicles; Other manufacturing; Electricity generation; Electricity distribution; Construction
	Services: Wholesale and retail trade; Hotels and restaurants; Transport and storage; Communications; Financial services; Business services; Real estate; Own dwellings; Public administration; Education; Health; Domestic services; Other services
Factors	*Labor (all by region):* Small-scale workers on own or rented farms; Medium and large-scale workers on own or rented farmers; Farm wage workers; Low-skilled nonfarm workers; Skilled nonfarm workers
	Cropland (all by region): Small-scale farm land (<12.5 acres); Medium-scale farmland (12.5–50.0 acres); Large-scale farmland (>50.0 acres)
	Capital: Livestock (by region); Agricultural capital (by region); Nonagricultural capital (formal sector); Nonagricultural capital (informal sector)
Households	*Farm households (by rural and peri-urban areas):* Small-scale farmers (quartile 1); Small-scale farmers (quartiles 2–4); Medium- and large-scale farmers (quartile 1); Medium- and large-scale farmers (quartiles 2–4); Non-landowning farmers (quartile 1); Non-landowning farmers (quartiles 2–4); Farm wage laborers (quartile 1); Farm wage laborers (quartiles 2–4)
	Nonfarm households (by rural and peri-urban areas): Rural nonfarm (quartile 1); Rural nonfarm (quartile 2); Rural nonfarm (quartile 3); Rural nonfarm (quartile 4)
	Combined farm and nonfarm households: Urban (quartile 1); Urban (quartile 2); Urban (quartile 3); Urban (quartile 4)

Source: 2010/2011 Pakistan Social Accounting Matrix (IFPRI 2016).

Note: Economic sectors in the model are disaggregated across regions, but they supply national product markets. As such, there are three regional activities that produce the same product.