



CHAPTER

3



# INCREASING PRODUCTIVITY FOR REVIVING ECONOMIC GROWTH AND SUPPORTING SUSTAINABLE DEVELOPMENT

Spectacular economic growth has been witnessed in the Asia-Pacific region over the last few decades. In most economies in the region, this growth has been driven primarily by factor accumulation, that is, by increases in the size of the labour force and by increases in the capital stock through investment, including from abroad. At the same time, significant increases in productivity, particularly in labour productivity, have also taken place throughout the region. However, the slowdown in economic growth that has been observed since 2010 has increased the difficulties faced by Asia-Pacific economies in terms of dealing with their numerous development challenges.

### *Rates of economic growth and productivity growth have slowed in the region*

The high levels of economic and productivity growth in previous decades have enabled the region to make significant advances in development, including attainment of the first target under Millennium Development Goal 1 to “halve, between 1990 and 2015, the proportion of people whose income is less than \$1 a day”.<sup>1</sup> This accomplishment has put the region in a well-placed position potentially to end poverty in all its forms everywhere, thereby also meeting the first goal of the 2030 Agenda for Sustainable Development. However, economic growth has slowed considerably in recent years, reaching only 4.6% in 2015 in the developing economies in the region, less than half of the rate of 9.4% that had been the average in the pre-crisis period of 2005-2007. This slowdown in rates of economic growth has also been accompanied by a slowdown in rates of productivity growth. Indeed, almost a fifth of the economic slowdown can be attributed to the deceleration in total factor productivity growth that took place during the period 2008-2013.

The declines in economic growth and productivity growth are worrying as both play a vital part in the development process. Indeed, the region’s experience over recent years has shown that, while economic growth is not sufficient for development to be sustainable, it is clearly a necessary component for that to take place. If economic growth is not addressed, the slowdown will make it more difficult for the region to deal with its unfinished development agenda, which includes: (a) lifting 639 million people, equivalent to more than half of the global total of extremely poor people, out of poverty; and (b) tackling remaining challenges in the areas of health, education, gender equality, decent employment and access to safe sanitation and drinking water, by, for instance, enrolling

17.3 million children in primary school, ensuring that 70 million children are no longer underweight and providing a staggering 1.5 billion people with access to safe sanitation (ESCAP, 2015c).

In addition to the observed decline in productivity growth, it is also apparent that higher levels of productivity have not been translated into commensurate increases in real wages. Indeed, labour’s share of output has declined in recent years for the region as a whole, and this situation has contributed to rising levels of inequality – of incomes and opportunities – that had taken place in the region since the 1990s, and has suppressed aggregate demand. Moreover, in many economies in the region, rising levels of debt have been supporting aggregate demand. Clearly, economic growth supported by sustained increases in real wages would be better than accumulation of private debt, as the latter tends to aggravate inequalities and often leads to severe economic instability with attendant consequences.

### *Domestic and regional factors should play a larger role in driving growth in the region*

To make growth more sustainable and inclusive, the region should shift to a development model in which domestic and regional factors play a larger role in driving growth. Indeed, with the global financial and economic crisis of 2008 highlighting the Asia-Pacific region’s vulnerability to external shocks due to its excessive reliance on exports, policymakers should view the overhang of the crisis as an opportune impetus for making a catalytic shift to such a development model – one that is intrinsically more stable and more sustainable.

Strengthening productivity is a critical element to this catalytic shift and to making growth more resilient and sustainable. While large pools of surplus labour have been absorbed in many economies, higher productivity growth is vital in fostering domestic demand, especially in those economies where the size of the labour force is forecast to stagnate due to population dynamics. Moreover, to foster domestic demand, countries will also need to pass on productivity gains to workers and strengthen investment in human resources to further improve productivity and competitiveness (ILO, 2015d).

Strengthening productivity and reversing the decline of labour’s share in income is particularly important in view of the 2030 Agenda for Sustainable Development, which was adopted by the international community in September 2015.<sup>2</sup> The 2030 Agenda covers 17

Sustainable Development Goals and provides a framework for the formulation of future development policies. For instance, higher standards of living and greater levels of productivity (and wages) will enable countries to: “end poverty in all its forms everywhere” (Goal 1); “end hunger, achieve food security and improved nutrition and promote sustainable agriculture” (Goal 2); and “reduce inequality within and among countries” (Goal 10). In particular, a crucial component for strengthening domestic demand will be fostering productivity growth in agriculture and strengthening rural industrialization in view of the fact that more than half the region’s population still lives in rural areas. Indeed, evidence from the region suggests that countries that have developed successfully have done so on the back of rapid industrialization rather than leapfrogging from agriculture to service-based economic structures.

The 2030 Agenda can play a pivotal role by guiding and facilitating the shift to such a development model, as investing in the Sustainable Development Goals will also foster productivity growth, creating a virtuous cycle between sustainable development and productivity. For instance, social policies that contribute to expanding investment in health and education to reach Goal 3 (“ensure healthy lives and promote well-being for all at all ages”) and Goal 4 (“ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”) will strengthen productivity by improving skills in the labour force (see figure 3.1). Similarly, economic and sectoral policies may strengthen productivity if they “ensure access to affordable, reliable, sustainable and modern energy”

(Goal 7) and “build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation” (Goal 9).<sup>3</sup>

In view of the prevailing development challenges facing the Asia-Pacific region, member States therefore need to embrace fully the Sustainable Development Goals.

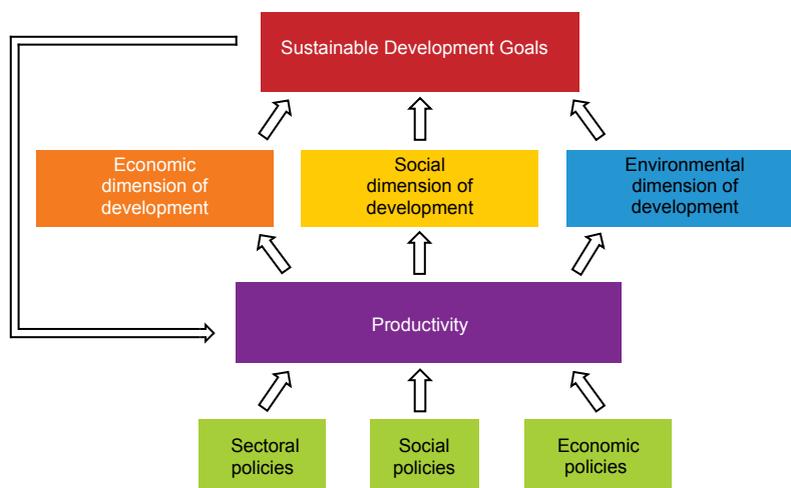
In section 1 of this chapter, an analysis is presented of trends in productivity in the Asia-Pacific region since the 1990s, differentiating between labour productivity and total factor productivity. Also presented in that section is a growth accounting analysis for selected Asia-Pacific economies. Section 2 contains a discussion of determinants of productivity that have been identified in the literature. In section 3, the link between productivity and the Sustainable Development Goals is drawn and their linkages in the region are analysed quantitatively. Section 4 contains a discussion of policies that are likely to increase productivity for sustainable development and analyses of the link between labour productivity and wages. Section 5 concludes.

### 1. ANALYSIS OF TRENDS IN PRODUCTIVITY IN THE ASIA-PACIFIC REGION

Growth in output (economic growth) typically results from the accumulation of factor inputs (usually capital and labour) in the production process, for instance by using more capital or by employing more people. Indeed, in the Asia-Pacific region, economic growth has been driven largely by factor accumulation.<sup>4</sup> Economic growth can also take place when firms are able to

Figure 3.1

Framework linking productivity to the Sustainable Development Goals



increase levels of output by using existing inputs more efficiently and effectively. This step is accomplished when firms increase *productivity*. Productivity can be assessed in terms of *levels* and in terms of *growth*. It can also be analysed at different levels, for instance across firms or across sectors, or across a country as a whole.

A country that has a higher *level of productivity* than another one is able to produce more with the same amount of inputs and is thus comparatively more competitive. In contrast, countries with higher *productivity growth* experience larger relative increases in their output than those with lower productivity growth rates. With this being said, however, across sectors industrial/manufacturing productivity tends to grow faster than agricultural productivity due to a variety of factors, including technological change, economies of agglomeration and economies of scale.<sup>5</sup> Moreover, as the share of the manufacturing sector in GDP increases, so does aggregate productivity growth, as labour moves from a relatively low productivity sector, such as agriculture, to a higher productivity sector, such as manufacturing (Junankar, 2014).

*In most economies in the region, output growth has been driven by capital and total factor productivity*

In studying the composition of economic growth in recent years for selected Asia-Pacific economies, one can see that the contribution of different factors of production to growth varies across countries due to differences in inputs, such as labour and capital and total factor productivity (TFP). In general, accumulation of physical capital and TFP are the main drivers of total output growth in most economies in the region, whereas the contribution of labour plays a less important role (see table 3.1). However, no attempt is made in this chapter to analyse the productivity of capital. For one, data are lacking on capital stock by activity and on the utilization rate of capital. Thus, unlike employment data, capital stock data are not widely available at the industry level, which limits the possibility of performing detailed cross-sectoral analyses. Furthermore, capital productivity is likely to be affected by the usage rate of capital inputs at the firm level, particularly during periods of economic slowdown. Again, data on the utilization rate of capital

**Table  
3.1**

**Percentage contribution of input factors and total factor productivity to output growth in selected Asia-Pacific economies in various periods – growth accounting**

Countries	1990s			2000s			1990-2011		
	Physical capital	Labour force	TFP	Physical capital	Labour force	TFP	Physical capital	Labour force	TFP
Armenia	-2.7	-34.6	137.3	25.8	0.2	73.9	13.6	-14.7	101.1
Australia	49.4	-18.4	68.9	64.5	56.7	-21.2	58.0	24.6	17.4
China	45.0	8.2	46.7	63.4	4.6	32.0	55.6	6.1	38.3
Fiji	9.4	34.4	56.2	14.4	13.7	72.0	11.9	24.0	64.1
India	59.1	14.0	27.0	48.5	16.2	35.3	53.0	15.2	31.8
Indonesia	82.9	17.0	0.1	57.5	15.2	27.4	68.3	15.9	15.7
Iran (Islamic Republic of)	21.4	30.3	48.3	55.9	30.3	13.8	38.7	30.3	31.0
Japan	75.8	20.5	3.7	14.3	5.8	79.9	45.0	13.1	41.8
Kazakhstan	-23.4	-15.6	138.9	42.1	14.4	43.5	14.0	1.5	84.4
Kyrgyzstan	-4.1	17.9	86.2	21.3	21.8	56.9	8.6	19.8	71.6
Malaysia	48.3	19.5	32.2	50.8	22.0	27.2	49.7	21.0	29.3
Mongolia	15.4	1.4	83.3	23.3	21.4	55.3	19.9	12.8	67.3
New Zealand	37.5	32.2	30.3	64.9	35.0	0.1	51.2	33.6	15.2
Philippines	30.4	38.2	31.4	68.1	27.8	4.1	52.0	32.3	15.8
Republic of Korea	50.9	20.8	28.3	60.1	19.6	20.3	55.5	20.2	24.3
Russian Federation	-2.0	3.2	98.8	4.7	7.6	87.7	1.3	5.4	93.3
Singapore	59.3	21.2	19.4	40.1	9.9	50.0	49.7	15.6	34.7
Sri Lanka	21.4	25.6	53.0	22.2	28.8	48.9	21.9	27.4	50.7
Tajikistan	-12.3	3.6	108.7	-16.3	2.9	113.4	-14.6	3.2	111.4
Thailand	45.2	3.0	51.7	38.5	24.4	37.1	41.9	13.7	44.4
Turkey	75.8	17.5	6.7	69.7	13.2	17.0	72.3	15.1	12.6

Sources: ESCAP calculations, based on Penn world table 8.1. See Robert C. Feenstra, Robert Inklaar and Marcel P. Timmer, "The next generation of the Penn world table", *American Economic Review*, vol. 105, No. 10, pp. 3150-3182.

inputs are not widely available. Thus, this chapter is focused on variables which are regularly analysed at the macroeconomic level, such as total factor productivity, or variables which enable cross-sectoral analyses, such as labour productivity.

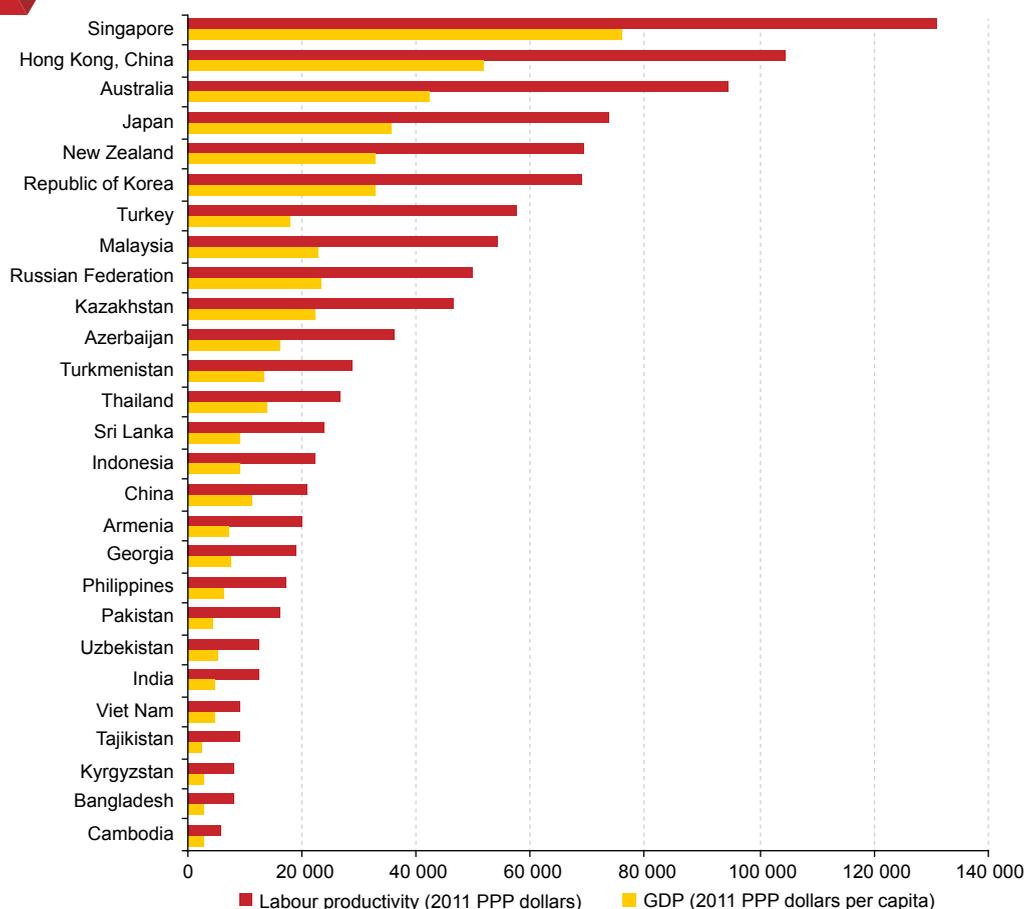
Notably, in resource-rich countries, such as the North and Central Asian economies, the contribution of TFP in total output growth is more dominant. One reason may be due to the fact that extracting natural resources is a relatively more technologically intensive process than that of other economic activities. Yet, additional factors, such as the transition from a centrally planned economy, are also likely to have played a large role.<sup>6</sup> In general, the role of TFP in output growth can be explained by technological absorption (Park, 2010). However, due to measurement issues, as TFP is determined as a residual, the concept of TFP technically also encompasses a whole array of other factors that are not directly related to productivity.

### 1.1. Labour productivity

Productivity is measured relative to an input. Thus, *labour productivity* refers to the amount of output that is produced relative to the amount of labour that is used. It has been argued that “[improving] a country’s ability to [raise]... its standard of living over time depends almost entirely on its ability to raise its output per worker” (Krugman, 1992). One simple way to measure labour productivity is by calculating the ratio of output (GDP) per employed worker.<sup>7</sup> As shown in figure 3.2, labour productivity can differ significantly from GDP per person due to differences in the size of the labour force relative to that of the total population.<sup>8</sup> Correspondingly, in some economies in the region there are large differences between labour productivity and output per person: in Tajikistan, labour productivity is 4.6 times greater than GDP per capita; in several countries, including in Cambodia, Kyrgyzstan, Pakistan, Uzbekistan and

Figure 3.2

Labour productivity and output per person in selected economies, 2013



Source: ESCAP calculations, based on data from the ESCAP Statistical Database.

Note: Labour productivity and GDP per capita are measured at constant 2011 PPP prices.

Viet Nam, labour productivity is more than three times greater than GDP per capita.

*Growth in labour productivity is declining in the region*

In recent years, growth in labour productivity has declined in the Asia-Pacific region. In looking at long-term trends, labour productivity growth in developing Asia-Pacific economies was the highest among developing regions of the world, at least since the 1990s, and exceeded that of developed economies by a significant margin (see figure 3.3). Indeed, due to this high growth in labour productivity, the gap in the level of productivity with developed economies has been roughly halved, with the labour productivity of developed economies being about 12 times higher in 2013 compared with 24 times higher in 1990. Yet, since the 2008 financial and economic crisis, growth in labour productivity has started to decline in the region. Moreover, with growth, labour productivity has in fact accelerated in developed economies since 2010; the margin between the two has declined significantly.

This slowdown in the growth of labour productivity may be linked to the procyclical behaviour of productivity (Hultgren, 1960), also referred to as *short-run increasing returns to labour*. However, as total factor productivity continued to grow during the past several years, the procyclicality of productivity cannot be explained by the real business cycle approach, in which TFP is considered as the key explanatory factor in business fluctuations.<sup>9</sup> The ongoing slowdown in labour productivity in the Asia-Pacific region could be explained mainly by labour hoarding (Bernanke

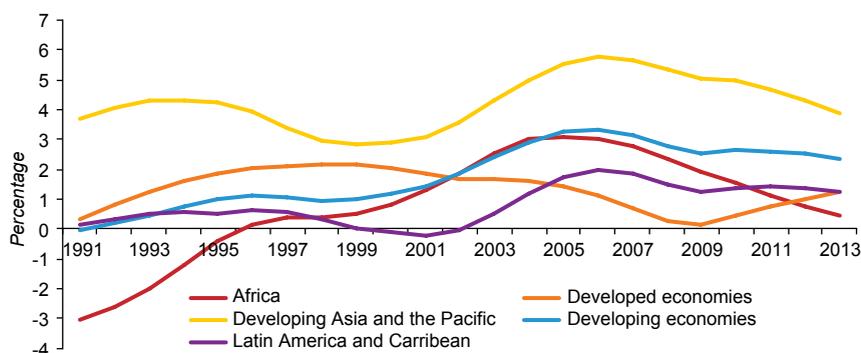
and Parkinson, 1991). This is because, during the period 2007-2013, the unemployment rate in several economies in the region remained mostly stable in comparison with the significant increases recorded in developed economies. This situation may be due to costly hiring and firing, but may also stem from the fact that reducing the number of workers may require organizational change. Price rigidity could also trigger the procyclical behaviour of productivity because, during a phase of low demand, marginal costs of firms which incorporate fixed costs and wages, could exceed the prices set before the realization of the demand, particularly if firms hoard labour (Rotemberg and Summers, 1988).

Rising/declining labour productivity does not, however, necessarily mean that a rising/declining contribution is being made by the existing workforce in a particular sector. For one, changes in aggregate labour productivity can arise from a sectoral shift away from low productivity sectors to high productivity sectors. Labour productivity can increase because of a rise in organizational efficiency, upgraded technology or simply a rise in capital accumulation. In the Indian context, for instance, capital accumulation, particularly in the manufacturing sector, has been a significant phenomenon that has contributed to rapid growth in labour productivity (Kato and Mitra, 2008).

Therefore, rapid growth in labour productivity must not be seen necessarily as a positive indicator of development. Rather, the limitations associated with such growth need to be kept in view. For instance, some of the technology that is imported from developed countries may offer only meagre possibilities for labour absorption as some technology may suit only the

Figure 3.3

Trend in labour productivity growth by region



Sources: ESCAP calculations, based on data from the ESCAP Statistical Database and the World Development Indicators database of the World Bank.

Note: The trend in labour productivity growth is a result of using the Hodrick-Prescott filter. Labour productivity is computed as the ratio of GDP, measured at 2005 constant prices in United States dollar terms, by the number of workers.

labour market situations of labour-scarce, high-income countries. With such technology, low levels of labour demand would translate into sluggish employment growth. Thus, the skill bias of modern technology and/or rapid capital accumulation can reduce the pace of absorption of unskilled labour. This could contribute to stretches of low productivity activities, particularly in the informal sector, by compromising the residual absorption of labour. In fact, it seems that in the Asia-Pacific region, relocation of labour into sectors with higher productivity has been less of a driver of growth in labour productivity than has actual growth in labour productivity *within* sectors.

*Growth in labour productivity within sectors has been more important in the region than reallocation of labour into sectors with higher productivity*

In agriculture, for instance, the value of production increased from \$276 billion to \$1,185 billion in aggregate terms between 1961 and 2013 in a sample of 23 countries in the region.<sup>10</sup> At the same time, agriculture’s share in GDP declined much faster than the corresponding decline of agriculture in total employment. Specifically, agricultural value added in GDP declined by more than 50% from 19.1% for the developing countries in the region as a whole in 1990 to 9.9% in 2013, while the share of agriculture in total employment declined by about 20 percentage points to 36% of the labour force.

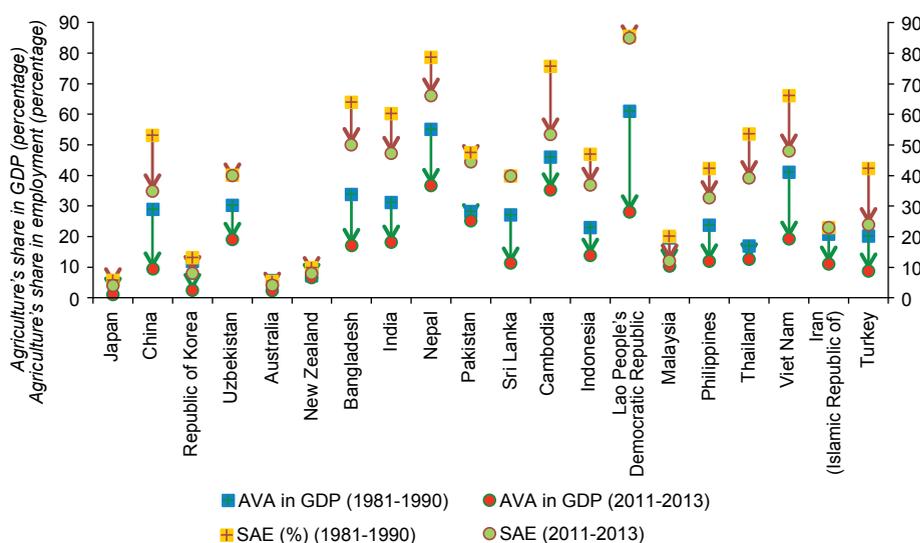
*Many countries have not been successful in integrating “surplus labour” from agriculture into the rest of the economy*

With the relative decline of agricultural value added in GDP and the share of agriculture in total employment differing across countries in the region (see figure 3.4), large gaps between the two generally indicate relatively faster growth of a national economy without a corresponding ability to absorb the expanding labour force. This declining contribution of agriculture in GDP is a major concern among policymakers, especially considering that 55% of people in the region lived in rural areas in 2014. Indeed, it could be suggested that a large number of countries in Asia and the Pacific have been unsuccessful in integrating “surplus labour” into the rest of the economy (Timmer, 2007).

To see these aspects in a better light, one can examine the *agricultural productivity gap*, which can be used as a proxy for labour misallocation across sectors.<sup>11</sup> Specifically, a gap that is close to one, as is the case only in Australia, New Zealand and Malaysia in the region (see figure 3.5), suggests that workers in the agricultural and other sectors are paid the value of their marginal product and that firms hire up to the point where the marginal value product of labour equals the wage. In contrast, labour appears to be particularly misallocated in China, Bangladesh, India, the Lao People’s Democratic Republic and Sri Lanka (where the gap is larger than one); however,

Figure 3.4

Share of agriculture in GDP and employment

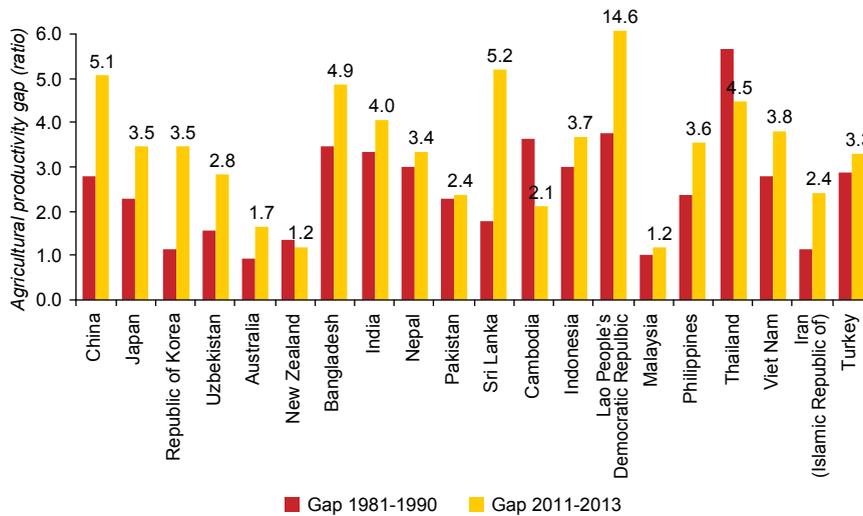


Sources: ESCAP analysis, based on data from the World Development Indicators database.

Note: AVA = agricultural value added in GDP; and SAE = share of agriculture in total employment. Arrows in the figure indicate the direction and magnitude of change. Decadal averages were used in the graph to minimize a potential bias that may arise due to the selection of an inappropriate year for a particular year. Even this approach may have introduced some biases. For example, Uzbekistan has a limited number of observations for the earlier years, and Tajikistan was dropped because of the unavailability of data on earlier years.

**Figure 3.5**

**Agricultural productivity gap**



Sources: ESCAP analysis, based on data from the World Development Indicators database.

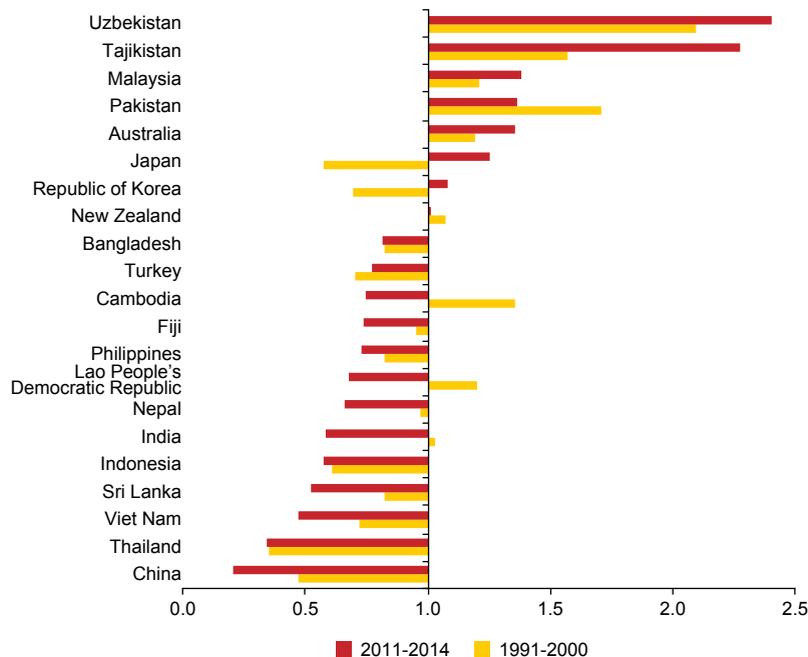
the degree of misallocation has in fact increased since the 1980s in most economies. Thus, where the gap is larger than one, aggregate output would increase even without increasing the amount of inputs employed in production if workers were reallocated out of agriculture – where the value of their marginal product is low – into other activities.

with GDP per capita also shows that agricultural value added per worker is below that of GDP per capita across a large number of countries; that ratio has declined significantly over the years in a large number of countries in the region. Figure 3.6 shows the ratio between the real values of agricultural value added per worker and per capita GDP for the periods 1991-2000 and 2011-2014.<sup>12</sup> It can be observed that values for agricultural value added per worker are below that of per capita GDP in many economies. Of

The relative position of agricultural incomes, measured by agricultural value added per worker, in comparison

**Figure 3.6**

**Ratio between agricultural value added per worker and per capita GDP**



Sources: ESCAP analysis based on data from the World Development Indicators database.

the 23 countries surveyed, China had the lowest ratio between the two shares; that economy was followed by Thailand, Viet Nam, Sri Lanka and Indonesia in that order. In a number of countries, the gap has widened recently, meaning that agricultural workers have become relatively poorer. For example, in the case of China, agricultural value added per worker in the period 1991-2000 was \$382 when per capita GDP was \$813 (ratio of 0.47), but in the period 2011-2014, the values, respectively, were \$721 and \$3,503 (ratio of 0.21).

In this context, increasing labour productivity in agriculture is therefore important to increase incomes in the rural sector. For one, agriculture, although generally viewed as having little impact on industrialization and the larger economy, provides the basis for many other activities, including manufacturing. For instance, in several economies, including Indonesia, Pakistan, the Philippines and Viet Nam, *food, beverages and tobacco* contribute between 20% and 30% of total value added in manufacturing. In Nepal, the contribution is more than a third of total value added in manufacturing, and in Fiji, it reaches almost half (Wickramasinghe, 2016). In addition, as poverty rates in the rural sector are significantly higher than in urban sectors in many countries, accelerating productivity gains in the rural sector may have a larger impact on poverty reduction.

Unlike agriculture, industry's contribution to value added in GDP has remained almost constant in the Asia-Pacific region since the 1990s, decreasing only somewhat from 39% in 1990 to 37.1% in 2013.<sup>13</sup> In developed economies in the region, its share declined from 37.1% of GDP in 1990 to 26.6% in 2013. However, in contrast to agriculture, the share of employment in industry has expanded by more

than a fifth in developing economies of the region since 1990 and now accounts for one in four workers (26.2%) (ESCAP, 2015b). In developed economies, the share of employment in industry declined by a quarter and now accounts for 24.3% of the labour force. While on a per worker basis, this share implies that productivity in industry has declined relative to other sectors in developing economies, it remains above that of other sectors (see figure 3.7). Moreover, the gap between productivity in industry to services has declined, and notably the gap to productivity in agriculture remains significant.

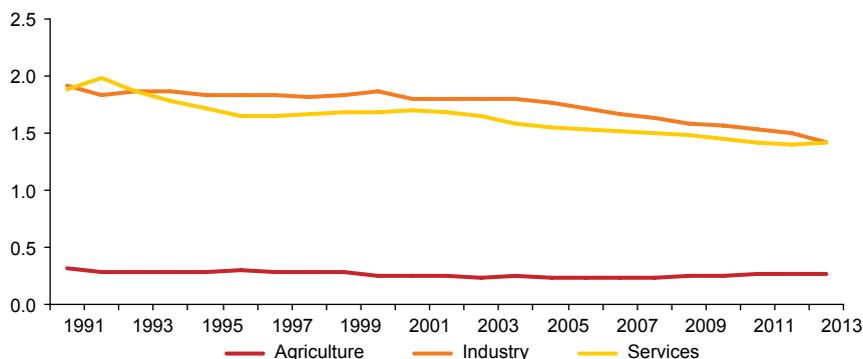
Value-added growth of GDP or any specific sector can be decomposed in terms of labour productivity growth and employment growth. In this regard, if labour productivity grows rapidly due to capital accumulation, the contribution to value-added generation by new additions to employment can be sluggish. Indeed, this phenomenon has been a striking feature of the organized (or formal) manufacturing sector in India (Mitra, 2013), where the correlation between productivity growth and employment growth is not negative but positive, albeit negligible.<sup>14</sup>

*Developing economies in the region are deindustrializing too early*

Many countries in the region are shifting from an agriculture-based economy to one in which services play a dominant role, a situation which has already occurred in other parts of the globe. For instance, India has evolved from being a largely agrarian economy to a service-led economy, leapfrogging the manufacturing stage in its economic transition and seeing the share of industry in value-added output in India peaking at 29.2% in 2007. Since then, that

Figure 3.7

Relative productivity across sectors in developing Asia-Pacific economies



Sources: ESCAP calculations.

Note: The graph shows the evolution of the ratio of value added in GDP per sector relative to the proportion of workers that are employed in that sector. A value less/greater than one implies that the proportion of workers working in that sector is greater/less than the proportion of value added in GDP that that sector accounts for.

share declined to 24.8% in 2013, a level that is below that of developed economies in the region (26.4% in 2013). Accompanying deindustrialization in India, the contribution of services to value-added output reached 57% in 2013, a level that developed economies in the region had breached only in 1980. This shift to services is coming at too early a level of development in many countries. Thus, GDP per person in India in 2013 was less than a fifth of that in developed economies in 1980.<sup>15</sup> With lower levels of GDP per person, demand for services will be significantly lower.

Indeed, the share of services in value added has increased by a quarter in ESCAP developing economies since the 1990s, accounting for more than 53.1% of total value added in 2013. This increase has been accompanied by a significant increase in the share of employment in services, which rose by 60% between 1990 and 2013 (reaching 37.6% of employment), compared with an increase from 20% to 71.9% of employment in developed economies. In terms of economic structure, developing economies in the region have deindustrialized and become more oriented towards services far earlier in the development process, that is, at far lower levels of income per capita than had been the case for developed economies.<sup>16</sup>

The early shift to a service-oriented economy that many countries in the region are experiencing may not be conducive for fostering development. One reason could be that services are not as tradable as manufactured goods; moreover, services do not usually exhibit the same technological dynamism, which therefore makes them a poor substitute for export-oriented industrialization (Rodrik, 2015). Moreover, it should be pointed out that, in general countries that have developed successfully, including, for instance, the Republic of Korea, have done so on the back of rapid industrialization.

The decomposition of aggregate labour productivity growth shows that in many Asia-Pacific economies, the contribution of the service sector to labour productivity growth is the most important one.<sup>17</sup> Moreover, while the agricultural sector contributed less to this growth (see table 3.2), the contribution of industry exceeded that of services only in Azerbaijan and China. Also, in terms of impact upon labour productivity, the reallocation of labour to higher productivity activities *within* sectors, as opposed to higher productivity activities *between* sectors, was more dominant in most countries, with the exceptions being Nepal and Thailand. Given the small contribution of agriculture to productivity growth

and the large proportion of the labour force that is still engaged in this sector, it is thus imperative to strengthen the role of agriculture in the economy.

## 1.2. Total factor productivity

*Total factor productivity* accounts for effects in total output that are not caused by traditionally measured inputs of labour and capital. Therefore, TFP cannot be measured directly. Rather, several methodologies have been devised to measure TFP, including *growth accounting, regression-based analysis and stochastic frontier approaches*.<sup>18</sup> Behind these methodologies lies the assumption that factors other than pure increases in factor inputs, namely labour and capital, drive increases in output. These factors may also include overall technological change, which makes it possible to produce more output with a given amount of inputs.

*Total factor productivity has grown faster in the region than in other regions, yet this growth is slowing*

Starting from a low base, developing countries in Asia and the Pacific grew rapidly in their initial stages of development as they were able to accumulate significant factor inputs by drawing upon large amounts of available labour in the rural sector, thus benefiting from high growth in savings and investment. From 1990 to 2014, total factor productivity in 18 developing Asia-Pacific economies, accounting for 84% of the developing region's population and 93% of its GDP, grew at an average annual rate of 1.74%. Indeed, as in the case of labour productivity, TFP growth rates in the Asia-Pacific region have generally been significantly above the ones recorded in other regions of the world that experienced TFP growth at an average of less than 0.6% (see table 3.3).

This higher TFP growth has played an important role in explaining the growth performance of the region. For instance, without significant growth in TFP, continuous economic growth in China would not have been possible (Zhu, 2012), as the growth of TFP accounted for about 40% of GDP growth, with the growth rate of TFP being more than half the growth in output per worker (Perkins and Rawski, 2008).

Nevertheless, as in other regions of the world, excluding Africa, TFP growth has declined in the aftermath of the 2008 financial and economic crisis, from 2.79% per year for developing countries in the Asia-Pacific region during the period 2000-2007 to 0.96% for the period 2008-2014 (see table 3.3). Indeed, TFP growth increased only in Mongolia and Sri Lanka, which are

Table  
3.2

**Decomposition of aggregate labour productivity growth in selected Asia-Pacific economies between 1990s and 2000s (latest year)**

(Percentage)

Countries	Within-sector effect	Reallocation-level effect	Reallocation growth effect	Agriculture	Industry	Services
Australia	105.24	-0.22	-5.02	2.52	15.94	81.54
Azerbaijan	179.67	-13.03	-66.64	1.09	86.37	12.55
Bangladesh	54.82	44.71	0.47	14.04	32.98	52.98
China	66.74	6.66	26.59	4.51	52.25	43.24
Georgia	101.46	-0.18	-1.28	1.14	33.06	65.80
India	75.28	11.66	13.06	5.64	27.50	66.86
Indonesia	53.75	36.76	9.49	4.61	42.66	52.74
Japan	93.28	17.21	-10.50	-1.84	1.42	100.42
Kyrgyzstan	-103.38	-19.08	222.46	-6.68	-110.72	17.40
Malaysia	89.79	2.93	7.28	-3.31	29.79	73.53
Mongolia	96.91	0.54	2.55	-12.67	41.45	71.22
Nepal	48.23	168.33	-116.56	1.17	27.06	71.77
New Zealand	96.15	7.42	-3.57	-2.67	-6.47	109.15
Pakistan	77.88	19.18	2.94	9.86	36.09	54.05
Philippines	64.61	31.02	4.37	0.76	24.90	74.34
Republic of Korea	147.93	16.28	-64.21	0.19	44.64	55.17
Russian Federation	102.10	70.47	-72.57	0.29	-129.85	229.56
Singapore	115.02	0.30	-15.32	-0.11	30.35	69.76
Sri Lanka	85.09	8.38	6.53	3.87	32.83	63.29
Thailand	38.79	52.76	8.45	4.10	42.97	52.93
Turkey	61.18	31.98	6.85	2.39	28.59	69.02

Sources: ESCAP analyses based on data from the ESCAP Statistics Division.

Note: Decomposition of aggregate labour productivity growth is based on the traditional decomposition formula (TRAD method). Output is valued at constant prices, 2005, at the production price. Labour productivity is measured as the ratio of GDP at production prices, 2005 constant prices, and the total number of employed persons. *Within-sector effect* measures the contribution to aggregate productivity growth due solely to productivity increases experienced within individual sectors. *Reallocation level effect* measures the contribution to productivity growth due to labour movements from sectors with below-average productivity levels to sectors with above-average labour productivity levels, the sector labour productivity level being constant. *Reallocation growth effect* measures the contribution to labour productivity growth due to labour movements towards sectors with positive labour productivity growth (or away from sectors with negative labour productivity growth).

Table  
3.3

**Average annual growth in total factor productivity across regions**

(Percentage)

Regions	1990s	2000s	2000-2007	2008-2014	1990-2014
Developing Asia-Pacific economies	1.42	1.93	2.79	0.96	1.74
Africa	-0.28	0.85	0.28	1.49	0.42
Latin America	0.02	0.07	0.38	-0.29	0.05
Developed economies	0.37	0.32	0.68	-0.09	0.34
Developing economies	1.16	1.64	2.32	0.86	1.46

Sources: ESCAP calculations and estimates for the period 2012-2014, based on Penn world table 8.1. See Robert C. Feenstra, Robert Inklaar and Marcel P. Timmer, "The next generation of the Penn world table", *American Economic Review*, vol. 105, No. 10, pp. 3150-3182.

likely to have benefited, respectively, from a boom in commodities and from post-conflict recovery (see table 3.4).

The slowdown in TFP growth can also be explained by labour hoarding and its impact on the efficiency

of firms. In fact, as TFP is determined by a residual, representing both technological change and technical efficiency, the actual low demand phase combined with the potential existence of labour hoarding contributed to the reduction of overall efficiency of firms at the microeconomic level and of economies in general

**Table  
3.4**

**Total factor productivity growth per annum in selected Asia-Pacific economies**

(Average growth rate in percentage)

Countries	1990s	2000s	2000-2007	2008-2014	1990-2014
Armenia	-1.47	5.78	11.39	-1.71	2.74
Australia	1.73	-0.31	0.12	-0.88	0.46
China	4.45	2.55	3.55	1.21	3.16
Fiji	-0.38	0.03	1.16	-1.48	-0.24
India	-1.34	1.32	1.56	1.01	0.43
Indonesia	-1.34	1.16	1.22	1.07	0.20
Iran (Islamic Republic of)	0.64	-1.04	1.00	-3.76	-0.41
Japan	-1.13	0.36	0.78	-0.20	-0.25
Kazakhstan	-5.45	4.50	7.44	0.58	0.42
Kyrgyzstan	-5.50	2.09	2.62	1.38	-0.85
Malaysia	-0.41	1.03	1.81	-0.01	0.52
Mongolia	-2.17	3.77	3.77	3.78	1.34
New Zealand	0.84	-0.87	-0.42	-1.46	-0.21
Philippines	-1.00	1.23	1.32	1.11	0.41
Republic of Korea	0.46	0.65	0.96	0.25	0.57
Russian Federation	-5.52	3.81	6.28	0.51	0.01
Singapore	0.18	0.50	2.19	-1.75	0.22
Sri Lanka	2.08	2.53	1.87	3.42	2.41
Tajikistan	-8.54	10.24	9.82	10.80	3.53
Thailand	-0.69	1.30	2.35	-0.12	0.39
Turkey	-1.39	0.16	2.03	-2.34	-0.66
<b>Weighted average</b>	<b>1.29</b>	<b>1.85</b>	<b>2.69</b>	<b>0.89</b>	<b>1.64</b>
<b>...for developing ESCAP economies</b>	<b>1.42</b>	<b>1.93</b>	<b>2.79</b>	<b>0.96</b>	<b>1.74</b>

Sources: ESCAP calculations, based on Penn world table 8.1. See Robert C. Feenstra, Robert Inklaar and Marcel P. Timmer, "The next generation of the Penn world table", *American Economic Review*, vol. 105, No. 10, pp. 3150-3182.

at the macroeconomic level. Moreover, as countries in the region approach technological frontiers, the catch-up advantage will be smaller; more reliance will therefore have to be placed on ingenious innovations for TFP and economic growth.

*There is considerable room to foster total factor productivity growth in the region*

Also, in several economies, consumption patterns are in the process of transitioning from consuming more physical products to utilizing more services, which means that the share of the service sector in GDP will increase continually. Since productivity in the service sector is usually lower than that in the industrial sector, transformation towards a service-oriented economic structure may, however, increase downward pressure on TFP growth in the future. Nonetheless, there is still considerable room to foster TFP growth in the region. In many economies, the *level of TFP* is still far behind that of developed economies, which indicates that there are ample opportunities for catch-up effects.

Indeed, in agriculture for instance, the contribution of TFP growth to output growth has been increasing significantly in most countries in the region. Real agricultural output growth can come from several sources, including area expansion (extensification), intensive use of inputs (inputs/area) (intensification) and efficiency improvements that result from better use of existing resources (measured by total factor productivity). Thus, while the land area devoted to agriculture has declined in several countries, including Australia, Japan, Republic of Korea, Turkey and Uzbekistan, it has expanded in all those for which data are available, yet mostly at slower rates than in earlier periods (see table 3.5). In this sense, the contribution of area expansion to output growth has declined across several countries. At the same time, the contribution of intensive use of land in output growth is largely continuing in the region, yet also at slower rates than in the 1990s. Importantly, however, the contribution of TFP growth has become larger over time in most countries, indicating that a large proportion of output growth in agriculture has come from the adoption of good agricultural practices and

Table  
3.5

Sources of agricultural output growth in selected Asia-Pacific economies

(Percentage)

Subregions	Countries	Output growth due to expansion of land area		Output growth due to intensive use of agricultural inputs (inputs/area)		Output growth due to growth in total factor productivity		Total agricultural output growth	
		1991-2000	2003-2012	1991-2000	2003-2012	1991-2000	2003-2012	1991-2000	2003-2012
East and North-East Asia	China	0.90	1.07	0.27	-0.72	3.99	3.20	5.16	3.55
	Japan	-0.81	-0.48	-1.80	-2.77	1.55	2.87	-1.06	-0.39
	Republic of Korea	-1.28	-1.16	0.14	-0.41	3.60	1.89	2.46	0.31
North and Central Asia	Tajikistan	-0.48	0.85	-3.96	2.16	0.34	2.17	-4.09	5.18
	Uzbekistan	-0.09	-0.17	-1.50	2.99	2.31	2.59	0.72	5.42
Pacific (developed)	Australia	-0.26	-0.81	0.71	0.11	3.12	1.64	3.57	0.94
	New Zealand	-0.18	1.30	0.66	-0.56	1.78	0.39	2.26	1.14
Pacific (developing)	Fiji	-0.01	-0.14	0.54	0.34	-1.27	-1.66	-0.74	-1.47
	Papua New Guinea	1.32	2.73	1.14	-0.47	0.01	0.08	2.46	2.34
South Asia	Bangladesh	1.21	0.55	0.71	0.68	1.03	3.04	2.95	4.27
	India	0.91	0.24	0.70	1.22	0.94	2.64	2.55	4.10
	Nepal	1.59	0.44	1.41	1.49	-0.19	1.68	2.81	3.61
	Pakistan	0.77	0.65	1.32	1.73	1.14	-0.37	3.24	2.00
	Sri Lanka	0.29	1.27	0.62	-0.09	0.17	1.96	1.08	3.15
South-East Asia	Cambodia	0.22	1.22	2.21	1.85	2.29	5.08	4.73	8.16
	Indonesia	1.83	1.16	-0.30	0.57	0.56	2.58	2.08	4.32
	Lao People's Democratic Republic	3.18	2.85	-0.12	0.94	2.22	1.54	5.29	5.32
	Malaysia	0.26	0.94	0.39	-0.85	1.81	2.91	2.46	3.01
	Philippines	-0.43	1.39	2.04	-0.69	0.46	1.80	2.06	2.50
	Thailand	0.33	1.10	-0.27	-0.63	2.34	2.22	2.39	2.70
	Viet Nam	2.44	1.31	0.92	0.03	2.34	2.71	5.69	4.05
South-West Asia	Iran (Islamic Republic of)	-0.48	1.06	1.94	-0.95	2.41	1.79	3.86	1.90
	Turkey	-0.36	-1.24	1.03	0.64	1.02	3.13	1.69	2.52

Sources: United States Department of Agriculture, "Methodology for measuring international agricultural total factor productivity (TFP) growth". Available from [www.ers.usda.gov/data-products/international-agricultural-productivity/documentation-and-methods.aspx](http://www.ers.usda.gov/data-products/international-agricultural-productivity/documentation-and-methods.aspx).

scientific methods of cultivation.<sup>19</sup> Indeed, countries that successfully managed a transition from land expansion to agricultural intensification consistently appear to have managed to increase the contribution of TFP growth over time.

In China, for instance, rapid TFP growth in agriculture, averaging 3.1% during the period 1998-2007, led to high growth of grain production, which has solved the country's food deficit problem after several years of reform. It has also made possible the reallocation of labour from agricultural to non-agricultural sectors. With labour productivity in the non-agricultural sector being more than five times higher than that in the agricultural sector, the reallocation of workers from agriculture, as previously mentioned, has been the most important source of aggregate productivity growth in China (Zhu, 2012).

## 2. DETERMINANTS OF PRODUCTIVITY

It is important to understand what drives productivity and to be able to identify gaps as well as to take relevant steps to accelerate productivity growth and enhance levels of productivity. Among those aspects that have a particularly significant impact are: labour quality, which includes knowledge and skills as well as health of the workforce; innovation through enhanced openness (trade, foreign direct investment and participation in global value chains); adequate infrastructure; and access to finance, to name a few.<sup>20</sup>

### 2.1. Labour quality and productivity

*Labour quality* in terms of knowledge and skills are essential factors that contribute to TFP growth.

Economic theory suggests that such growth can be sustained only through technological change – analysed through productivity growth – and the latter is the result of research and development activities which are knowledge-intensive.<sup>21</sup> Thus, at the national level, good-quality education and research and development activities are core elements of total factor productivity growth. They enable countries to tap effectively into existing knowledge globally and, more importantly, provide for absorption capabilities and skills to integrate such knowledge.

With the importance of a high-quality workforce in TFP growth having been highlighted for the OECD countries (Maudos, Pastor and Serrano, 1999), education has also had a positive impact on the rapid economic performance of 12 Asian developing economies between 1981 and 2007 (Lee and Hong, 2012).<sup>22</sup> In Hong Kong, China; the Republic of Korea; Singapore; and Taiwan Province of China, for instance, improving the educational attainment of the workforce contributed the equivalent of about 1% per annum additional growth in labour input during the period 1966-1990 (Young, 1994).

In this regard, the progress that Asia-Pacific economies have made in enhancing the education levels of the labour force must be acknowledged. For instance, between 1990 and 2013 the average years of schooling of adults increased from 6.2 to 8.2 years; the literacy rate and the net enrolment rate at the secondary level increased, respectively, from 69.8% to 82.9%, and from less than 50% to 66.8%. In addition, average

expenditure allocated to research and development activities in the region has doubled to 1.4% of GDP since the end of the 1990s. This increase, however is still significantly lower than the average in the euro area, in OECD countries and in the United States (see figure 3.8, panel A), suggesting that the region has quite a bit of catching up to do as it lags by more than a decade the developed regions of the world. At the same time, expenditure on tertiary education is important, as universities play an important role in developing countries in raising the skills of the population and in helping people to absorb ideas from developed countries (Mathews, 2001). Indeed, public expenditure on tertiary education is associated with faster growth rates in labour productivity in the region (see figure 3.8, panel B).

*The labour force lacks important skills that are needed in a modern economy*

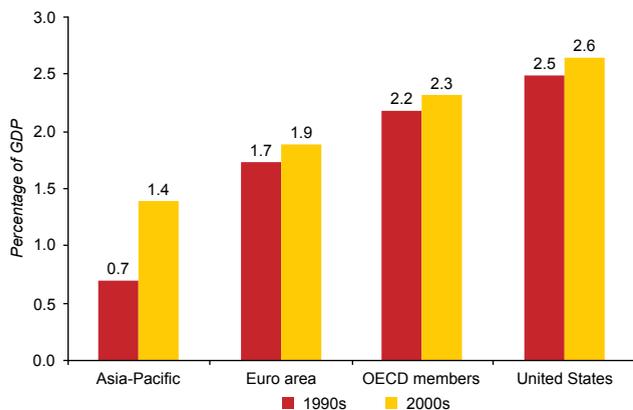
Nevertheless, while levels of education, measured in terms of enrolment, literacy and years in schooling, have increased in most countries, the *quality* of education is a critical factor, especially as a shortage of skills would constrain the abilities of economies to take advantage of technological change, thereby limiting productivity growth, particularly in manufacturing, as well as limiting economic diversification.

To evaluate the quality, equity and efficiency of school systems in providing young people with “key knowledge and skills that are essential for full participation

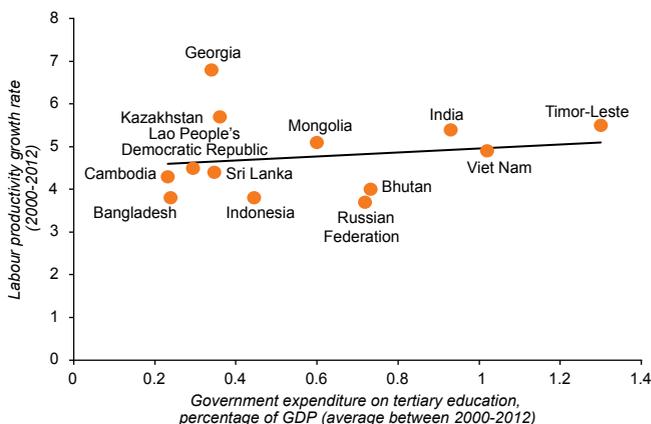
**Figure 3.8**

**Expenditure on research and development, and education**

**Panel A: Research and development expenditures (percentage of GDP)**



**Panel B: Expenditure on tertiary education and growth in labour productivity**



Sources: Based upon World Development Indicators of the World Bank and data from the United Nations Educational, Scientific and Cultural Organization Institute of Statistics.

Note: Weighted averages based on countries with available data contained in the ESCAP Statistical Database.

in modern societies”, the OECD Programme for International Student Assessment, which is widely known as PISA, assesses the competencies of 15-year-olds in reading, mathematics and science (with a focus on mathematics). In the most recent survey for which data are available, 12 of the 65 countries and economies that were analysed are located in the Asia-Pacific region.<sup>23</sup> In comparing the ranking of those 65 economies, Indonesia ranked 64th, Malaysia 52nd, Thailand 50th, Kazakhstan 49th, Turkey 44th and the Russian Federation 34th. Low rankings in several of these economies point to a lack of quality in education, suggesting that the labour force in those economies may lack important skills that would be needed in the near future in a modern economy. The rankings also contrast with the relatively high standing of Viet Nam (ranked 17th), especially in view of the fact that labour productivity in Viet Nam is 60% lower than that of Indonesia (measured in 2011 PPP terms, see figure 3.2).

Interestingly, Hong Kong, China; Japan; Republic of Korea; and Singapore, which rank among the highest in terms of labour productivity in the Asia-Pacific region (see figure 3.2), come out at the top of the PISA assessment in *reading and mathematics*,<sup>24</sup> which points to the importance of increasing the quality of education, especially to foster science, technology and innovation.

In fact, firm-level analyses show that research and development activities, the training of the labour force and the availability of a skilled labour force contributed significantly to innovation (process and product) in several economies (see red cells in table 3.6).

## 2.2. Impact of openness on productivity

The degree of *openness*, as measured by exports, imports and FDI, is also considered an important determinant of productivity, particularly TFP growth. One explanation is that, as firms are exposed to different products, processes and practices, they are more likely to innovate in order to compete (Keller, 2010) and are more likely to benefit from technological diffusion (Barro and Sala-i-Martin, 1995), assuming, however, that workers are sufficiently educated and skilled to adopt new technologies. Thus, international trade is considered a key source of technology transmission and adoption (see Barro, 1997; Coe and Helpman, 1995; Frankel and Romer, 1999). This channel is particularly important for developing economies where new technology is relatively scarce, resources are limited and firms are dependent on high-quality imported inputs. However, as mentioned

previously, in order to take advantage of technology that is imported from developed countries, workers must be sufficiently skilled; otherwise labour absorption will remain limited due to the skill bias of modern technology and/or rapid capital accumulation.

### *More open economies are generally more productive*

In one sense, **imports** are generally seen as representing an increase in the level of competition for domestic firms, pushing them to invest and be more productive. Additionally, the importation of intermediate and capital goods is seen as a factor that would stimulate productivity through technology transfer from advanced countries and provide better-quality inputs (Goldberg and others, 2010; Topalova and Khandelwal, 2011), while imported services can enhance the efficiency of the industrial sector (see box 3.1). The learning spillover between foreign knowledge and domestic production is another channel in this process (see Aitken, Hanson and Harrison, 1997; Keller, 2004), assuming again that the labour force is sufficiently skilled to absorb the imported knowledge and technologies.

In this regard, productivity gains that come from reducing tariffs on intermediate goods could be twice as large as those coming from comparable reductions on final goods, as is the case for manufacturing in Indonesia (Amiti and Konings, 2007) and India (Topalova and Khandelwal, 2011). Thus, while lower tariffs will make imported goods more competitive, thereby increasing pressures on domestic firms producing those goods, they will also increase access to better inputs, thereby increasing firm-level productivity, which has a particularly large impact. In the case of India, for example, new imported inputs for manufacturing to a large extent originate in more advanced countries and exhibit higher unit value relative to existing imports. The enhanced contribution of high-quality inputs adds to productivity growth. For instance, with a firm’s access to new, imported inputs increasing its ability to manufacture new products, trade reforms that took place in India between 1992 and 1997 contributed to a quarter of India’s growth in manufacturing output (Goldberg and others, 2010).

For economic linkage between **exports** and productivity, it is argued that the higher productivity of exporters reflects the self-selection of more efficient producers into a highly competitive export market (Bernard and Jensen, 2004). Others emphasize that exporting improves the productivity of firms because international competition is a factor that encourages exporting firms to invest more in productive technologies, organization

**Table  
3.6**

**Main drivers of product and process innovations in selected regional economies**

**A: Product innovation**

Drivers	BGD	CHN	IND	MNG	MYA	RUS	LKA	TUR
Duration of manager's experience in sector								
Research and development activities								
Training of labour								
Size of firm								
Proportion of workers having completed secondary school or having university degree*								
Usage of foreign licence								
Quality certified								
Age of firm								
Number of competitors								

Note: BGD = Bangladesh; CHN = China; IND = India; MNG = Mongolia; MYA = Myanmar; RUS = Russian Federation; LKA = Sri Lanka; and TUR = Turkey.

\* Workers are production workers.

**B: Process innovation\*\***

Drivers	BGD	IND	MNG	MYA	RUS	LKA	TUR
Duration of manager's experience in sector							
Research and development activities							
Training of labour							
Size of firm							
Proportion of workers having completed secondary school or having university degree*							
Usage of foreign licence							
Quality certified							
Age of firm							
Number of competitors							

Note: BGD = Bangladesh; CHN = China; IND = India; MNG = Mongolia; MYA = Myanmar; RUS = Russian Federation; LKA = Sri Lanka; and TUR = Turkey.

\* Workers are production workers. \*\* Data not available for China.

- Positive and significant impact on innovation
- Negative and significant impact on innovation
- No impact

Sources: ESCAP analyses based on results from econometric analyses performed at the firm-level in each country. Data were obtained from the Enterprise Surveys of the World Bank. Available from [www.enterprisesurveys.org/data](http://www.enterprisesurveys.org/data).

Note: Green/orange coloured cells signify that the increase of the variable or the existence of a specific feature in the firm could result in a higher/lower probability of innovating; white coloured cells mean that the variable does not have a significant impact on innovation.

and innovation (Krugman, 1994; Rodrik, 1988). Evidence also suggests that apart from self-selection, exporting firms gain new knowledge and expertise, and at times access to technical expertise through from their buyers, and improve their efficiency. This is the 'learning-by-exporting' hypothesis (Wagner, 2007; De Loecker, 2007). Empirically, for the period 1994-2008, trade intensity in India was found to be positive and significant in metal and metal products, non-metallic mineral products and transport equipment, all of which are relatively more exposed to foreign competition.<sup>25</sup> The impact of greater trade intensity on total factor

productivity was estimated at 5-10% in these industries. The effect on overall manufacturing was found to be about 2%, which is lower than expected (Mitra, Sharma and Veganzones-Varoudakis, 2011; 2014).

It is shown in table 3.7 that, since the global financial and economic crisis of 2008, productivity and openness, defined as the sum of imports and exports relative to GDP, have declined in the region.

**Foreign direct investment** is a key channel for the transfer of technology via the generation of positive

Box  
3.1

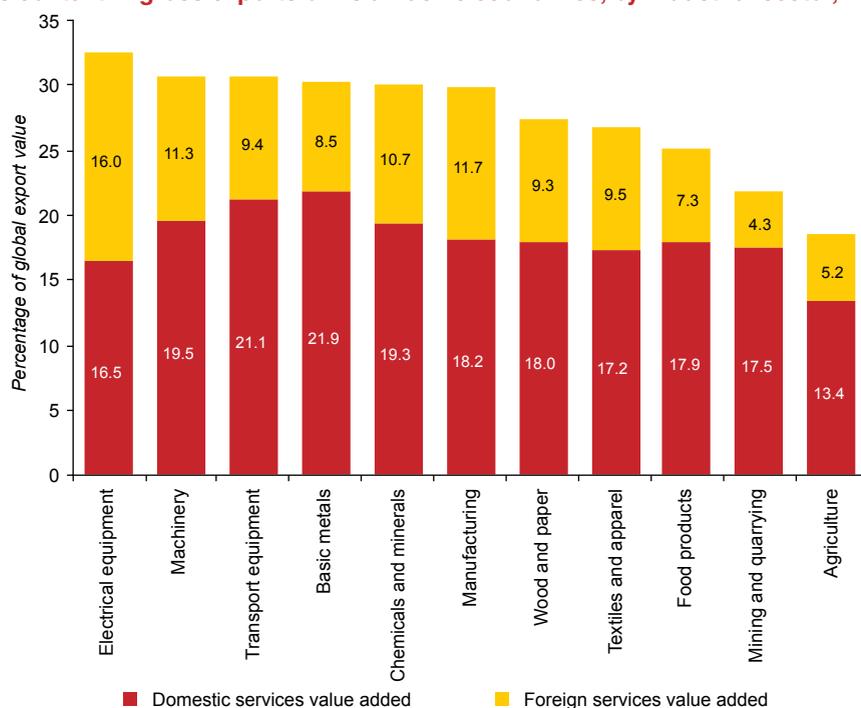
**Industry-service linkages: implications for productivity improvement in Asia-Pacific economies**

Evidence on the use of services by manufacturing firms, described as “servicification”, has revealed that the availability of cost-efficient services is crucial for productivity improvement overall. Based on data on trade-in-value added, the average service content of industrial exports from the Asia-Pacific region is as high as 30%. The share of services is predominant in the high-technology sector, that is, electrical and optical equipment (32.5%) (see figure below). More than two thirds of the service inputs into industrial production come from distribution services (9%), business services (7.5%) and logistics-related services (5.2%).<sup>a</sup> Additionally, the contribution of imported services has been rising over time. The share of imported services in industrial exports from the Asia-Pacific region increased from 7.6% to 11.1% over the past decade, and import growth has been predominant in high-technology exports.

Given the strong linkages between manufacturing and services as well as the increasing importance of imported services, Governments of developing economies in the Asia-Pacific region are under considerable pressure to find balance between assisting domestic service providers and promoting the overall productivity of their economies. Availability of imported services could enhance the efficiency of the industrial sector and increase their export competitiveness. On the other hand, too much reliance on imported services may limit the long-term opportunities to strengthen the productivity of the domestic service sector.

The general policy direction should therefore be focused on creating competitive market conditions and developing a well-functioning domestic service sector that meets high-quality standards. For example, ensuring access to the grid or network for new entrants in the telecommunications or electricity sectors should help create equal opportunities and result in pro-competitive efficiency gains. The openness of financial services with a good regulatory framework could enhance competition and stability in the financial sector as well as contribute to overall macrostability. In addition, it is important to have a comprehensive set of policies in place to encourage spillovers and technological diffusion from foreign to domestic providers, which may include, for example public investment to upgrade and improve accessibility to backbone infrastructure, such as railways, ports, telecommunications systems, health care and education. The provision of education and training (for example in information technology, languages and professional skills) as well as greater domestic and international labour mobility will enable domestic firms as well as individuals to take advantage of service-export opportunities.

**Services content in gross exports of Asia-Pacific economies, by industrial sector, 2009**



Source: United Nations, Economic and Social Commission for Asia and the Pacific, Asia-Pacific Trade and Investment Report 2015: Supporting Participation in Value Chains (Sales No. E.15.II.F.15), p. 140.

<sup>a</sup> Distribution services include wholesale, retail, and hotel and restaurant services. Business services include such services as legal and accounting services, research and development, advertising and market research, engineering activities and ICT services. Logistic-related services include transport and storage, post and communications.

**Table  
3.7**

**Average change in openness and labour productivity between 2000-2007 and 2008-2013 in selected Asia-Pacific countries**

Countries	Change in openness (Percentage of GDP)	Change in labour productivity growth (Percentage)
Australia	-0.01	-0.49
Azerbaijan	-3.02	-13.73
Brunei Darussalam	-8.30	-1.06
Cambodia	-1.00	-2.82
China	-2.91	-1.59
Georgia	-0.54	-5.22
Iran (Islamic Republic of)	-0.70	-3.15
Japan	-3.90	-0.51
Kazakhstan	-6.89	-5.17
Kyrgyzstan	-5.16	-0.03
Malaysia	-0.27	-1.09
Maldives	-2.19	-2.00
New Zealand	-4.71	-0.46
Pakistan	-0.72	-1.57
Philippines	-0.02	-0.45
Republic of Korea	-1.00	-1.76
Russian Federation	-3.28	-4.97
Samoa	-6.67	-4.98
Singapore	-9.73	-0.61
Thailand	-1.60	-1.16
Vanuatu	-8.66	-0.87
Viet Nam	-2.40	-0.73

Sources: ESCAP, based on data from the ESCAP Statistics Division.

externalities through knowledge spillovers into the domestic economy, for instance by linking local firms to foreign firms. However, such results seem to be conditional upon the host country having a minimum stock of skilled workers (Borensztein, De Gregorio and Lee, 1998). Levels of FDI often also reflect the overall macroeconomic environment in that FDI is more attracted to countries where inflation is low and stable and where fiscal and monetary policies are considered “sound” – ultimately, an environment that is conducive to higher growth in productivity (Loko and Diouf, 2009).

An estimate involving 25 Asia-Pacific economies, covering the period 1990-2013, confirmed that countries with a greater share of industry in value added are more productive as they have higher levels of output per worker, whereas countries that have a higher share of agriculture in value added have a lower level of output per worker. That study also confirmed that countries with a higher level of skilled workers produce a higher level of output per worker. Moreover, higher levels of skilled workers and greater inflows of FDI have a positive impact on labour productivity growth in general, while a higher share of industry

in value added does not have an impact on the growth of labour productivity.

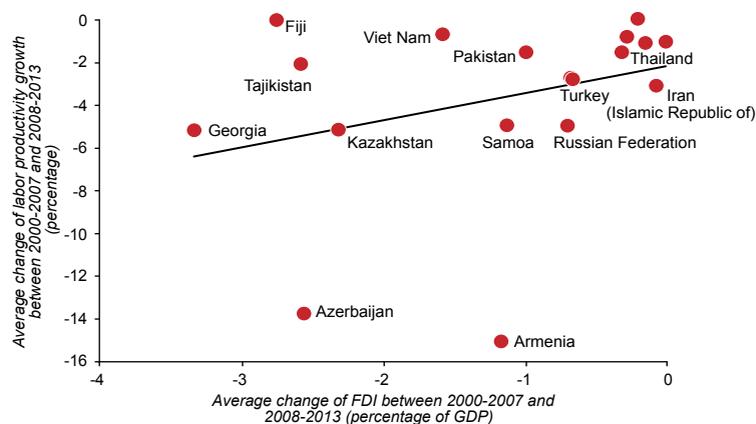
Data analysis confirms that the expansion of trade that has taken place in the Asia-Pacific region over the past 25 years and the dramatic increase in inflows of FDI into the region have contributed to an overall increase in labour productivity. For instance, FDI inflows increased from about \$34 billion in 1990 to \$545 billion in 2013, while the value of international trade (exports and imports) was estimated to have reached \$13,712 billion in 2013 compared with \$1,506 billion in 1990. Yet, since the global 2008 financial and economic crisis, FDI inflows into some countries in the region have been declining. In countries where the decline in inflows has been relatively larger, there has also been a larger decline in the growth of labour productivity (see figure 3.9).

### 2.3. Infrastructure and productivity

The importance of *infrastructure* vis-à-vis productivity is widely recognized in the literature. For example, public infrastructure is considered as a crucial factor for enhancing productivity and technical efficiency

Figure  
3.9

Decline in foreign direct investment and labour productivity growth in selected economies in the Asia-Pacific region



Source: ESCAP, based on World Development Indicators of the World Bank.

through complementary relationships with other factors of production (for example, see Lucas, 1988; Anwar, 1995; Barro and Sala-i-Martin, 1995).<sup>26</sup> Better infrastructure also bolsters labour productivity by reducing the time employees spend in commuting to work, by improving health and education outcomes and allowing for improvements in economies of scale (Straub and Terada-Hagiwara, 2010). With poor road and telecommunications networks raising transport and logistics costs, better infrastructure would enable better market access, while better energy infrastructure is critical to improving productivity of the industrial sector.

### *Infrastructure has an important impact on productivity*

The importance of infrastructure to productivity is highlighted by the argument that one of the main causes of productivity slowdowns in the United States during the 1970s and 1980s was insufficient investment in infrastructure (Aschauer, 1989). Indeed, it has been argued that the differential evolution of infrastructure in Latin America compared with seven Asian economies (Hong Kong, China; Indonesia; Malaysia; Republic of Korea; Singapore; Taiwan Province of China; and Thailand) widened gaps by some 30% in GDP per worker in favour of Asia between 1980 and 1997 (Calderón and Servén, 2003), whereas more than one quarter of the differential growth rate between Africa and four economies in Asia (Indonesia, Malaysia, Philippines and Thailand) could be attributed to the difference in effective use of infrastructure resources (Hulten, 1996).

In Australia, for instance, public infrastructure has been found to have an important impact on productivity in

private sector industries, with rates of return to public capital estimated at about 25% in terms of cost savings and 68% in terms of output, not even taking into account the benefits that public infrastructure affords consumers (Satya, 2003). In Japan, public capital (infrastructure) has also been found to contribute to higher productivity, although the higher the share of investment in public infrastructure that was devoted to the agricultural and natural disaster prevention sectors, the lower was the effect on private production (Mizutani and Tanaka, 2010).

In the case of India, infrastructure has a moderate to large impact on the performance and productivity of manufacturing (Mitra, Varoudakis and Végonzonès-Varoudakis, 2002; Hulten, Bennathan and Srinivasan, 2006; and Sharma and Sehgal, 2010). For instance, infrastructure explains up to 65% of growth of TFP in transport equipment, 32% in metal and metal products and 30% in textiles (Mitra, Sharma and Végonzonès-Varoudakis, 2011; 2012; and 2014). In other industries, the impact of infrastructure varies from being large to moderate, except in the case of chemicals which has been found to be statistically insignificant. On average, results for India suggest that, for overall manufacturing, a 1% increase in infrastructure leads to a 0.32% increase in the growth of TFP. Indeed, the shortage of infrastructure provision in India hampers the performance of manufacturing industries (Hulten, Bennathan and Srinivasan, 2006).

For the Asia-Pacific region, *infrastructure and connectivity* (as measured by access to electricity, the Internet and mobile telephones) are important drivers of labour productivity. Yet, in several countries, poor infrastructure for energy supply and distribution is

already a major barrier to growth in productivity, output and employment, and thus to improving the welfare of the societies concerned. Moreover, investment in infrastructure in urban areas in the region is particularly important as urbanization will increasingly become a driver of productivity, as the share of agricultural workers declines and shifts instead towards manufacturing and services. In the same study, analysis showed that lack of transport infrastructure and trade facilitation systems increases production costs and reduces productivity by, for instance, contributing to delays when importing or exporting shipments.

## 2.4. Finance and productivity

The *availability of finance* can have an important positive impact on productivity. For one, given the region's infrastructure deficit, the availability of financing to reduce this deficit would boost productivity by, for instance, reducing the costs of trade and widening

access to information and communications technology (ICT). In addition, an important service is provided by the finance sector, which acts as an intermediary and screens firms in order to identify those with promising prospects that make them worth funding. In many economies in the region, however, financial markets are underdeveloped. Greater financial development would thus clearly foster capital deepening, that is, the availability of more capital, and thus would strengthen the growth of productivity in those economies by supporting productivity growth within firms (Levine and Warusawitharana, 2014).

Providing small and medium-sized enterprises with finance is particularly important to foster productivity in the region, considering that such enterprises during the period 2007-2012 accounted for 98% of all enterprises in Asia and employed two thirds of the national labour force on average (ADB, 2013) (box 3.2 below).

### Box 3.2

#### Small and medium-sized enterprises and their access to finance

Small and medium-sized enterprises (SMEs) form a critical component of the industrial sector, having contributed on average 38% of manufacturing value added in Asia between 2007 and 2012 and having brought in about 30% of total export value during that period. However, the relevance of SMEs varies substantially across countries, ranging from 28% of total employment in Kazakhstan to 97% in Indonesia in 2012.<sup>a</sup> Fostering SMEs, many of which are located in the informal sector, and ensuring that they become more productive are therefore critical steps for achieving sustainable development of the Asia-Pacific region in general and for increasing productivity in regional economies in particular.

Despite their importance, SMEs face several constraints in expanding activities and becoming more productive. Of these, lack of access to finance is critical. Thus, cross-country research points to substantial evidence that small firms face larger constraints and have less access to formal sources of external finance, which may be one of the factors holding back SMEs from contributing more to economic growth.<sup>b</sup> Indeed, access to and cost of finance are often ranked among the most constraining features of the business environment faced by SMEs.<sup>c</sup> As such, the removal of credit constraints for investment in the manufacturing sector in developing countries has proven relevant for development.<sup>d</sup> Addressing financial and institutional development is therefore critical to strengthening industry and unleashing SMEs' growth and accelerating sustainable development in the Asia-Pacific region. This statement is especially true for SMEs in the manufacturing sector, as their productivity is strongly correlated to their access to finance.<sup>e</sup> Indeed, the impact of better access to finance contributes significantly to an increase in productivity, as depicted in the figure below, which shows that the productivity of small firms in the manufacturing sector could increase by 6.6% if the rating of this factor improves by one point on a scale of five levels. Therefore, a business environment allowing firms to access credit for their investments creates favourable conditions for economic growth. In other words, credit is essential for development.<sup>f</sup>

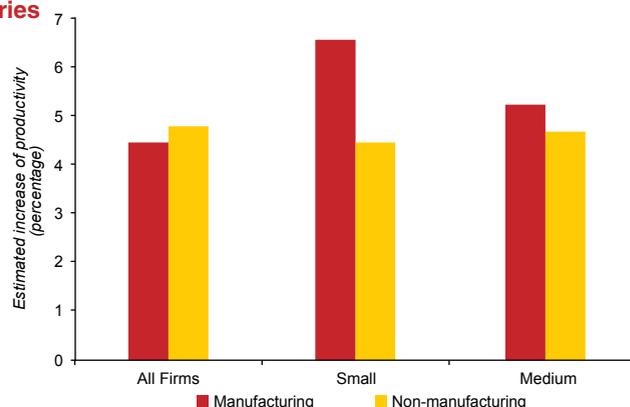
Various policy options can be considered that would strengthen SMEs and thereby foster development. Such options include, for instance, credit guarantee schemes, the development of credit information systems and the use of equity financing solutions.<sup>g</sup>

Credit guarantee schemes have been used in India, Japan and Pakistan for example to mitigate risks associated with lending to SMEs and to increase the access of SMEs to short-term and long-term loans. However, policymakers should also carefully consider issues related to moral hazard, as banks may

Box  
3.2

(continued)

**Estimated impact of an improvement in the access to finance on the level of productivity in selected Asia-Pacific countries**



Source: Filipe Lage de Sousa, "Obstacles to productivity in Asia and Pacific region: finance reigns", Working Paper (Bangkok, ESCAP, forthcoming).

Note: The improvement in the access to finance is measured on the basis of a score ranging between zero ("finance is not an obstacle") and four ("finance is a severe obstacle").

relax stringent assessment of applications in response to credit guarantee schemes. In addition, credit guarantee schemes may have high administrative costs and contribute to delays in gaining access to funds. Moreover, credit guarantee schemes could threaten fiscal sustainability if the Government faces the situation of having to honour a high level of contingent liabilities.

The development of credit information systems, through data flows from SMEs to credit bureaus and registries, can help SMEs to gain access to loans as such systems reduce the asymmetry of information and help financial institutions to have a broader picture of the market. These data can be used for the credit rating of SMEs as is the case in India, Malaysia and Singapore. However, the development of a credit rating system requires national authorities to be mindful of, among other things, costs associated with the initial rating exercise and the maintenance of the database and of potential conflicts of interest between clients and the credit agency due to the remuneration of the latter.

Equity financing solutions can contribute to the development of SMEs at an early stage of the business lifecycle of an SME, or when it does not have a proven track record. Such solutions include angel finance schemes, such as the Singapore-based "Business Angel Network Southeast Asia". They also include venture capital firms, as have been developed in India for the ICT industry and the biotechnology sector, as well as stock market and initial public offerings, such as those in China, India, New Zealand, the Philippines, the Republic of Korea, Thailand and Viet Nam.

"SMEs are the emerging private sector in poor countries, and thus form the base for private sector-led growth".<sup>h</sup> Their development, therefore, requires reforming the institutional framework and providing financial support from the Government, but also providing SMEs with business development services to assist them in their activities.

<sup>a</sup> All figures are from the Asian Development Bank, special chapter on "Asia's economic transformation: where to, how, and how fast?", in *Key Indicators for Asia and the Pacific 2013*, (Mandaluyong City, Philippines, 2013).

<sup>b</sup> Thorsten Beck and A. Demircuc-Kunt, "Small and medium-size enterprises: access to finance as a growth constraint", *Journal of Banking and Finance*, vol. 30, No. 11 (2006), pp. 2931-2943.

<sup>c</sup> T.H.L. Beck, "Financing constraints of SMEs in developing countries: evidence, determinants and solutions", in *Financing Innovation-oriented Businesses to Promote Entrepreneurship* (n.p., 2007).

<sup>d</sup> Abhijit V. Banerjee and Ester Dufo, "Do firms want to borrow more? Testing credit constraints using a directed lending program", *Review of Economic Studies*, vol. 81, No. 2 (2014), pp. 572-607.

<sup>e</sup> Filipe Lage de Sousa, "Obstacles to productivity in Asia and Pacific region: finance reigns", Working Paper (Bangkok, ESCAP, forthcoming). Limited access to credit has also been shown to hamper economic growth, especially long-term growth. See Abhijit J. Banerjee and Andrew F. Newman, "Occupational choice and the process of development", *Journal of Political Economy*, vol. 101, No. 2 (1993), pp. 274-298; and Oded Galor and Joseph Zeira, "Income distribution and macroeconomics", *Review of Economics Studies*, vol. 60, No. 1 (1993), pp. 35-52.

<sup>f</sup> Ross Levine, "Finance and growth: theory and evidence", in *Handbook of Economic Growth*, vol. 1A (Amsterdam, Elsevier B.V., 2005), pp. 865-934.

<sup>g</sup> Nick Freeman, "Financing small and medium sized enterprises for sustainable development: a view from the Asia-Pacific region", ESCAP Macroeconomic Policy and Development Division Working Paper, WP/15/05. Available from [www.unescap.org/sites/default/files/5-ESCAP\\_SME%20finance\\_July2015\\_share\\_2.pdf](http://www.unescap.org/sites/default/files/5-ESCAP_SME%20finance_July2015_share_2.pdf).

<sup>h</sup> Kristen Hallberg, "A market-oriented strategy for small and medium scale enterprises", International Finance Corporation Discussion Paper, No. 40 (Washington, D.C., World Bank Publications, 2000).

*Finance is important for productivity,  
but the relationship between  
these two factors is not linear*

It is important to note, however, that the relationship between finance and growth is not linear, as too much financial development can in fact inhibit the growth of productivity (Chopra, 2015). Thus, while financial development is good up to a point, it can become a drag on growth, especially when growth of the financial sector disproportionately benefits projects where it is easy to pledge collateral but where productivity is low, such as in construction (Cecchetti and Kharroubi, 2012). Similarly, a fast-growing financial sector can be detrimental to aggregate productivity growth if a high demand for skilled labour in financial institutions crowds out more productive sectors. Indeed, empirical evidence suggests that during financial booms the growth of productivity falls disproportionately in manufacturing industries that are research- and development-intensive (Cecchetti and Kharroubi, 2015)

In addition, the availability of too much credit can undermine the growth of productivity by inducing labour reallocation towards sectors characterized by lower-productivity growth (Borio and others, 2015). Moreover, financial development may have only a limited effect on growth in economies that are already close to the productivity frontier (Aghion, Howitt and Mayer-Foulkes, 2005).

### **3. PRODUCTIVITY AND SUSTAINABLE DEVELOPMENT: SOME EXAMPLES**

*The Sustainable Development Goals and productivity are interlinked*

Increasing productivity and accelerating growth as well as making sure that growth is more inclusive are particularly important to close the development gaps in the region. These issues are also important to enable countries to move from a development model that is currently driven by exports to developed economies to one in which domestic and regional demand plays a greater role, thereby making growth more sustainable. Emphasis on domestic and regional demand becomes all the more important considering the recent persistent decline in trade flows and the relationship between trade and productivity. Thus, policies that promote domestic sources of demand, such as investments in the quality of the workforce, can simultaneously support growth of productivity and help countries reduce their reliance on exports to drive growth.

Critically, focusing on productivity provides an overarching framework for countries to tackle the achievement of several Sustainable Development Goals. To highlight some of the interlinkages between productivity and those Goals, including the virtuous link between the two, this section is focused on six Sustainable Development Goals as examples: end poverty in all its forms everywhere (Goal 1); end hunger, achieve food security and improved nutrition and promote sustainable agriculture (Goal 2); ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (Goal 4); promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all (Goal 8); build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Goal 9); and take urgent action to combat climate change and its impacts (Goal 13).

#### **3.1. Ending poverty and hunger by promoting sustainable agriculture**

Raising agricultural productivity must be at the centre of the focus to end poverty (Goal 1) and end hunger and achieve food security (Goal 2). Recent economic growth experiences in the world, in the context of issues of inclusiveness and sustainability, have shown that a more strategic approach is required to alleviate poverty, in which active development of the agricultural sector and the rural economy is essential for stimulating economic growth, realizing equity, and economic and political stability: the so-called “development trilogy” (Timmer, 2015).

*Increasing productivity, especially in the agricultural sector, is important*

Tackling poverty in rural areas is particularly important as more than half the population in the developing economies of Asia and the Pacific live in rural areas, and this population represents a significant proportion of the 1.4 billion poor people living on less than \$3.10 per day (2011 PPP). Indeed, about 40% of the workers in Asia-Pacific developing economies are employed in the agricultural sector. Moreover, while the prevalence of undernourishment has declined significantly in the Asia-Pacific region, having fallen from 23% from the early 1990s to less than 14% today, about 500 million people remain undernourished.<sup>27</sup> The great bulk of the remaining poor and food-insecure people live on agriculture and inhabit rural areas. As such, significant challenges remain to end hunger and attain Goal 2.

Reduction in the prevalence of undernourishment depends upon several socioeconomic factors as

well as actions by Governments. For instance, at the macroeconomic level, household food security, care of children and mothers, and access to health services are important strategies to reduce hunger, particularly with regard to the nutritional status of children (Smith and Haddad, 2002).<sup>28</sup> While the role of economic growth is a core element in the reduction of undernourishment, it is particularly critical that such growth also reaches poorer people (FAO, WFP and IFAD, 2012). Moreover, government interventions, such as enhancing access to health services and “ensuring healthy lives” (part of Goal 3), improving water sources and sanitation (part of Goal 6), investing in productive sectors, strengthening of institutional frameworks and improving the business environment, among other measures, are also critical to spurring inclusive economic growth. Agricultural growth thus has a critical role to play in achieving the objective of “zero hunger”.

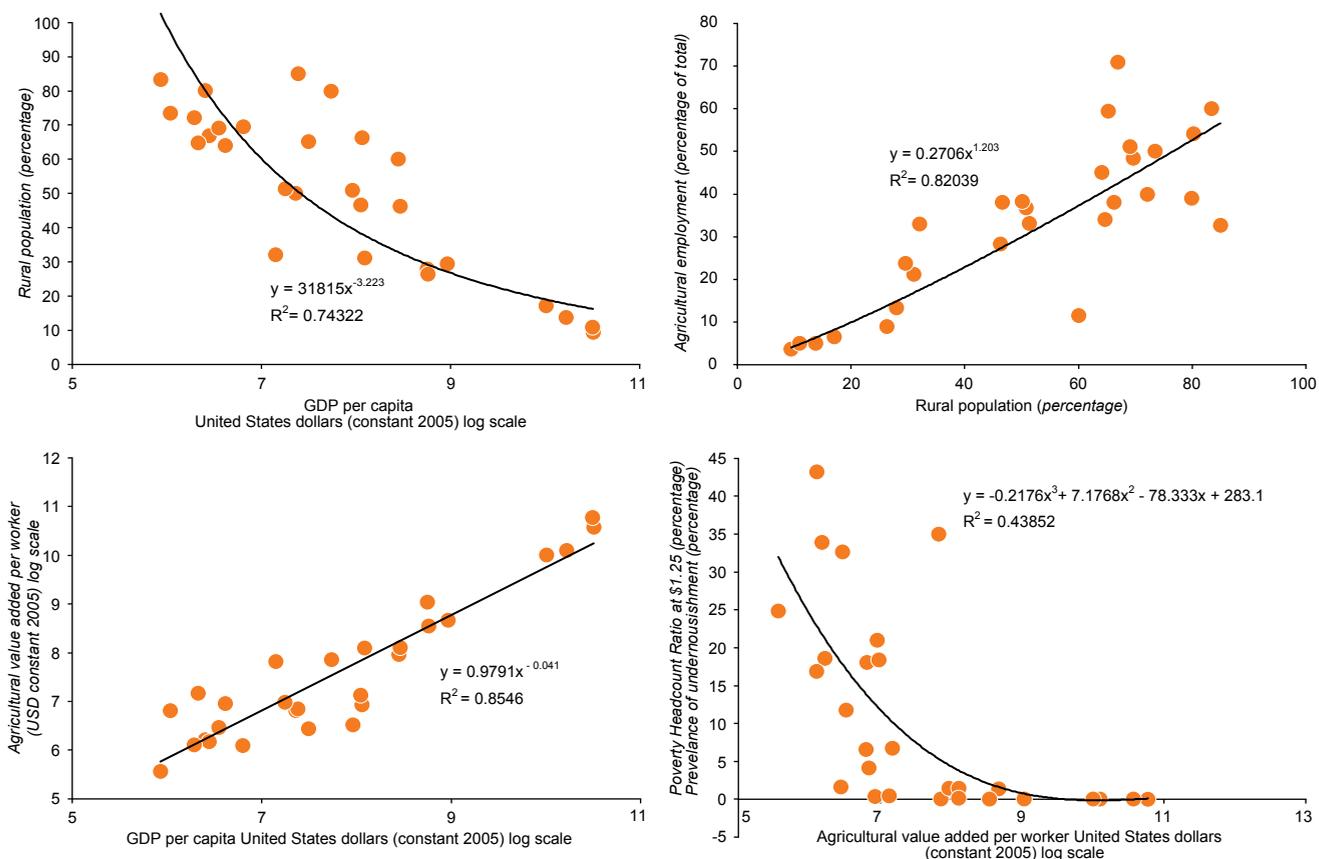
Thus, increasing productivity, especially in the agricultural sector, contributes to the reduction of

poverty directly by positively affecting rural households’ income obtained from agricultural and non-agricultural activities. In addition, growth in agricultural productivity and the associated increase in real wages reduce the food insecurity of poor households, as household incomes tend to be positively correlated with output per worker in agriculture. Such productivity also contributes indirectly to the well-being of the poor by improving the interaction between non-agricultural and agricultural sectors, such as through additional sales to rural households (Irz and others, 2001).

Cross-country data on GDP per capita, the share of agricultural employment in total employment, agriculture value added per worker, the share of rural population, poverty headcount ratios and the prevalence of undernourishment in the region confirm the relationship between agriculture and development. For instance, a rise in GDP per capita implies a reduction by a significant margin in the share of the rural population, especially at lower levels of income (top left panel of figure 3.10). At the same time,

Figure 3.10

Agricultural productivity, rural residence, poverty and food insecurity



Sources: ESCAP analysis, based on data from the World Development Indicator database.

people living in rural areas are highly likely to be working in the agricultural sector (top right panel), while GDP per capita is positively correlated with agriculture value added per worker, meaning that people in low-income countries also earn relatively less from agriculture (bottom left panel). The bottom right panel shows that agriculture value added per worker is strongly and negatively correlated with the indicators of poverty and food insecurity; it also shows that a rise in agriculture value added per worker induces a greater reduction in poverty and food insecurity at lower levels of income than at higher levels. The panels thus highlight the fact that being rural is synonymous with having a small amount of cash income, being poor and food-insecure.

Empirical analysis confirms that “pro-poor” growth strategies aimed at reducing poverty contribute significantly to poverty alleviation. Studies have also shown that agricultural income growth is more effective in reducing poverty than growth in other sectors; that the welfare effects of non-agricultural growth are smaller among poorer households (Ligon and Sadoulet, 2011; FAO, 2012); that agricultural growth reduces poverty many times more than identical growth in the non-agricultural sector (excluding sub-Saharan Africa) (FAO, 2012); and that, in different

sets of developing countries in Asia and Africa, an increase in agricultural GDP could be effective in reducing poverty, with the impact being greater in low-income countries than in resource-rich countries (Christiaensen, Demery and Kuhl, 2011).

In the case of India, Ravallion and Datt (1996) and Datt and Ravallion (1998) concurred on the role of agriculture or an increase in agricultural productivity in poverty reduction, while the expansion of a labour-intensive sector should have a greater impact on poverty alleviation, according to Loayza and Raddatz (2010). In this sense, it is critical that countries increase their growth of agricultural productivity in order to make a meaningful impact on the alleviation of poverty (Timmer, 2015), especially as sectoral productivity gaps appear to have widened in recent years because of slow growth and, in some cases, stagnation.

Over the last few decades, fertilizer and agricultural machinery have played an important role in the Asia-Pacific region by making the agricultural sector workforce more productive, thus contributing to higher yields in agriculture. Greater agricultural yields, in turn, have had a positive impact on economic growth and on poverty reduction (see box 3.3). For instance, it

### Box 3.3

#### Increasing productivity in agriculture to lift people out of poverty: projections to 2030

The agricultural productivity gap in the Asia-Pacific region points to a misallocation of labour in many countries. The income level of workers in the agricultural sector is likely to be low because relatively inefficient production methods are being used or because the actual number of workers in this sector is high. In fact, about 36% of the labour force is employed in the agricultural sector, which contributes to less than 10% of the total output of ESCAP developing economies.

Importantly, this situation needs to be analysed, taking into account expanding populations and uncertainty related to the consequences of climate change. Thus, the impact of climate change on agricultural productivity will differ depending on a country's latitude and longitude, the altitude of the field and crops being planted, among other such factors. Farmers need to be ready to cope with such changes. Increasing agricultural productivity and concomitantly the level of income of people engaged in agricultural activities therefore represents a major challenge over the next several decades.

To increase agricultural productivity (measured as the value added per unit of cropland), farmers can, for instance: (a) make better use of available inputs and access innovative knowledge represented by an increase in total factor productivity; (b) increase mechanization of agriculture in those countries that are lagging behind in terms of usage of these assets and inputs; and (c) increase usage of fertilizers which are assumed to have a lower environmental footprint.

The analysis below of the role of agricultural productivity in poverty alleviation is based on a system of equations which enable estimating and projecting GDP per capita, at 2011 PPP, constant prices, and analysing the differences in poverty headcounts between a baseline scenario and a scenario in which: (a) the growth rate of productivity (total factor productivity) and yields are assumed to be the average growth of

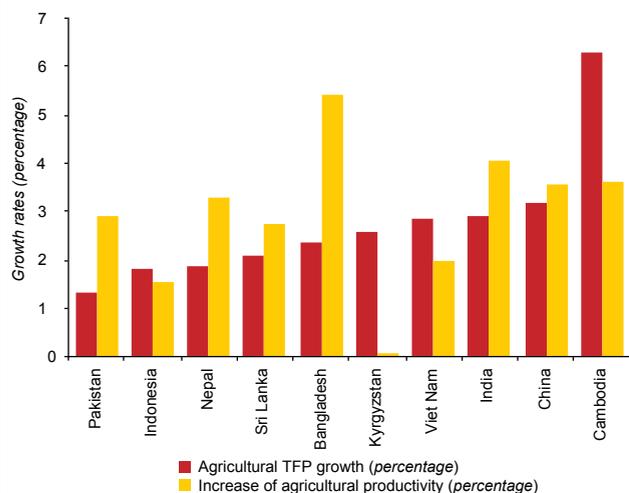
**Box  
3.3**

(continued)

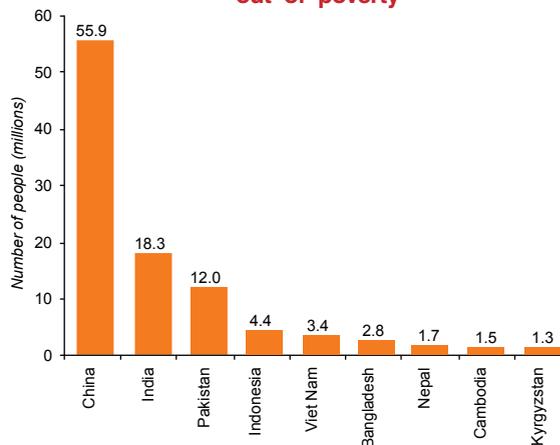
the last available five years for each country; (b) any decline in usage of farm machines at the country level that had been observed in the past is in fact reversed; and (c) growth of fertilizer use remains unchanged.

In figure A, the key assumptions are presented which have been used to perform the analysis, that is, how high total factor productivity (TFP) growth in agriculture is and by how much it is increased given the assumptions outlined above.

**Figure A: Growth of agricultural TFP and productivity**



**Figure B: Millions of people lifted out of poverty**



Source: ESCAP calculations.

Source: ESCAP calculations.

In figure B, the additional number of people lifted of poverty in selected Asian countries is presented. In countries with a high GDP-poverty elasticity, such as China and India, the simulated increase in agricultural productivity could lift at least 56 million and 18 million, respectively, out of extreme poverty during the period 2016-2030. In Kyrgyzstan and Viet Nam, the impact of higher productivity is more limited as poverty rates in these countries are already well below 15%.

Overall, the agricultural sector can clearly play a significant role in poverty alleviation in the region, as at least 110 million people could be lifted out of extreme poverty if agricultural productivity is raised.

is estimated that a 1% increase in agricultural yields resulted, on average and with everything else being equal, in an overall increase of 0.07% of GDP per capita over the period 1990-2011.<sup>29</sup>

*Linkages between agricultural and non-agricultural sectors are important, especially to reduce poverty*

The large number of additional people that could be lifted out of poverty in the region if agricultural productivity is increased indicates that interlinkages between the agricultural and non-agricultural sectors are still highly relevant in the Asia-Pacific region. Moreover, greater agricultural productivity would not only generate additional income to be used for non-

tradable and tradable goods, but would also contribute to lower food prices. This outcome would in turn increase food security, which would contribute towards attainment of Sustainable Development Goal 2, and would lead to an increase in real consumption, which would be particularly beneficial to poor households.

However, the occurrence of these positive externalities would also depend on other factors, such as the labour participation rate of people identified as poor in the process, the size of farms, and access to and adoption by farmers of adequate technologies, including information and communications technologies. For instance, small farms may not be able to fully benefit from such an agricultural strategy if they are unable to access credit or if they lack access to appropriate

machines to increase their productivity (Dethier and Effenberger, 2012). In cases where levels of productivity are low, consolidating farms may in some circumstances enable a critical move forward. Yet, it should be recognized that small farms are efficient in some environments but large farms are efficient in others under different conditions. For instance, in Uzbekistan a shift from large-scale collective farming to small-scale individual farming contributed to a productivity surge between 1998 and 2012, during which labour productivity in agriculture grew by 2.8 times and crop yields of basic agricultural products increased significantly (Pomfret, 2016).

### 3.2. Ensuring good-quality education, promoting productive employment and sustainable industrialization

The counterfactual analyses discussed above show that strengthening agriculture and increasing levels of productivity in the rural sector play an important role in ending poverty (part of Goal 1) and in ending hunger and achieving food security (part of Goal 2). In doing so, it is important to consider a broader development strategy, especially as higher levels of productivity in agriculture would free-up labour from that sector, which would then be available to work in the non-agricultural sector. To accommodate this “agricultural push” of labour (Christiaensen, Demery and Kuhl, 2011), it is important that such a strategy be aimed at providing full and productive employment and decent work for all to ensure that economic growth is sustainable and inclusive. Such a strategy would contribute towards attainment of Goal 8.

#### *Industrialization is required to develop successfully*

Moreover, as outlined above, countries that have developed successfully have generally done so on the back of rapid industrialization. Yet, many countries in the region are shifting to service-based economies at levels of income per capita that are far lower than was the case in developed economies. It is therefore important that efforts be increased to help developing economies industrialize while strengthening agriculture in view of its links with the industrial sector.

Approaches to strengthen the role of agriculture in this context include diversifying into high-value crops, focusing on quality and standards, and strengthening investment in research and development (ESCAP, 2008). Appropriate strategies and policies to help absorb the agricultural push of labour from the agricultural sector and enable higher growth of

productivity also include developing the non-farm sector. This change can be achieved by emphasizing development of the rural sector so that structural change ultimately follows an agriculture-industry-service sequence, for instance by fostering rural industrialization through small-scale industries. Doing so can strengthen linkages between agricultural and non-agricultural sectors, which would in turn lead to backward-forward and production-consumption linkages within agriculture and between the agricultural and non-agricultural sectors (ESCAP, 2015b). Doing so would promote inclusive and sustainable industrialization and innovation, thereby strengthening progress towards attainment of Goal 9.

For instance, in Bangladesh, the structural shift in the rural non-farm sector, especially since the 1990s, in favour of micro and small-sized enterprises instead of exclusive dependence on self-employment activities that characterized the earlier period, has led to a rise in employment opportunities in the rural non-farm sector and has improved productivity and enhanced wages. Indeed, agroprocessing and the marketing of processed food now have the potential to emerge as new engines of inclusive growth in Bangladesh (Mujeri, 2014).

#### *Sustained growth of productivity requires a highly educated labour force*

The above discussion makes it clear that absorbing the agricultural push of labour through rural industrialization will require additional training of low-skilled labour, particularly when considering the skill bias in modern technology, which, if unaddressed, will reduce the scope for absorption of unskilled surplus labour. In this regard, considering that “The automatism of *laissez-faire* never worked properly in that field” (Rosenstein-Rodan, 1943, pp. 204-205), strong government participation is needed to transform rural workers into full-time industrial workers. Doing so will require providing good-quality education and ensuring that national populations have access to lifelong learning, thereby attaining Goal 4, so that their skills become relevant – and remain so – to an industrializing framework.

Achieving sustained growth of productivity by consistently increasing the value added of output requires a highly educated labour force. However, the absorptive capacity needed to take full advantage of technology transfer is often lacking in developing countries, as is the capacity to design new pathways to production and new markets (UNESCO, 2014). Indeed, despite the virtuous circle between spending

on research and development, innovation, productivity and levels of income, which lead to sustained economic growth by mutually reinforcing one another (Crespi and Zuniga, 2012), levels of spending on research and development in the region remain quite low, as highlighted above.

In many developing countries, research and development is hampered by underdeveloped financial markets (Goedhuys, Janz and Mohnen, 2008). Moreover, firms may lack incentives to invest in innovation the farther away they are from the technological frontier, as the perceived returns to investment may be considered too low. Nevertheless, some newly industrialized economies have been successful at transforming research and development into innovation (UNESCO, 2014). In addition, the case of the Republic of Korea demonstrates that research and development expenditure can increase rapidly: between 1999 and 2013 alone, research and development expenditure in that country more than doubled to 4.15% of GDP – the highest rate in the region – compared with 3.47% of GDP in Japan in 2013, the second highest rate.<sup>30</sup>

*Vocational schools must be strengthened  
and teaching curricula reformed*

Strengthening research and development comprises one avenue to strengthen skills of the labour force. Another is to expand undergraduate and technical education to raise the overall level of skills, particularly as higher education is critical to providing the skills required to apply current technologies as well as to be able to assimilate, adapt and develop new technologies. Another important aspect is to strengthen vocational schools in the region and to reform teaching curricula to make them more relevant to today's environment, as the impact of education and training on productivity rests on their relevance to the needs in labour markets.

For instance, in Viet Nam the Government launched its vocational training-education development strategy during the period 2001-2010, the objective of which was to improve the quality of education, strengthen intellectual standards by moving towards compulsory lower secondary education by 2010 and improve human resources in the economy. By establishing facilities for public vocational training institutions and encouraging enterprises to provide on-the-job training to improve the skills and qualifications of their workers, some favourable results were achieved by 2010: the number of graduates from vocational schools, technical colleges and tertiary institutions rose by 3.08 times, 2.69 times and 2.35 times, respectively. The strategy

for the development of education has since been renewed in Viet Nam for the period to 2020.

*Better infrastructure is needed to lift  
productivity*

Greater industrialization will also require better access to infrastructure. Indeed, investments in infrastructure – transport, irrigation, energy, and information and communications technology – are crucial in achieving sustainable development and in strengthening productivity. For instance, while rural infrastructure can raise agricultural productivity in particular (Llanto, 2013), it also provides a good stimulus to the growth of the rural economy and contributes to greater productivity by reducing loss and inefficiency. In terms of the power infrastructure, firm-level analysis shows that, among Asia-Pacific countries, the percentage of firms using or sharing a generator in order to gain access to electrical power varies between 5.3% in Armenia and 75.7% in Myanmar (see figure 3.11); the average duration of a typical electrical outage varies between about 30 minutes in China and about 16.9 hours in Pakistan. In the latter case, losses due to electrical outages are estimated by firms to amount to 33.8% of total annual sales. Improving both access and the reliability of such infrastructure would increase firms' profitability and would encourage additional investment.

*Increases in labour productivity  
must translate into commensurate  
increases in income*

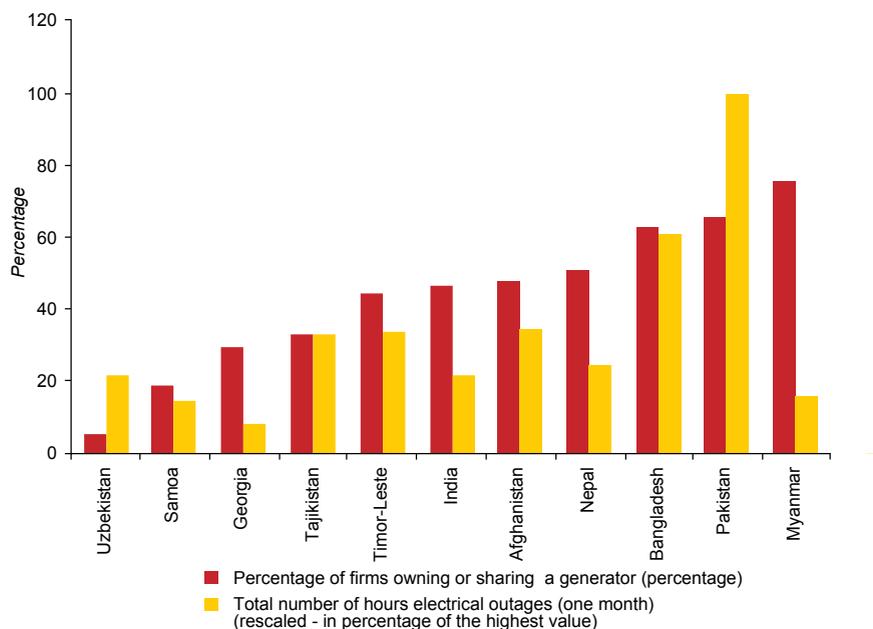
In parallel with the positive impact of greater agricultural yields on economic growth in the Asia-Pacific region (see above), higher productivity in the industrial sector should have a similar impact on overall economic growth. Yet, to ensure that the economies in the region are able to shift to a development model in which domestic and regional demand plays a greater role, increases in labour productivity will have to be translated into commensurate increases in levels of income – something that has not been the case in the region in the past (see box 3.4).

**3.3. Combating climate change and its impacts**

The effects of climate change are profound and far-reaching (Field and others, 2014). Among the numerous challenges that need to be addressed, climate change is expected to have impacts on productivity in particular. For one, climate change is expected to have adverse impacts on agricultural productivity. With agriculture being important in terms of GDP and much more critical in terms of

**Figure 3.11**

**Status of firms regarding generator usage and duration of electrical outages in selected Asia-Pacific economies for most recent available year**



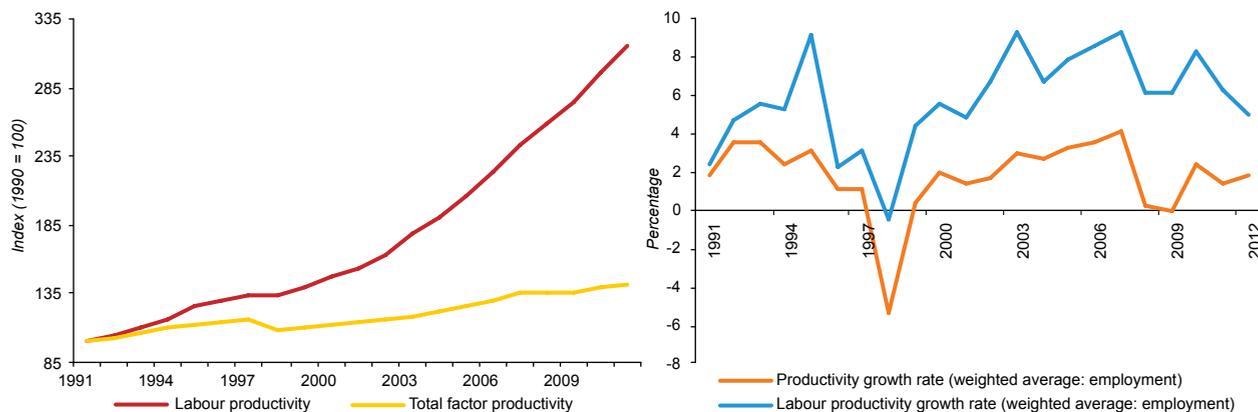
Sources: ESCAP, based on data from Enterprise Surveys of the World Bank. Data extracted through the World Bank data portal on 22 March 2016

**Box 3.4**

**Increasing real wages**

Notwithstanding recent declines in the rate of growth of total factor productivity, levels of that measure have increased significantly in the Asia-Pacific region since the 1990s. Increases in the level of labour productivity have been even greater (see figure A). As a reflection of higher levels of labour productivity, the region has also seen significant improvements in wage levels. Thus, in 2013, real wages in the region were more than 2.4 times as high as in 1999 compared with a global increase of only one third.<sup>a</sup>

**Figure A**  
**Total factor productivity and labour productivity in Asia and the Pacific**  
**(Cumulative Latin hypercube sampling; index, 1990 = 100; and annual growth rates – right-hand side)**



Source: ESCAP calculations, based on the Key Indicators of the Labour Market (KILM) database of the International Labour Organization and Penn world table 8.1. See Robert C. Feenstra, Robert Inklaar and Marcel P. Timmer, "The next generation of the Penn world table", *American Economic Review*, vol. 105, No. 10 (2015), pp. 3150-3182.

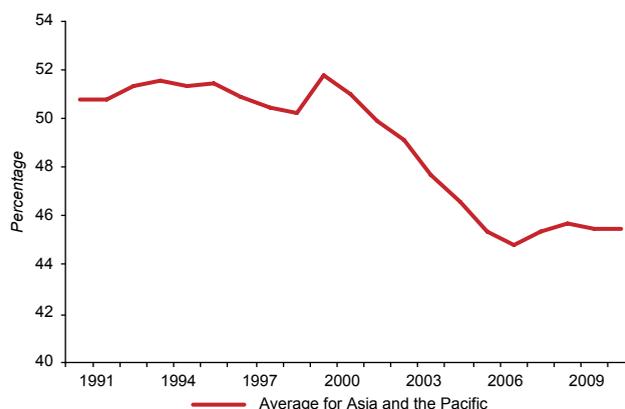
Box  
3.4

(continued)

However, growth in real wages has not been commensurate with the observed increases in productivity levels. As a consequence, labour's share in total income has declined in the Asia-Pacific region in recent years (see figure B),<sup>b</sup> which represents a shift from wages to capital income, as a declining share of wages in total income implies that a larger share of income is going to owners of capital. While shifts from labour-intensive to capital-intensive economic structures have supported economic growth, they have also reduced the capacity of some economies to provide rapid growth of employment. Indeed, such a shift from wages to profits is associated with higher inequality that has taken place across the developed and developing world. Moreover, the shift to capital-intensive economic structures has also expanded the inputs of energy and resources, which have contributed to growing environmental pressures.<sup>c</sup>

One important reason behind the relative decline in real wages is that economic growth has been led primarily by exports. Under such circumstances, wage increases tend to be limited and domestic labour employed in export industries tend not to share the productivity gains through equi-proportionate increases in real wages, so that product prices can be maintained, or even reduced to increase international competitiveness. Such a strategy can, however, be self-defeating, as when supply grows faster than domestic demand; in that case, innovation and productive investment may in fact be discouraged.<sup>d</sup> Importantly, such wage-compression dynamics negatively affect demand in the economy. Reversing this decline would therefore be important in fostering domestic and regional demand and ensuring that growth is sustained in the region and is more inclusive.

**Figure B**  
**Labour income share in Asia and the Pacific from 1991 to 2011**  
**(Percentage of output)**



Source: ESCAP calculations, based on Penn world table 8.1. See Robert C. Feenstra, Robert Inklaar and Marcel P. Timmer, "The next generation of the Penn world table", *American Economic Review*, vol. 105, No. 10 (2015), pp. 3150-3182.

Productivity gains therefore need to be passed on to workers in the form of higher real wages to enable and support greater domestic demand. Otherwise, there is a risk that increases in domestic demand, especially consumption, will end up being financed by borrowings. To some extent, the weak link between productivity and wages that has been observed in the region in recent years may be a result of the surplus labour model in which wages are not determined by the productivity of labour.<sup>e</sup> Yet, it may also be the result of weak or absent collective bargaining mechanisms and of weak labour market institutions.

<sup>a</sup> International Labour Organization Regional Office for Asia and the Pacific, "Wages in Asia and the Pacific: dynamic but uneven progress", Global Wage Report 2014/15: Asia and the Pacific Supplement. Available from [www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-bangkok/documents/publication/wcms\\_325219.pdf](http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-bangkok/documents/publication/wcms_325219.pdf).

<sup>b</sup> It should be noted, however, that in most economies in South-East Asia for which data are available, the wage share in total income has in fact been increasing since the turn of the century.

<sup>c</sup> United Nations, Economic and Social Commission for Asia and the Pacific, United Nations Environment Programme and Asian Development Bank, *Green Growth, Resources and Resilience: Environmental Sustainability in Asia and the Pacific* (ST/ESCAP/2600). Available from [www.unescap.org/esd/environment/flagpubs/GGRAP](http://www.unescap.org/esd/environment/flagpubs/GGRAP).

<sup>d</sup> United Nations Conference on Trade and Development, *Trade and Development Report 2010: Employment, Globalization and Development* (Sales No. E.10.II.D.3).

<sup>e</sup> W. Arthur Lewis, "Economic development with unlimited supplies of labour", *Manchester School*, vol. 22, No. 2 (1954), pp. 139-191.

providing livelihoods in developing countries, even a small percentage loss in agricultural productivity could impose large income losses in developing countries. Yet, the impact of climate change on agriculture will not, however, be uniform in the Asia-Pacific region. For instance, in East and South-East Asia crop yields are projected to increase by up to 20% by the middle of the twenty-first century. However, impacts on agricultural productivity are likely to be negative in the North and Central Asian and South and South-West Asian subregions, where yields might decrease by up to 30% in Central and South Asia (Smith and others, 2007).

Impacts of climate change on labour productivity are also likely to be negative. Historically, economic growth rates have been found to decrease with absolute latitude, which can be used as a proxy for temperature. As a result, income levels in hotter countries tend to be lower than in cooler countries, which may reflect labour productivity losses (Dell, Jones and Olken, 2008). The impact of greater increases in average temperature resulting from climate change is likely to amplify this phenomenon by producing a disproportionately stronger effect on the world's poor. Thus, warmer-than-average years generally contribute to negative output shocks in hot countries, but positive output experiences in cold countries. For instance, in hot environments, such as India and Thailand, annual output per capita decreases by up to 3.9% per degree Celsius compared with an increase of up to 4.1% in the colder countries of Canada and Sweden (Heal and Park, 2013).

In the context of climate change and its negative impacts, including those on growth in productivity, it is worth highlighting that boosting productivity is generally seen as a predominantly economic concern. Typically, little attention is paid to the efficiency of the economic system in terms of intensity of resource use, particularly energy, and associated environmental degradation. The current dominant development approach tends to favour the phenomenon known as “grow now, clean up later” without assessing the significant socioeconomic and environmental costs – expenditure borne most often by the most vulnerable in society. Climate change resulting from this approach negatively affects growth of productivity.

Moreover, efforts to increase both labour and total factor productivity often end up reflecting substitutions between human, natural and manufactured capital inputs. In other words, productivity improvements rely on increased intensity of energy use and other forms of capital in a disproportionate manner, with

undesirable consequences for society, including environmental degradation. Reducing or, at the very least, mitigating the consequences of such trade-offs between the economic, social and environmental spheres requires rethinking the notion of productivity. In a nutshell, policies geared towards enhancing productivity should internalize all aspects of various implications, particularly those related to energy use. Among its many benefits, this approach would reduce vulnerability to rising and volatile energy and resource prices and create savings that could be better invested in socioeconomic progress.

## **4. POLICIES TO INCREASE PRODUCTIVITY TO REVIVE ECONOMIC GROWTH AND SUPPORT SUSTAINABLE DEVELOPMENT**

Given the declining trend in productivity growth and its relationship with the Sustainable Development Goals, countries in the region would benefit tremendously by focusing on policies that foster growth in productivity. Doing so would facilitate the pursuit of the Sustainable Development Goals as well as improve the prospects for economic growth. At the same time, moving towards attainment of the Sustainable Development Goals will have a positive impact on productivity, as outlined above, thereby leading to a virtuous cycle between sustainable development and productivity growth.

Appropriate sectoral and economic policies as well as social policies form the primary entry point for countries to foster productivity growth and move towards attainment of the Sustainable Development Goals (see figure 3.1). These would affect economic, social and environmental dimensions of development and thereby strengthen sustainable development. This section contains an outline of some of these relevant policies.

### **4.1. Economic and sectoral policies**

Policies to strengthen the role of agriculture and industry, particularly through rural industrialization, are especially relevant in the Asia-Pacific region in view of the proportion of persons that continue to depend on the rural sector for their livelihood. Notwithstanding the important role that services can play, countries therefore need to pay particular attention to fostering productivity in agriculture and in industry.

#### ***Fostering productivity in agriculture***

Fostering productivity in the rural sector will be key to strengthening domestic demand. Notwithstanding

the tremendous transformation and despite rapid urbanization that the Asia-Pacific region has undergone in the last 5-6 decades, more than half the region's population, equivalent to 2.1 billion people, continue to live in rural areas. Although non-farm income is becoming an increasingly important part of household income, the rural sector relies heavily on agriculture, especially considering that, while the region is no longer dependent on exports or imports of raw material as in the past, the share of food, beverages and tobacco in manufacturing has generally increased. In this sense, raising productivity in agriculture is a vital element for strengthening domestic demand.

*Industrializing agriculture and raising agricultural productivity is critical*

The declining contribution of agriculture to national income and the high dependency of a disproportionately large number of people on agriculture for their livelihood on one hand and the apparent mismatch between economic growth and the capacity for absorbing labour that became "surplus" in the transition from the agricultural to non-agricultural sectors on the other have received considerable attention from policymakers in recent years owing to their implications for poverty, food security, sustainable urbanization and sustainable development.

A challenge for the region is therefore to simultaneously effect the convergence of labour productivity across the agricultural, industrial and services sectors. There is a need to make growth more inclusive by providing rural areas with growth dividends and thus contribute to the elimination of poverty and hunger. Industrializing agriculture and raising agricultural productivity must be at the centre of this effort in view of the great mass of the remaining poor and food-insecure people who live on agriculture and inhabit rural areas. Policymakers should remember that growth in agriculture not only stimulates economic growth but also contributes to equity and political stability.

In spite of very different national circumstances and resource endowments, policies that have helped countries in raising agricultural productivity have several common elements. First, economic reforms in more successful countries started with reforms that supported the poorest segments of society, usually those in the rural and agricultural sectors. The cases of China in recent times and the Republic of Korea in the 1950s are prominent examples. For instance, in China reforms started in late 1978 with the decentralization of agricultural production through

the contract responsibility system, which provided farmers with flexibility to decide what they wanted to grow and how much to produce and sell (FAO, 2009; Von Braun, Gulati and Fan, 2005); subsequently, the Government liberalized the pricing and marketing of agricultural goods. Those reforms contributed to the acceleration of agricultural growth from below 3% per annum prior to the reforms to more than 7% after the reforms. Farm incomes rose by as much as 15% during the period 1978-1984 (Von Braun, Gulati and Fan, 2005). Second, these policy reforms were targeted not merely to gain political expediency but all attempts were made to actually improve economic efficiency in the utilization of resources, especially land. Third, in all successful transformations, public policy facilitated the process by: establishing an enabling environment for farms and agro-firms to operate smoothly; making possible investment in rural infrastructure, such as roads, irrigation systems and ICT; easing access to credit to promote entrepreneurship through mechanisms to reduce or eliminate collateral requirements; investing in research and development; and providing extension services.

In contrast, countries that attempted to coerce farmers and agro-firms to deliver results through a combination of policy instruments and controls, such as price fixing, subsidies and mandatory procurement requirements, largely failed to raise agricultural productivity sustainably beyond a certain level.<sup>31</sup>

One important element for increasing productivity in agriculture will be to recognize the interconnections between the agricultural, industrial and services sectors. As the three sectors are interwoven, the issue of large and unsustainable "surplus labour" in agriculture cannot be solved within the boundaries of agriculture alone. Policies, strategies and action plans are therefore needed that will effect a convergence of labour productivity across the three sectors over time. Government policy should thus remove regulations that limit the movement of labour and capital across sectors; facilitate such movements by retraining workers to carry out different functions, such as training farmers in operating machines and training industrial workers to better utilize technical services in rural areas; and offer productivity-based financial incentives for encouraging such movements.

Another important element will be to ensure that the development of value chains does not result in the overexploitation of resources within a given landscape. Rather, agricultural value chains must be sustainable over time by conforming to environmental, economic and social boundaries in a given setting.

Policy should also be focused on an efficient allocation of resources, particularly land. For example, what is important is the efficient organization of land within a given environment rather than whether or not small farms or large farms are efficient.<sup>32</sup> For instance, in India small farms are largely efficient but lack economies of scale (ICAR, 2010). In Turkey's Tenth Development Plan (2014-2018) important "problem areas" have been identified; they include the small and fragmented structure of agricultural businesses. The same principle applies to technology choice, where the issue is not whether more mechanisation is the correct option, but rather which technology and machinery would be more efficient for producing a given commodity. Similarly, enhancing the quality and efficiency of extension services should be the main criterion for choosing and recommending extension services, not whether the private or the public sector should deliver them.

### *Research and development in agriculture must be strengthened*

Institutional foundations must be strengthened for undertaking technology-related research and development activities as well as policy formulation and analysis, including data collection. With growth and productivity in agriculture having stalled and the green revolution that boosted agricultural yields in the 1970s having bypassed millions, agriculture urgently needs another revolution (ESCAP, 2008). Yet, while the region has a large number of research and development institutions, small countries generally have inadequate capacity for such activities. Moreover, even when research and development institutions exist, many of them are not geared towards undertaking fundamental research but are focused mainly on applied or translational research.<sup>33</sup> In contrast, policy research affecting agriculture and its links to industrial and services sectors is rare.

The region needs to invest more in fundamental research and development and policy research, and strengthen networking arrangements that link public research and development institutions, academic institutions, civil society organizations, the private sector and farmers. Asia and the Pacific should be focused on fundamental issues facing agriculture from a technical point of view, such as minimizing exploitable yield gaps, identifying good farming practices to raise yields and developing new crop varieties with certain required qualities. In Turkey, investing in research and development has been a major part of the country's agricultural development efforts, with the Government having established gene banks in recent years; it also

supports the development of new product varieties through biotechnology, nanotechnology and technoparks, as well as the use of renewable energy in agriculture. With particular regard to the development of new product varieties, greater international effort, involving triangular cooperation may be required; regional economic organizations could play a decisive role in such efforts.

More efforts also need to be made to strengthen agricultural skills development and training. Although the region needs more agricultural scientists, policy and programme analysts, statisticians, technology experts, logistic managers and the like, research and development expenditures are declining in many countries. In such an increasingly resource-scarce environment, new and innovative technologies and agricultural practices, such as precision agriculture, laser-guided land preparation and automated agricultural systems, will become the norm because they conserve resources. Future agricultural competition and productivity will depend on how the region is able to innovate, identify, adapt or adopt new technologies. All such technologies require better human skills, and countries in the region will have to lay the foundation for this transition by attracting and training youth to be part of the "new agriculture", which will pose a challenge given that in many countries large proportions of young people tend to migrate to urban areas.

### *Fostering productivity in industry*

While in several economies in the region a rapid transformation from agriculture to services is taking place, history suggests that countries that have developed successfully have done so based upon rapid industrialization. In this regard, for development to be sustainable, it is impossible to leapfrog industrialization. Rapid growth of productivity in industry, particularly in the manufacturing sector, is usually considered as necessary to raise profitability and wages in this sector, which in turn generates demand for goods produced in other sectors, enabling them to experience rapid expansion in output, productivity and wages. Moreover, technology spillover effects from the manufacturing sector can be transmitted to other sectors. Strengthening productivity in this sector is therefore an important element in strengthening domestic and regional demand.

### *Total factor productivity in manufacturing must be increased*

Manufacturing is capable of experiencing rapid productivity gains largely through technical progress,

innovation, externalities, economies of scale and knowledge spillover (Kaldor, 1966; Murphy, Schleifer and Vishny, 1989). These productivity gains can be further realized at the macroeconomic level through structural transformation and changes in resource allocation from less to more productive firms and sectors (Bernard and Jensen, 2004). In particular, improving total factor productivity in manufacturing is recognized as an effective way for enhancing overall performance and catching up with other better performers; this process describes the “convergence hypothesis”.

Several policies have been put forward to increase productivity in industry. These include: trade reforms; skills-upgrading programmes for the workforce; infrastructure-related programmes, which refer not only to physical but also financial and social infrastructure; efforts to improve accessibility of the enterprises to ICT, and proactive measures to encourage FDI and innovation.

For instance, FDI is expected to bring into countries foreign capital and foreign technology which would contribute to productivity growth not only directly but also through spillover effects. Similarly, innovations are expected to develop technology which would contribute to productivity and employment. Also, there are sufficient indications for improvements to be followed in terms of allocative efficiency, that is, resources to be diverted towards sectors of higher productivity away from sectors of lower productivity. For instance, in India major policy changes have been witnessed in the manufacturing sector since 1991, because industrial delicensing and the removal of restrictions on foreign investment have modified the profile of this sector considerably (Aghion and others, 2008). In addition, the Government of India has launched several initiatives and policies to increase productivity and the role of manufacturing in the economy (see box 3.5).

Trade policies can stimulate exports and imports, especially of intermediate and capital goods, which can lead to gains in productivity. In addition, encouraging firms to innovate and conduct research and development activities through fiscal incentives and financial benefits that are aimed at making industry (in particular, manufacturing) and services more efficient, technologically up to date and competitive, can also lead to growth in productivity (Sharma, 2012; UNIDO, 2005). In particular, non-traditional ICT-intensive services, which are characterized by growing tradability, increasing technological sophistication and low transport costs, are at the forefront of a third industrial revolution which started showing up in

terms of a revival in productivity growth in the 2000s (Ghani, 2010).

This being said, however, there is of course a trade-off between providing fiscal incentives and the need in the region to raise more fiscal revenues to strengthen development (ESCAP, 2014a). With many of the economies in the region having low tax-to-GDP ratios, actual public resources that are spent on, for instance, enhancing research and development expenditure, or on infrastructure-related investment, may be very low, despite being relatively important in terms of percentage of overall government expenditure. In this regard, as outlined in chapter 1, ensuring fiscal sustainability through the raising of adequate revenues plays an important part in supporting long-term national development priorities, which includes accelerating productivity growth rates.

## 4.2. Social policies

Various social policies can contribute to increasing productivity for reviving economic growth and supporting sustainable development. For instance, policies that increase the share of labour in national income are important to strengthen domestic demand, and thereby contribute to a more sustainable model of development in which domestic and regional factors play a larger role than relying primarily on export demand of developed economies. Other policy tools include, for instance, minimum wage policies, greater social protection and social transfers that could support aggregate demand during times of crisis, as well as public employment guarantees, taking possible fiscal constraints into account.

### *Wages and social protection*

To catalyse a shift to a development model in which domestic and regional demand play a larger role in driving the region's demand, gains in labour productivity must be translated into commensurate gains in wage levels, which has not been the case in recent years, as witnessed by the declining proportion of the share of wage income in output. Rising inequality and relatively weak wage-setting institutions in many countries mean that the benefits of growth often have not been spread as widely as would have been feasible (ILO, 2015d). Moreover, the weak link between productivity and wages may also be due to surplus labour, such that wages are not determined by the productivity of labour.

In this regard, minimum wages can act as an important policy tool to ensure that wage levels are increased.

India's "National Manufacturing Policy" of 2011 was designed to create 100 million more jobs and contribute 25% to the country's GDP in a decade.

The policy addresses in great detail environmental and regulatory issues, labour laws and taxation, but it is the proposed creation of national manufacturing investment zones, or NIMZs, which are clusters of manufacturing units that represent a unique way of integrating industrial infrastructure to achieve economies of scale, that have become the focus of attention. NIMZs will be developed as integrated industrial townships with world-class infrastructure and land use based on zoning, and clean and energy-efficient technology. Each zone will be at least 5,000 hectares in size. NIMZs will be built on non-agricultural land with adequate water supply, and ownership will be with state governments.

The new policy is aimed at introducing flexibility into the labour market by offering employers greater freedom in hiring and firing. It also enables so-called sunset industrial units, that is, firms/sectors that remain important to the economy but are losing favour with investors due to such factors as declining employment-generation capacity and profits or comparatively higher environmental costs, to follow a simplified exit mechanism. At the same time, the policy maintains workers' rights which otherwise might run the risk of being compromised in the name of flexibility.

"Make in India" under the current Government is now a flagship initiative. An important feature of the manufacturing policy is its financial and development incentives for small and medium-sized enterprises. On the whole, the promise of the policy is to increase the share of the manufacturing sector in the country's gross domestic product from the existing 16% share to 25% by 2020. The formation of "smart cities" is an attempt to reduce the cost of investment and reap the benefits of concentration. The new policy and the creation of NIMZs would seem to subscribe to the view that concentration can lead to enhanced productivity.

In order to raise the share of the manufacturing sector, the Government has identified 25 focus sectors for development; 100% FDI is allowed in all sectors, except space (74%), defense (49%) and the news media (26%). Key emphasis of the "Make in India" campaign is to improve the ease of doing business in these sectors through faster clearances, transparency for permits and financing, as well as efficient e-governance mechanisms.

Since the launch of Make in India in September 2014, FDI into the country has witnessed a 48 percent jump in the seven-month period between October 2014 and April 2015, and a 31 percent increase, valued at US \$9.50 billion, between April and June 2015. It is still early days, and critical infrastructural developments are needed to convert investment into manufacturing gains. Nevertheless, *Make in India* affirms that India is open for business.<sup>a</sup>

The current Government has also launched the "Skill India" initiative and the "Start Up India Stand Up India" scheme. The objective of the Skill India initiative is to create opportunities for youth and to develop more of those sectors which had been involved in skills development in the past and to identify new sectors for skills development; this campaign was launched in July 2015 to prepare graduates and workers alike for the skills needed by industry. It is aimed at imparting training to 400 million young people by 2022 through the National Skill Development Corporation.<sup>b</sup> Start Up India Stand Up India comprises a 19-point action plan for start-up enterprises in India and is aimed at boosting entrepreneurship and generating employment for the youth.

<sup>a</sup> For additional details, see [www.india-briefing.com/news/indias-economic-initiatives-magnet-investments-11247.html/#sthash.XWla3aDn.dpuf](http://www.india-briefing.com/news/indias-economic-initiatives-magnet-investments-11247.html/#sthash.XWla3aDn.dpuf).

<sup>b</sup> <http://pibphoto.nic.in/documents/rlink/2015/jul/p201571502.pdf>.

For instance, in Thailand minimum wages were increased significantly in 2013 following a decade of flat real wages. Similarly, in the Republic of Korea minimum wages grew faster than inflation between 2012 and 2014, whereas significant increases in minimum wages have revived wage growth in Viet Nam.

In Cambodia, minimum wages in the garment industry increased to \$128 per month starting on 1 January 2015 compared to \$61 per month in 2013, and in Malaysia the country's first-ever minimum wage standards were implemented at the beginning of 2013. These developments will help stimulate

domestic demand and enable the region to move towards a development model that relies relatively less on exports and facilitates sustainable development instead of just promoting economic growth.

However, while minimum wages are an important wage-fixing tool, they are more relevant for less skilled workers. In contrast, wages for higher paid workers are usually better determined directly by employers and employees or trade unions. In this regard, Governments should strengthen the context needed for this to happen.<sup>34</sup>

Strengthening social protection is a further important tool to foster domestic demand. Thus, providing unemployment insurance and strengthening access to old-age pensions would, for instance, not only protect the vulnerable in times of crisis and contribute to reducing inequality, but would also decrease the need for precautionary savings and would strengthen demand. Similarly, providing an employment guarantee, such as has been done in India with the Mahatma Gandhi National Rural Employment Guarantee Act, would not only form an important pillar in the efforts to eradicate poverty and strengthen domestic demand, but also enable more consumption. Importantly, such schemes would not be expensive; they are well within the reach of most developing countries in the region, especially when considering the existing tax potential of the region.<sup>35</sup>

### *Reforming education for innovation and productivity*

Despite efforts in Asia-Pacific economies to improve access to and the quality of education systems, the region has not yet become a technological or innovational leader. In fact, while economies in the region host multinational enterprises and have proven themselves as being able to adopt foreign technologies, increasing productivity may also require more creativity and indigenous innovative skills. Moreover, a prerequisite for workers to be able to use new technology and capital productively is that they have the appropriate skills and abilities that are required to do so. Key examples of policy areas that should be considered to foster productivity therefore also include not only improving the availability and quality of physical as well as information and communication infrastructure, but also expanding investment in education, with a particular focus on improving its quality and increasing the focus on science, technology and innovation. Policy attention is also increasingly being paid to technical and vocational education and training, which comprises formal, non-formal and informal learning for the world of work.

In this regard, education and training systems need to be adapted to provide new skills, competencies and abilities. Reassessing training and educational systems by taking into account such criteria as quantity, quality and relevance of teaching methods and teaching material would therefore be an important step in strengthening the innovation potential of the region. For instance, Asia-Pacific countries should develop educational systems that draw more upon “lifelong learning” systems for all which offer a more active role for learners over their lifetime than “traditional learning” systems where teachers are the source of knowledge, as such systems are less supportive of a knowledge-based economy and thus of innovation.

Improving the skills of the labour force is particularly important for highly labour-intensive industries that are often characterized by low-wage employment, such as the garment industry. Although mechanization and automation have not yet diminished the importance of workers in industry, some industries are vulnerable to potentially large-scale layoffs when pressures for wage increases rise. It should be pointed out that several countries have already seen socioeconomic unrest stemming from low wages, low standards of safety and security, and an overall weak implementation of labour laws and compliance with ILO conventions, all of which factors have led to an increase in labour costs. Providing workers with a larger, more broad-based skills set would therefore be important to increase their employability in other industries. Thus, for former employees of multinational enterprises, the combination of training and their experience in such enterprises could help create competitive firms or firms able to supply parts of products which meet the standards of multinational enterprises (Fosfuri, Motta and Rønde, 2001; Görg and Greenaway, 2004), provided that adequate entrepreneurial policies are implemented in the country.

## 5. CONCLUSIONS

The strong economic growth witnessed in the Asia-Pacific region over the last few decades was primarily driven by factor accumulation. Yet, at the same time, significant increases in productivity, particularly in labour productivity, have also taken place in the region. Since the 2008 economic and financial crisis, economic growth and productivity growth have, however, been on a downward trend. This is worrying as both are vital for development.

To bolster Asia-Pacific economic growth in the light of the fragile global economic conditions, priority must be given to stimulating domestic and regional demand.

In this chapter, it has been argued that doing so will require higher levels of productivity.

While many countries in the region are shifting from an agriculture-based economy to one in which services plays a dominant role, greater emphasis must be placed on strengthening productivity in agriculture. At the same time, appropriate strategies and policies are needed to foster rural industrialization and absorb the push of labour from the agricultural sector. For one, the current shift to a serviced-based economy is coming at an early stage in the region's developing countries. In addition, with almost 4 of every 10 workers still engaged in agriculture and more than half the developing region's population living in rural areas, development of the rural economy remains pivotal to making growth more sustainable. Increasing productivity in agriculture and industrializing the rural sector will therefore be vital to strengthening domestic demand.

In addition to policies that foster productivity growth and thereby increase aggregate supply, catalysing a shift to a growth model in which domestic and regional factors play a relatively larger role also need to be accompanied by policies that strengthen aggregate demand. In this respect, productivity gains need to be shared more equally with workers. Thus, increases in productivity must be coupled with commensurate increases in real wages to enhance the well-being of societies.

The Sustainable Development Goals provide a critical entry point to strengthening productivity. While strengthening productivity will contribute to the success of a number of the Sustainable Development Goals, investing in their achievement will also nurture productivity growth, creating a virtuous cycle between sustainable development, productivity and economic growth.

## Annex

### Sustainable Development Goals

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

Endnotes

- <sup>1</sup> Since the adoption of the Millennium Declaration in September 2000, the line for measuring extreme poverty has been updated twice: first, in 2008 when this indicator was updated to \$1.25 a day measured at 2005 international prices adjusted for purchasing power parity (PPP); and second, in 2015 when the indicator was updated to \$1.90 a day measured at 2011 international prices adjusted for PPP.
- <sup>2</sup> General Assembly resolution 70/1.
- <sup>3</sup> See annex for a complete list of the Sustainable Development Goals.
- <sup>4</sup> For instance, a number of authors have claimed that the main source of economic growth in Asia is the rapid accumulation of capital: Susan M. Collins and Barry P. Bosworth, “Economic growth in East Asia: accumulation versus assimilation”, *Brookings Papers on Economic Activity*, No. 2, 1996, pp. 135-203; Kim Jong-Il and Lawrence J. Lau, “The sources of economic growth of the East Asian newly industrialized countries”, *Journal of the Japanese and International Economies*, vol. 8, No. 3, pp. 235-271; and Alwyn Young, “The tyranny of numbers: confronting the statistical realities of the East Asian growth experience”, National Bureau of Economic Research Working Paper No. 4680. Yet, the literature is not undivided on these issues. For instance, subsequent to 2002, the importance of TFP, as opposed to factor accumulation, in growth for developing Asian economies has become more prominent, according to Donghyun Park and Jungsoo Park, “Drivers of developing Asia’s growth: past and future”, Asian Development Bank Economics Working Paper Series 235; for a critical survey, see Jesus Felipe, “Total factor productivity growth in East Asia: a critical survey”, *Journal of Development Studies*, vol. 35, No. 4, pp. 1-41.
- <sup>5</sup> The term *economies of agglomeration* refers to the benefits of firms, such as being located near each other, whereas *economies of scale* refers to benefits of firms increasing their size.
- <sup>6</sup> In the case of North and Central Asian economies, it is worth noting that these economies went through a transition towards a market-based economy during the 1990s and experienced a collapse of their production. This situation may explain the negative or low contribution of input factors to output growth and the larger contribution of total factor productivity to output growth, as noted in Robert C. Feenstra, Robert Inklaar and Marcel P. Timmer, “The next generation of the Penn world table”, *American Economic Review*, vol. 105, No. 10, pp. 3150-3182.
- <sup>7</sup> Using a simple headcount of employed persons can hide changes in average hours worked, caused by the evolution of part-time work or the effect of variations in overtime, absence from work or shifts in normal hours. In such cases, the use of *hours* actually worked per worker would be a preferable measure to its use in the denominator. However, lack of data availability on hours worked per worker is a limiting factor in many developing countries. Moreover, the correlations between using either hours worked or headcount of employed persons are quite strong, at least in countries that are members of the Organisation for Economic Co-operation and Development. See Rebecca Freeman, “Labour productivity indicators: comparison of two OECD databases – productivity differentials and the Balassa-Samuelson effect”, OECD Statistics Directorate, July 2008.
- <sup>8</sup> Employment-to-population ratios in the region range from more than 80% in Cambodia to less than 37% in Timor-Leste.
- <sup>9</sup> Indeed, the Hodrick-Prescott filter removes the cyclical fluctuations from the productivity series in figure 2 above).
- <sup>10</sup> Australia, Bangladesh, Cambodia, China, Fiji, India, Indonesia, Iran (Islamic Republic of), Japan, Lao People’s Democratic Republic, Malaysia, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Sri Lanka, Tajikistan, Thailand, Turkey, Uzbekistan and Viet Nam.
- <sup>11</sup> The agricultural productivity gap is defined as  $\frac{(1-y_a) / (1-l_a)}{y_a / l_a}$ , where  $y_a$  is the share of agriculture in GDP and  $l_a$  is the share of agriculture in total employment. The ratio must be equal to one under the assumption of a competitive labour market, which implies that workers are paid the value of their marginal product and that firms hire up to the point where the marginal value product of labour equals the wage. This measure has some biases coming from various sources and data noise, yet even after considering sector differences in, for instance hours worked and the skill level of workers as well as alternative measures of sector output constructed from household survey data, a puzzlingly large gap remains. See Douglas Gollin, David Lagakos and Michael E. Waugh, “The agricultural productivity gap”, National Bureau of Economic Research Working Paper No. 19628, November 2013.
- <sup>12</sup> The value must be equivalent to one when values for value added in agriculture per worker are equal to per capita GDP; values below one indicate situations where agricultural value added per worker is lower than per capita GDP.

- <sup>13</sup> Industry's share in GDP declined from approximately 39% in 1990 to 37.1% in 2013.
- <sup>14</sup> Based on the decomposition of value-added growth in terms of employment growth and labour productivity growth, it has been noted that only a handful among the 62 groups within the organized (formal) manufacturing sector experienced rapid productivity growth of at least 5% per annum and employment growth of at least 4% per annum simultaneously. In this regard, see Arup Mitra, "Can industry be the key to pro-poor growth? An exploratory analysis for India", ILO-Asia-Pacific Working Paper Series (New Delhi, International Labour Organization, 2013).
- <sup>15</sup> GDP per person was equivalent to \$3,269 in constant 2005 terms at purchasing power parity (PPP) in India in 2013. In developed economies, it was \$18,149 in 1980 (also in constant 2005 terms at PPP).
- <sup>16</sup> Services have accounted for more than 50% of value added in GDP since 2000 in developing economies in the region when GDP per capita was \$3,131 (in constant 2005 terms at PPP). This level is barely a fifth of the GDP per capita levels of more than \$15,000 (at PPP) that existed in 1970 in developed economies in the region, when services contributed 50% of value added in GDP.
- <sup>17</sup> This aspect is also confirmed by Asian Development Bangkok, *Key Indicators for Asia and the Pacific 2013*, special chapter on "Asia's economic transformation: where to, how, and how fast?" (Mandaluyong City, Philippines, ADB, 2013).
- <sup>18</sup> For growth accounting, see Robert M. Solow, "A contribution to the theory of economic growth", *Quarterly Journal of Economics*, vol. 70, No. 1, pp. 65-94. For the stochastic frontier approach, see Denis J. Aigner, C.A. Knox Lovell and Peter Schmidt, "Formulation and estimation of stochastic frontier production function models", *Journal of Econometrics*, vol. 6, No. 1, pp. 21-37; and Wim Meeusen and Julien Van den Broeck, "Efficiency estimation from Cobb-Douglas production functions with composed error", *International Economic Review*, vol. 18, No. 2, pp. 435-444.
- <sup>19</sup> These methods include growth in the efficiency of using existing resources and crop and livestock varieties arising from the use of high-yielding, disease-resistant and drought-tolerant varieties; the implementation of efficient and timely cultivation and harvesting practices; and the application of agricultural practices that control more precisely the use of water, fertilizer and other agricultural inputs ("precision agriculture"); providing better education in rural areas that enhances community understanding of modern agricultural practices; institutional innovation; and improved quality of resources.
- <sup>20</sup> For an extensive review of determinants of productivity, see Anders Isaksson, "Determinants of total factor productivity: a literature review", Research and Statistics Branch Staff Working Paper 02/2007 (Vienna, United Nations Industrial Development Organization, 2007).
- <sup>21</sup> Technological progress was considered to be exogenous in the neoclassical models of growth. See Robert M. Solow, "A contribution to the theory of economic growth", *Quarterly Journal of Economics*, vol. 70, No. 1, pp. 65-94. Such progress has since been included as an endogenous process of growth by, for instance, considering spillovers (externalities) of the skilled workforce. See P.M. Romer, "Increasing returns and long-run growth", *The Journal of Political Economy*, vol. 94, No. 5, pp. 1002-1037.
- <sup>22</sup> These economies comprise China; Hong Kong China; India; Indonesia; Malaysia; Pakistan; Philippines; Republic of Korea; Singapore; Taiwan Province of China; Thailand; and Viet Nam.
- <sup>23</sup> Hong Kong, China; Indonesia; Kazakhstan; Macao, China; Malaysia; Russian Federation; Shanghai, China; Singapore; Taiwan Province of China; Thailand; Turkey; and Viet Nam.
- <sup>24</sup> Hong Kong, China; Japan; and Singapore also ranked highest in *science*.
- <sup>25</sup> Trade intensity is captured by the ratio of total exports plus imports to the value of total sales of the industry.
- <sup>26</sup> While there is no standard definition of *infrastructure* across economic studies, the term public infrastructure includes not only transport and energy infrastructure, but also, among other things, *social* infrastructure, such as educational infrastructure (schools and universities) and health infrastructure (hospitals and health services). For a discussion on these aspects, see Gianpiero Torrisi, "Public infrastructure: definition, classification and measurement issues", *Economics, Management, and Financial Markets*, vol. 4, No. 3, pp. 100-124.
- <sup>27</sup> Food Security Indicators of the Food and Agriculture Organization of the United Nations, released on 12 October 2015. The prevalence of undernourishment expresses the probability that a randomly selected individual from the population consumes an amount of calories that is insufficient to cover his/her energy requirement for an active and healthy life. The indicator is computed by comparing a probability distribution of habitual daily dietary energy consumption with a threshold level called the minimum dietary energy requirement. Both factors

are based on the notion of an average individual in the reference population.

- <sup>28</sup> For determinants at the microeconomic level, see Gustava Anríquez, Silvio Daidone and Erdgin Mane, “Rising food prices and undernourishment: a cross-country inquiry”, *Food Policy*, vol. 38, No. C, pp. 190-202. Those authors provided some evidence on the characteristics of households in different Asian developing countries and identified as potentially important factors: (a) income of the household; (b) education of the head of the household; and (c) access to cropland. An attempt to address the same type of issues by considering the increasing urbanization of developing countries is contained in Alberto Zezza and Luca Tasciotti, “Urban agriculture, poverty, and food security: empirical evidence from a sample of developing countries”, *Food Policy*, vol. 35, No. 4, pp. 265-273. Those authors also suggested that agriculture can help the poorest households.
- <sup>29</sup> This result is in line with that of other authors who analysed the impact of agricultural GDP on non-agricultural GDP to support the role of agriculture in poverty eradication strategies. See Luc Christiaensen, Lionel Demery and Jesper Kuhl, “The (evolving) role of agriculture in poverty reduction: an empirical perspective”, *Journal of Development Economics*, vol. 96, No. 2, pp. 239-254.
- <sup>30</sup> Expenditure on research and development was third highest in Singapore, reaching 2% of GDP in 2012 (latest data available).
- <sup>31</sup> For instance, in Indonesia, all three policies were applied together, but failed to produce the desired result of improved productivity. Thus, input subsidies in the form of fertilizer subsidies and price support for paddy farmers have been used in Indonesia since the beginning of the 1970s. While the initial objective had been to stabilize rice prices, later on it was directed towards raising the domestic price of rice and increasing self-sufficiency. See Dalili Cervantes-Gody and Joe Dewbre, “Economic importance of agriculture for sustainable development and poverty reduction: findings from a case study of Indonesia”, Global Forum on Agriculture, 23-30 November 2010, Policies for Agricultural Development, Poverty Reduction and Food Security, OECD Headquarters, Paris. Mandatory procurement policies and production of sugar largely fell after 1997, yet rice imports were banned in 2004, and trade protection for rice remained high. While TFP could explain up to 60% of agricultural growth in Indonesia during the period 2003-2012, this increase was largely attributed to a gradual shift from the production of food staples to higher-value perennial, horticultural and livestock products rather than to commodities that were provided with subsidies and price support. See Keith O. Fuglie, “Productivity growth and technology capital in the global agricultural economy”, in *Productivity Growth in Agriculture: An International Perspective*, K.O. Fuglie, S.L. Wang and V.E. Ball, eds. (Wallingford, United Kingdom, CAB International, 2012).
- <sup>32</sup> In some environments, small farms are efficient whereas large farms are more efficient in others under different conditions.
- <sup>33</sup> *Translational research* applies findings from basic science to enhance human health and well-being. It is thus not geared towards enhancing production by making it more effective or efficient.
- <sup>34</sup> Such a move is covered in the Right to Organise and Collective Bargaining Convention, 1949 (No. 98) of the International Labour Organization. That convention, the name of which was changed when it entered into force in 1951, may be accessed at [www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100\\_ILO\\_CODE:C098](http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C098).
- <sup>35</sup> Highlights of the costs involved for these programmes are available in United Nations, Economic and Social Commission for Asia and the Pacific, *Economic and Social Survey for Asia and the Pacific 2013: Forward-looking Macroeconomic Policies for Inclusive and Sustainable Development* (Sales No. E.13.II.F.2). The 2014 issue of that publication points to existing tax potential. See *Economic and Social Survey for Asia and the Pacific 2014: Regional Connectivity for Shared Prosperity* (Sales No. E.14.II.F.4).