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Pakistan: Spending Needs for Reaching the
Sustainable Development Goals (SDGs)

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Pakistan: Spending Needs for Reaching the Sustainable Development Goals (SDGs)[1,2]

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Abstract

This paper assesses the additional spending required to make substantial progress towards achieving the SDGs in Pakistan. We focus on critical areas of human (education and health) and physical (electricity, roads, and water and sanitation) capital. For each sector, we document the progress to date, assess where Pakistan stands relative to its peers, highlight key challenges, and estimate the additional spending required to make substantial progress. The estimates for the additional spending are derived using the IMF SDG costing methodology. We find that to achieve the SDGs in these sectors would require additional annual spending of about 16 percent of GDP in 2030 from the public and private sectors combined.

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I. INTRODUCTION

Pakistan has integrated the SDGs into its national development agenda. Pakistan committed to the 2030 Agenda for Sustainable Development in 2015 and adopted the SDGs as part of its national development agenda in 2016. Pakistan has designed a comprehensive national SDG framework to identify and prioritize goals in different areas and guide the design of development strategies. The national and provincial assemblies have established taskforces to monitor progress towards the SDGs and Pakistan underwent a Voluntary National Review (VNR) in 2019 to take stock of its progress.

While Pakistan has made progress in some areas, its current performance in critical SDG sectors lags that of its peers. The 2019 VNR highlighted progress in several areas, including poverty and child stunting, transparency and accountability, and gender equality and women's empowerment. However, Pakistan's current performance in education, health, electricity, and water and sanitation—as measured by the SDG indices of each sector—is below the median for Emerging Market and Developing Economies (EMDEs) (Figure 1). Pakistan's performance in education and water and sanitation is also below the median for countries with GDP per capita below US$3,000. In a context of rapid population growth, Pakistan needs to redouble its efforts to make further progress towards meeting the SDGs.

Figure 1. Pakistan's Performance in Selected SDGs
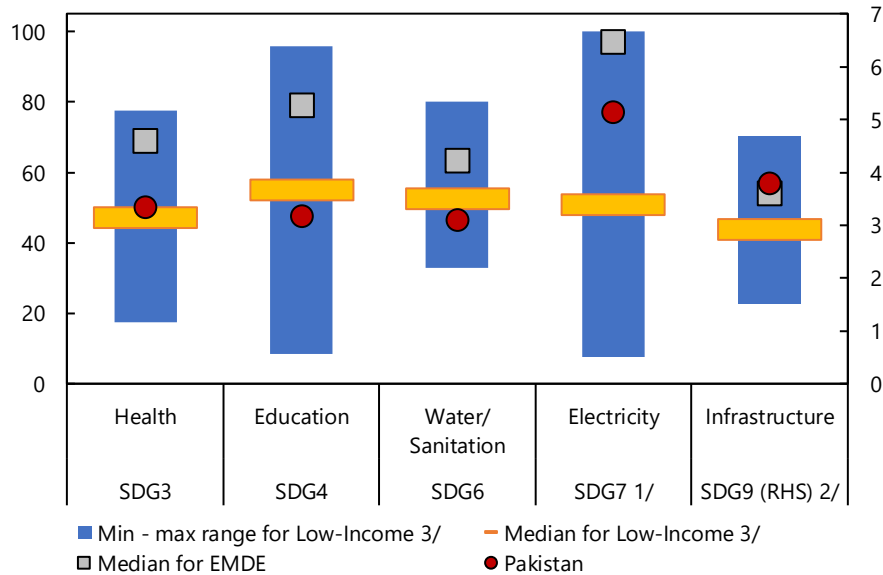
Source: IMF staff calculations using Sachs and others (2019).
Notes: 1/ Access to electricity (percentage of population).
2/ Quality of overall infrastructure.
3/ Countries with GDP per capita below US$3,000.

Following the methodology developed by Gaspar and others (2019)—see details in Annex—to achieve the Sustainable Development Goals (SDGs) in critical sectors would require additional annual spending of 16.1 percent of GDP in 2030 from the public and private sectors combined. The breakdown by sector is as follows:

- *Education – raising enrollment rates, improving essential infrastructure, and increasing the quantity and quality of teachers.* Additional spending needs in education are about 5.7 percent of GDP. The required spending reflects both a need to (i) increase the teacher wage bill to hire more teachers to support higher enrollment and reduce class size; and (ii) raise capital spending to build more schools and improve school infrastructure such as the availability of bathrooms, electricity, drinking water, and the existence of boundary walls.

- *Health – increasing the number of doctors and medical personnel.* The additional spending needs in health care are about 5.4 percent of GDP. To achieve high performance in the SDGs, the number of doctors should be increased by about 50 percent. The number of other medical personnel, currently far below the high performing countries, should be increased by about six times from its current level. As wages of doctors are slightly higher than in high-performing peer countries, efforts could primarily focus on increasing the number of doctors while allowing salaries to increase by less than GDP per capita.

- *Electricity – keeping up with population and economic growth while moving to a more sustainable power mix.* Electricity consumption is expected to increase by 78 percent between 2019 and 2030, reflecting population growth and higher per capita consumption. To keep up with this higher consumption, Pakistan will need to invest an aggregate amount of US$24.5 billion by 2030, equivalent to spending 0.7 percent of GDP every year from 2020 to 2030. This should be accompanied by the planned shift toward renewable energy, which could bring substantial environmental advantages at a local and global level.

- *Roads – gradually increasing rural access.* Gradually raising rural access from the current 61 percent to 75 percent by 2030 will require about 94,146 additional kilometers of all-weather roads (about a 36 percent increase in road length). This will require investing an aggregate amount of US$76 billion by 2030, equivalent to spending 2.3 percent of GDP every year from 2020 to 2030.

- *Water and sanitation – aiming at safely managed water and sanitation for all.* Closing the water and sanitation gap would require investing an aggregate amount of US$55 billion by 2030, equivalent to spending 2 percent of GDP every year from 2020 to 2030. The bulk of the burden comes from sanitation in rural areas.

This analysis was completed before the global impact of COVID-19 became clear and therefore does not incorporate the effects of the pandemic on spending needs and GDP projections. However, it is clear that the pandemic will have a substantial negative effect on the fiscal space available to countries due to expenditures on addressing the immediate effects of COVID-19 and to declining government revenues. As explained in García-Escribano and others (forthcoming), the cost of attaining the SDGs may also increase as a result of the pandemic. Educational delays are likely as a result of school closures, while provision of preventive healthcare may be hampered by fears of contagion in medical facilities. Nonetheless, it is possible that the pandemic could hasten progress towards the SDG targets in some respects, as higher health spending may improve access to healthcare for some groups, and the emphasis on frequent handwashing could spur the provision of better water and sanitation facilities.

II. Spending Estimates

A. Education

Despite improvements over the last decades, education outcomes in Pakistan lag those of its peers, especially in secondary and tertiary education. The primary gross enrollment rate has increased significantly over the last 15 years (from 73 percent in 2003 to 94 percent in 2018), but 23 million children aged 5 to 16 are estimated to be out of school (about 40 percent of students aged 5 to 16) (ADB, 2019). While gross enrollment rates in pre-primary education are above peers, enrollment rates in secondary and tertiary education remain below (Figure 2).[3] Gross enrollment rates for female student are even lower than for male students, particularly at the pre-primary and primary levels. Average years of schooling have gradually increased, from 3.3 in 2000 to 5.2 in 2018—though remain below MENAP and EMDE averages. These improvements have resulted in increases in the adult literacy rate, which has improved from 55 percent in 2011 to 59 percent in 2017.

Figure 2. Education Outcomes–Evolution and International Comparison
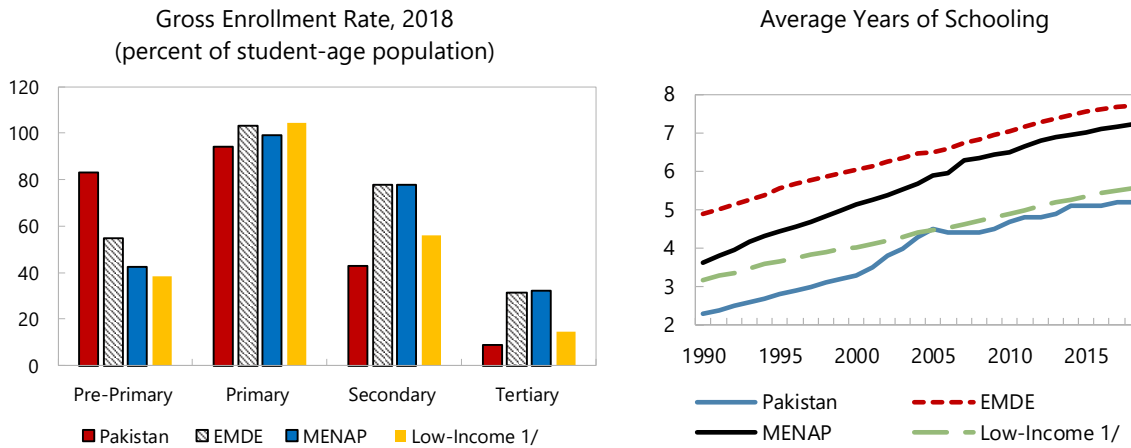
Gross Enrollment Rate, 2018
(percent of student-age population)

Average Years of Schooling

Source: IMF staff calculations using World Bank World Development Indicators.
Note: 1/ Countries with GDP per capita below US$3,000.

The weak performance in education is mainly driven by a low level of spending, but there is also room to increase spending efficiency. Pakistan's total education spending (public and private) reached about 4 percent of GDP in 2018, below its peers (Figure 3). The student-teacher ratio (22) is above that of high-performing countries with similar income per capita (15 on average). Moreover, the student-teacher ratio differs significantly across education levels, reaching over 40 for primary education and only 13 for secondary and tertiary education. There is also room to increase spending efficiency, as suggested by Pakistan's low secondary net enrollment rate compared to countries with similar spending per student. Spending efficiency could notably be

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[3] The *gross* enrollment rate is the number of students enrolled in a given education level (primary, secondary, or tertiary), regardless of age, divided by the population of the age group that officially corresponds to that level. Therefore, gross enrollment rates could be higher than 100 percent. This is as opposed to the *net* enrollment rate, which is the number of students enrolled in a given level who belong to the age group that officially corresponds to that level, divided by the total population of the same age group.

increased by tackling the issue of "ghost" teachers who are on the teachers' payroll but are not actually working as teachers. Teacher absenteeism has been historically high in Pakistan, but recent initiatives have reduced it from 24 percent in 2009 to 12 percent in 2016 (ADB, 2019). Minimum qualifications for public school teachers have been increased, but there is still significant room to improve teacher quality.

Demand- and supply-side factors further constrain improvements in education outcomes. While shortfalls in education spending hinder improvements in enrollment rates, reluctance by parents to send their children to school is an additional obstacle. This reluctance may reflect demand-side factors, including a preference for having children engaged in activities which are more "productive" in the short run and cultural norms and security concerns, such as a view that girls' education is not worth investing in or that is not safe for girls to travel to a school too far from the home.[4] The reluctance to send children to school could also mask several supply-side issues that households do not articulate clearly (ADB, 2019), including lack of or poor basic facilities in schools, poor quality of education, and teacher absenteeism (Ailaan, 2017). In some provinces, the high dropout rates at middle and high school levels are explained by the lack of availability of schools.

Figure 3. Education Sector–Inputs and Efficiency
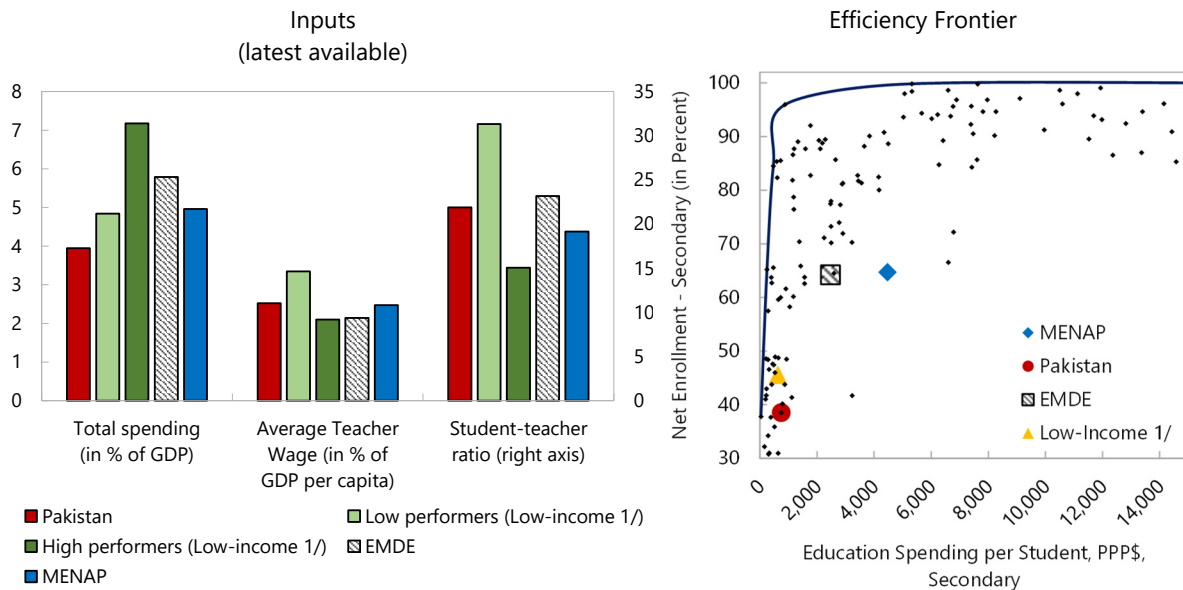
Source: IMF staff calculations using data from Pakistan authorities and Gaspar and others (2019).
Note: 1/ Countries with GDP per capita below US$3,000.

Source: IMF FAD Expenditure Assessment Tool (EAT).
Note: 1/ Countries with GDP per capita below US$3,000.

Education spending in Pakistan would need to increase significantly to meet the SDG targets. Annual total (public and private) education spending would need to increase by about 5.7 percent of GDP (from 3.9 percent in 2018 to 9.6 percent in 2030) to meet the SDG targets (Table 1). The higher spending needs reflect both an increase in the teacher wage bill, given the

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[4] Schools in Pakistan are mostly segregated by gender, with girls' schools requiring female teachers.

need to recruit more teachers to support higher enrollment and reduce class sizes, and higher capital spending.

- *Increasing enrollment rates and improving essential infrastructure.* Pakistan needs to increase enrollment rates significantly, particularly in secondary and tertiary education. In line with the SDG targets, the estimates assume that by 2030 gross enrollment rates will reach 50 percent in pre-primary education, 100 percent in primary and secondary education, and 50 percent in tertiary education.[5] Increasing enrollment rates requires addressing the barriers to enrollment described above. This will also require building more schools, particularly in rural areas, and improving school infrastructure, such as the availability of bathrooms, electricity, drinking water, and the existence of boundary walls.[6]

- *Increasing the quantity and quality of teachers.* Pakistan needs to reduce its student-teacher ratio from 22 to 15 in order to match the current ratio of high performing countries. Teacher qualifications, as well as attendance, should be further improved. Teacher wages relative to GDP in Pakistan are slightly above those of high-performing countries, and therefore do not necessarily have to increase to attract more and better-qualified teachers. However, policymakers should consider whether and how additional resources should be directed to increasing the number of primary school teachers in particular, given the large class sizes at that level.

Table 1. Additional Spending Required in Education by 2030

	GDP per capita US$ 0 - US$ 3,000	Pakistan	
	High performers	2018	2030
Main factors			
Students per teacher ratio	15	22	15
Teacher wages (ratio to GDP per capita)	2	3	2
Other current and capital spending (percent of total spending)	55	30	55
Student-age population (percent of total population)	39	42	39
Enrollment rate (preprimary to tertiary)	59	57	80
Private share (percent of total spending)	20	39	20
Results			
Education spending (percent of GDP)	7.2	3.9	9.6
Public	5.7	2.4	7.7
Private	1.5	1.5	1.9
Spending per student (US$ 2018)	674	244	570
SDG4 index	86	47	>80

Source: IMF staff estimates.

[5] The estimates assume a gross enrollment rate in pre-primary education by 2030 that is below the current level of 83 percent. Maintaining this high pre-primary enrolment rate would increase the 2030 annual spending needs by 1 percentage point of GDP.

[6] A recent study on the availability of school facilities has revealed that only 52 percent of public schools in Pakistan have all four components of essential infrastructure, i.e., boundary walls, electricity, drinking water, and toilets. Furthermore, 11 percent of all public schools do not have any of these four elements (ADB, 2019).

B. Health

Pakistan has made steady strides in health outcomes. Infant mortality rates decreased from 106 to 58 deaths per 1,000 live births between 1990 and 2018 (Figure 4). Significant progress has also been made in child mortality, with the mortality rate of children under 5 declining by about 50 percent from 1990 to 2018.[7] Despite these improvements, Pakistan's health outcomes lag those of peers, with infant mortality rates and under-5 mortality rates about twice as high as the EMDE and MENAP averages and life expectancy at birth somewhat below peer averages.

Figure 4. Health Outcomes–Evolution and International Comparison
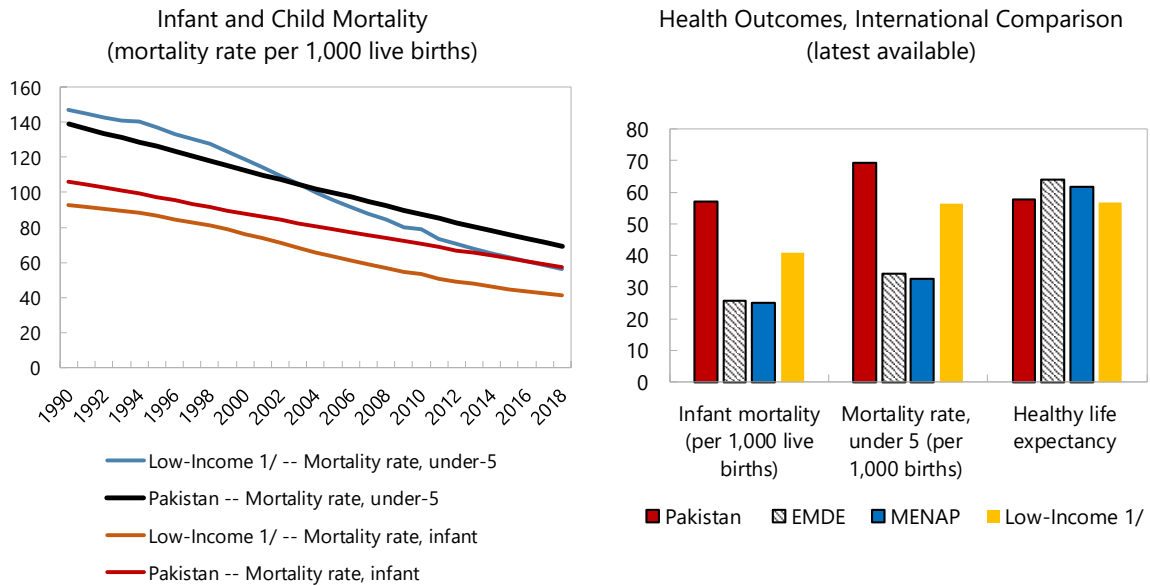
Infant and Child Mortality
(mortality rate per 1,000 live births)

Health Outcomes, International Comparison
(latest available)

Source: IMF staff calculations using World Bank World Development Indicators.
Note: 1/ Countries with GDP per capita below US$3,000.

Spending on healthcare is low and there is room to improve efficiency. Pakistan spends only 3 percent of GDP on healthcare, below its peers which spend around 5.5 to 7.5 percent of GDP (Figure 5). The "out-of-pocket" share of spending on healthcare is high at 65 percent, compared to 35 percent for EMDEs on average. This leads to greater vulnerability of poor households to health shocks. In part reflecting low spending, healthcare inputs in terms of number of doctors and particularly other medical personnel are below peer levels. While spending efficiency is better than in other countries with GDP per capita below US$3,000, there is still room to improve efficiency as Pakistan remains far from the health efficiency frontier.

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[7] Other health indicators also show improvements in recent years, including the proportion of children aged 1–2 years covered by all vaccines (which increased from 54 percent in 2013/14 to 66 percent in 2015/16) and the proportion of births attended by skilled personnel (from 52 percent in 2013/14 to 69 percent in 2015/16) (National Institute of Population Studies, 2013 and 2019; Government of Pakistan, 2019).

Figure 5. Health Sector–Inputs and Efficiency
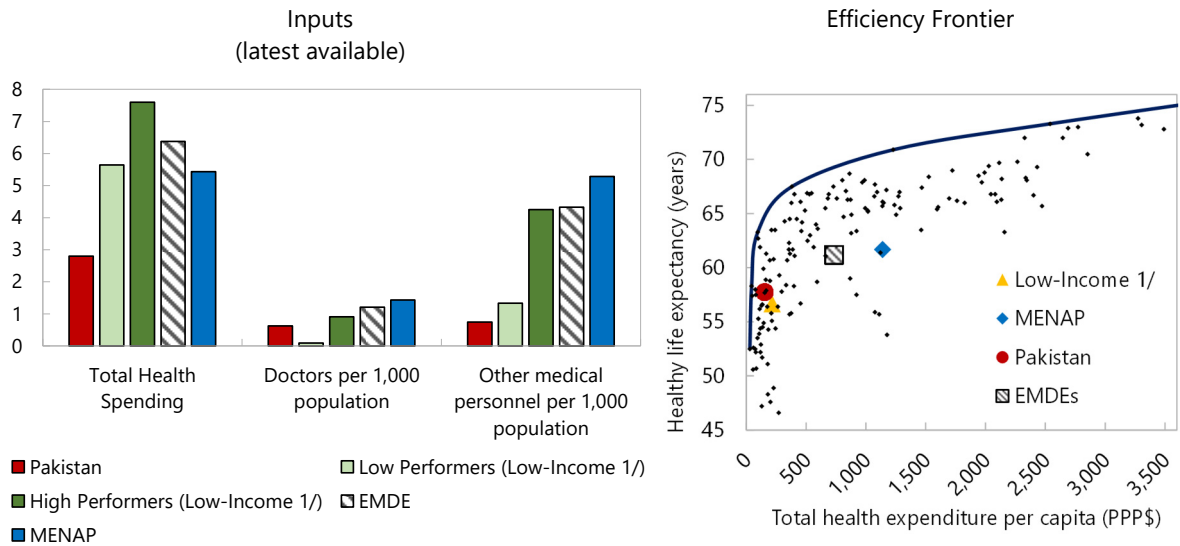
| Inputs (latest available) | Efficiency Frontier |

Source: IMF staff calculations using data from Pakistan authorities and Gaspar and others (2019).
Note: 1/ Countries with GDP per capita below US$3,000.

Source: IMF FAD Expenditure Assessment Tool (EAT).
Note: 1/ Countries with GDP per capita below US$3,000.

Table 2. Additional Spending Required in Healthcare by 2030

	GDP per capita US$ 0 - US $3,000	Pakistan	
	High performers	2018	2030
Main factors			
Doctors per 1,000 population	0.9	0.6	0.9
Other medical personnel per 1,000 population	4.3	0.7	4.3
Doctor wages (percent of GDP per capita)	10	11	10
Other current and capital spending (percent of total spending)	62	62	62
Private share (percent of total spending)	48	69	48
Results			
Health spending (percent of GDP)	7.6	2.8	8.2
Public	3.9	0.9	4.3
Private	3.7	1.9	4.0
Per capita spending (US$ 2018)	165	41	151
SDG3 index	75	50	>70

Source: IMF staff estimates.

Healthcare spending would need to increase significantly by 2030 to meet the SDG targets. Pakistan would need to almost triple its healthcare spending in terms of GDP—from the current 2.8 percent to 8.2 percent by 2030— to meet the SDG targets and perform at a commensurate level with high-performing peer countries (Table 2). This would require increasing public healthcare spending almost five-fold in terms of GDP, from 0.9 percent in 2018 to 4.3 in 2030.
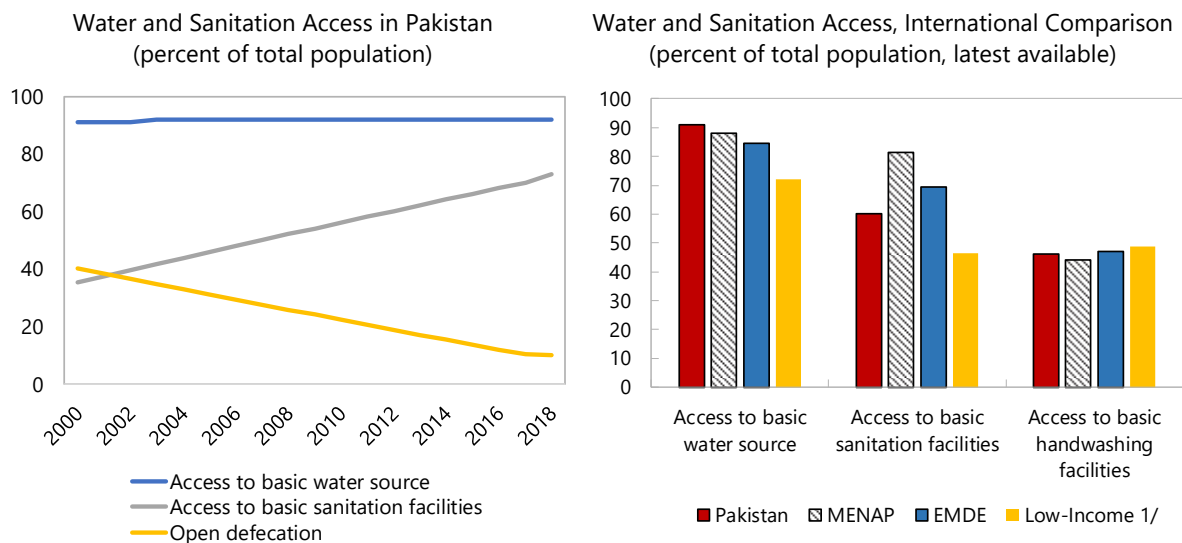
- *Increasing the number of doctors and medical personnel.* Pakistan needs substantially to increase the number of medical service providers. The number of doctors per

1,000 inhabitants should increase from its current level of 0.6 to 0.9. The number of other medical personnel such as nurses and midwives should increase to almost six times its current level. The wages of doctors are slightly higher than in high-performing peer countries, thus there is room to increase the number of doctors while allowing salaries to increase by less than GDP per capita. Pakistan needs dramatically to increase the number of other medical personnel being trained to ensure a sufficient supply of such personnel; this could involve, for example, providing them with financial support during their training on the condition of practicing for a certain number of years within the country.

- *The public and private share of total health spending could be more balanced.* Private spending represents two-thirds of total health spending in Pakistan, significantly above the level in high-performing peer countries. Increasing the public share of spending would improve the access of poor households to healthcare.

C. Water and Sanitation

Pakistan has made remarkable progress in improving basic sanitation provision but still lags its peers. The share of the population resorting to open defecation decreased from 40 percent in 2000 to 10 percent in 2018 (Figure 6). Access to basic sanitation facilities, such as flush toilets or latrines with a slab, also improved significantly over this period, with 73 percent of the population having access to these facilities in 2018, compared to 36 percent in 2000. The bulk of this improvement came from rural areas, where the share of the population with access to basic sanitation increased almost four-fold, from 16 percent in 2000 to 60 percent in 2018. Despite this improvement, access to basic sanitation facilities in Pakistan is still below the average for EMDEs and other countries in the MENAP region. Access to basic water sources and to basic handwashing facilities in Pakistan is similar to the average for EMDEs and MENAP.

Figure 6. Water and Sanitation–Evolution and International Comparison

Water and Sanitation Access in Pakistan
(percent of total population)

Water and Sanitation Access, International Comparison
(percent of total population, latest available)

Source: World Health Organization and United Nations Children's Fund (WHO/UNICEF) Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene (WASH) (2017) and additional data provided by the Planning Commission.
Note: 1/ Countries with GDP per capita below US$3,000.

Substantial efforts to increase access to non-contaminated drinking water and safely managed sanitation facilities are needed. To achieve the SDGs by 2030, Pakistan must expand access to safely managed water and sanitation to the entire population. This will require significant efforts as currently only 44 percent of the population has access to non-contaminated drinking water and only 46 percent has access to safely managed sanitation facilities on household premises, where excreta are safely disposed of in situ or treated off-site. The Planning Ministry is working closely with provincial governments to formulate an integrated water resource management strategy to meet the SDGs.

Spending needs to meet SDG targets in water and sanitation are sizable. To achieve universal coverage by 2030, Pakistan would need to expand access to safely managed water and sanitation facilities to an additional 168 million and 184 million people, respectively (Table 3). It would also need to expand access to basic handwashing facilities with soap and water to 131 million people. This will require investing an aggregate amount of US$55 billion by 2030, equivalent to spending 2 percent of GDP every year from 2020 to 2030.[8]

Table 3. Additional Investment in Water and Sanitation Required by 2030

|	Water		Sanitation		Hygiene		Total
	Rural	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	
Total target population (million)	96	71	114	69	94	37	
Population unserved in 2017 (million)	79	42	97	40	76	8	
Population growth 2017-2030 (million)	18	29	18	29	18	29	
Cost (per capita, US$)	200	178	146	83	5	8	
Investment required by 2030 (US$ billion)	19.27	12.63	16.73	5.74	0.50	0.29	**55.2**
Annual spending 2020-2030 (percent of GDP)							**2.0**

Source: IMF staff estimates.

D. Electricity

Electricity consumption in Pakistan lags its peers and electricity access is still limited, particularly in rural areas. Per capita electricity consumption reached 452 kWh in 2018, equivalent to about 10 percent of the average for other countries in the MENAP region and 19 percent of the average for EMDEs (Figure 7). Electricity access is still limited, with 77 percent of the population having access to on-grid electricity, slightly below the average for EMDEs, but above the average for countries with a GDP per capita below US$3,000. About 32,300 villages—accounting for 8.8 million households—remain without grid access. These villages tend to be in remote and sparsely populated areas, making expanding the grid to reach them technically challenging and costly.[9]

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[8] The investment costs for each service are based on the estimates for Pakistan in Hutton and Varughese (2016).

[9] Electricity access is universal in the provinces of Punjab and in the two autonomous territories (Azad Jammu and Kashmir, Gilgit-Baltistan). Access is limited in Balochistan (44 percent), Khyber Pakhtunkhwa (96 percent), and Sindth (95 percent).

Figure 7. Electricity Sector–International Comparison

Electricity Consumption
(kWh per capita)

Access to Electricity
(percent of population)
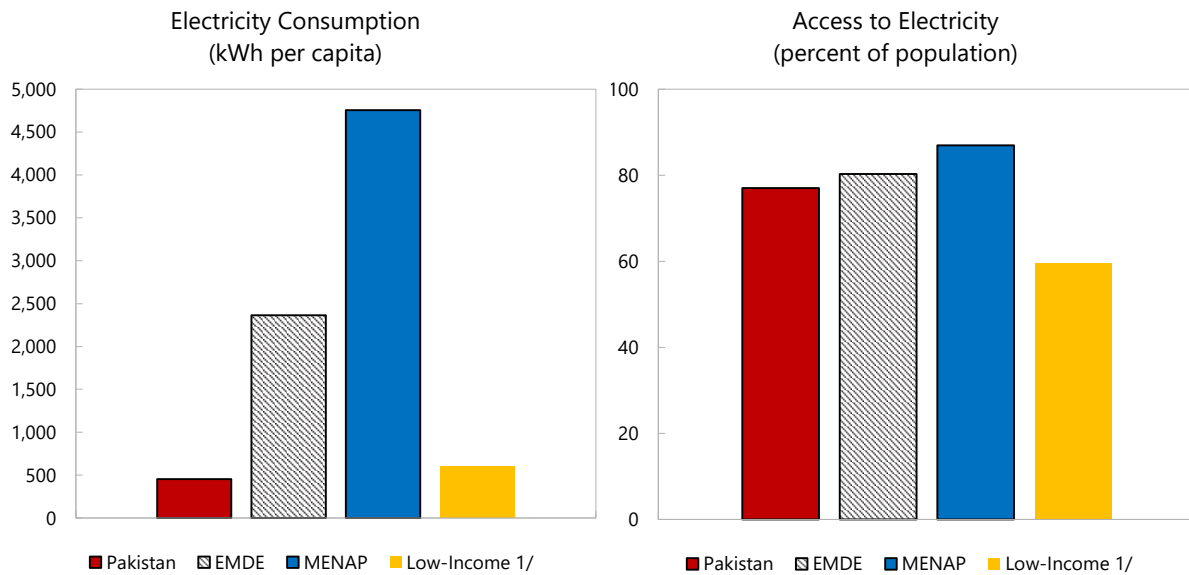
Source: IEA, World Energy Statistics; World Bank, World Development Indicators.
Note: 1/ Countries with GDP per capita below US$3,000.

Installed capacity has increased significantly over the last decade, but generation capacity remains underutilized due to limitations in transmission and distribution. Pakistan increased its generation capacity by 52 percent in the last 5 years, from 23,663 megawatts (MW) in 2013 to 36,010 MW in 2018 (Figure 8). Most of the additional capacity comes from thermal and hydro plants, with an increasing share of renewable energy sources. Generation capacity is underutilized given limitations and inefficiencies in transmission and distribution systems. According to government estimates, the average capacity utilization factor is around 43 percent. Transmission and distribution losses in Pakistan average about 20 percent, among the highest in the region.

Figure 8. Electricity Generation Installed Capacity by Source, in MW
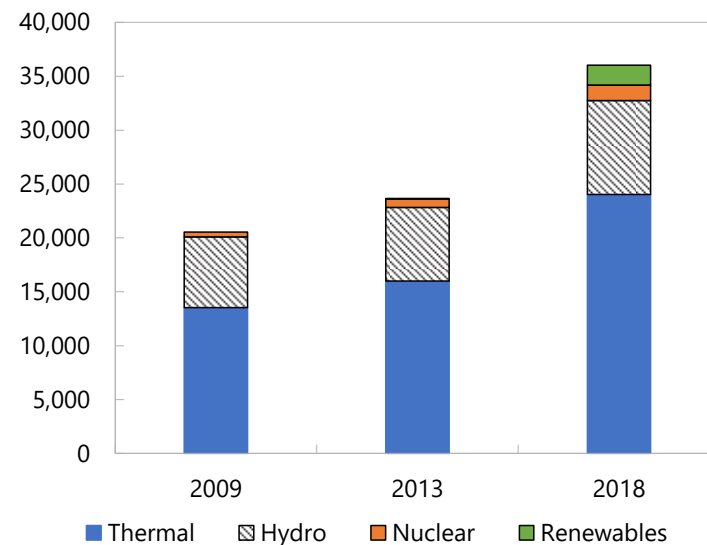
Source: National Electric Power Regulatory Authority.

Pakistan has embarked on an ambitious plan to increase the use of renewable energy sources. To achieve SDG7 and cope with expected increases in electricity consumption, the government plans to significantly increase generation capacity from hydro, nuclear, and renewable sources over the next ten years. The government plans to double generation capacity from renewable energy sources in the next five years. In addition, the government plans to rely on renewable energy sources to provide access to electricity in areas that are not connected to the grid and where extending the grid might not be economically feasible.[10]

Providing electricity access to all by 2030 would require significant investments. Total electricity consumption is expected to increase by 78 percent between 2019 and 2030, reflecting population growth as well as higher per capita consumption, due to the expansion of the electricity grid to achieve universal coverage and economic growth. To keep up with this higher consumption, Pakistan will need to invest an aggregate amount of US$24.5 billion by 2030, equivalent to spending 0.7 percent of GDP every year from 2020 to 2030 (Table 4).[11] This estimate considers total investment needed and it does not take into account any planned investment.

Table 4. Additional Investment in Electricity Generation, Transmission, and Distribution Required by 2030

Change in total consumption 2019-2030 (kWh)	109,183,957,844
Change in consumption 2019-2030 that cannot be met by current installed capacity (kWh)	61,423,117,980
Required change in installed capacity (incl. generation, transmission, and distribution) (kW)	16,255,365
Additional required change in transmission and distribution capacity (kW)	13,630,377
Assumptions	
Coefficient (electricity consumption to GDP per capita)	0.95
Plant capacity factor	43%
Unit cost of installed capacity (incl. generation, transmission and distribution) (US$ per kW)	1,059
Unit cost - only transmission and distribution capacity (US$ per kW)	530
Depreciation per year (percent)	5.0
Investment required (US$ billion)	**24.5**
Annual spending 2020-2030 (percent of GDP)	**0.7**

Source: IMF staff estimates.

E. Roads

Road length in Pakistan has not increased during the last two decades and road density lags its peers. Since 2000, Pakistan has added 19,000 kilometers to its road network (from 250,000 kilometers in 2000 to 269,000 in 2018).[12] Most of the road network (124,442 kilometers)

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[10] The government plans to extend on-grid access to 97 percent of the population. The remaining 3 percent would have off-grid access.
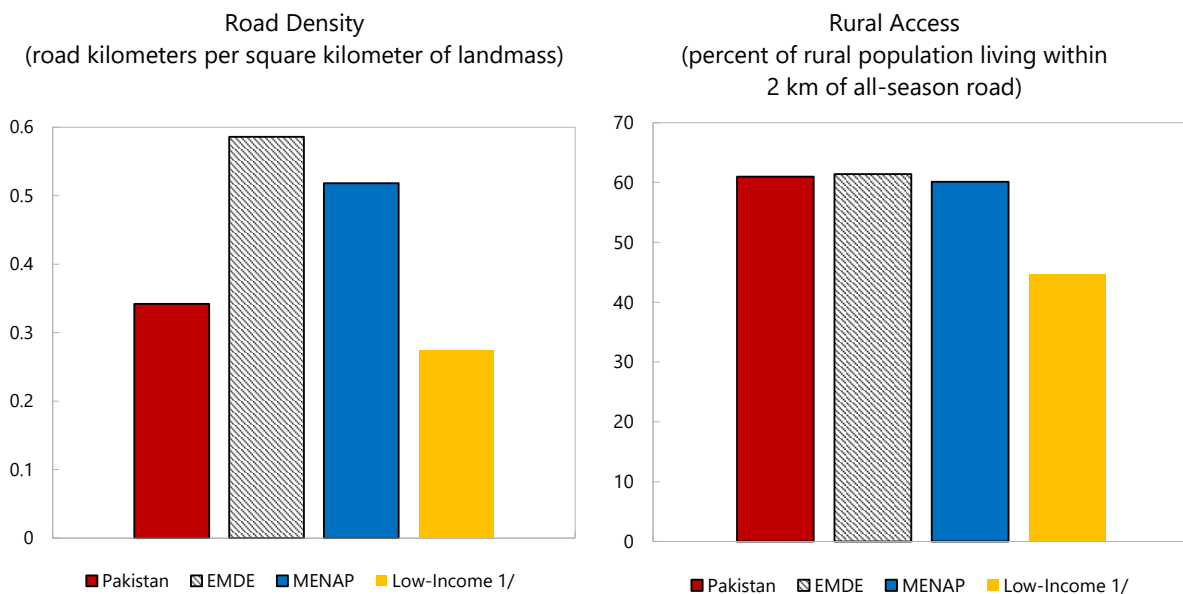
[11] The unit cost of investment per kW (including generation, transmission, and distribution costs) is estimated at US$ 1,059 based on data from the National Electric Power Regulatory Authority in Pakistan and Ministry of Power.

[12] Pakistan Planning Commission, Ministry of Planning.

is composed of provincial roads, while federal highways and motorways represent 5 percent of total road length. Road density in Pakistan is equivalent to 66 percent of the average for other countries in the MENAP region and 58 percent of the average for EMDEs (Figure 9). The government of Pakistan has ambitious plans to increase road density to 0.45 kilometers per square kilometer by 2025, which would imply expanding the existing road network by 38 percent (Planning Commission, 2014).

There are gaps in rural road connectivity. Road connectivity is key for rural development—roads promote access to economic and social services, with potentially positive effects on agricultural and non-agricultural employment and productivity. In Pakistan, 61 percent of the rural population live within 2 km of an all-season road, similar to the EMDE and MENAP averages but above the average for low-income countries (Figure 9).[13] To achieve the SDGs, investment plans should focus on improving rural road infrastructure.

Figure 9. Roads–International Comparison

Road Density
(road kilometers per square kilometer of landmass)

Rural Access
(percent of rural population living within 2 km of all-season road)

Source: Pakistan Planning Commission, Ministry of Planning.
Note: 1/ Countries with GDP per capita below US$3,000.

Source: IMF, World Economic Outlook; World Bank, Rural Access Index.
Note: 1/ Countries with GDP per capita below US$3,000.

Spending requirements to expand the road network and improve connectivity are sizeable. Increasing rural access from the current 61 percent to 75 percent by 2030 will require about 94,146 additional kilometers of all-season roads—a 36 percent increase in road length. This will require investing an aggregate amount of US$76 billion by 2030, equivalent to spending 2.3 percent of GDP every year from 2020 to 2030 (Table 5).[14]

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[13] Rural access data come from Mikou and others (2019).

[14] Construction costs vary by road type (e.g., number of lanes, type of surface, etc.) and region. Based on data from the Pakistan Planning Commission, we estimate an average cost of US$ 808,000 per kilometer.

Table 5. Additional Investment in Roads Required by 2030

Required change in road length 2019-2030 (km) 1/	94,146
Unit cost (US$/Km)	808,098
Depreciation per year (percent)	5.0
Investment required (US$ billion)	**76.1**
Annual spending 2020-2030 (percent of GDP)	**2.3**

Source: IMF staff estimates.
Note: 1/ Required change to improve the rural access to 75 percent.

III. CONCLUDING REMARKS

Making substantial progress in critical SDG sectors will require additional annual spending of about 16 percent of GDP in 2030. Overall, total (public and private) additional spending needs in Pakistan are substantial at around 16 percent of GDP in 2030. Additional spending needs for education and healthcare in Pakistan are especially large. While the estimates refer to spending requirements for 2030, given the size of the spending needs and the challenges that must be addressed to achieve a high performance in SDGs, the scale-up of spending should start well before 2030, taking into account the various financing options and fiscal space. The COVID-19 pandemic has exacerbated the challenges faced by Pakistan and underlined the urgency of additional and better spending on healthcare in particular. This paper's analysis was completed before the global impact of COVID-19 became clear, therefore the spending needs and GDP projections in this paper do not reflect the effects of the pandemic. Health spending needs will be correspondingly higher and the resources to finance them will be commensurately scarcer as a result of the pandemic. The many challenges raised by the COVID-19 outbreak are beyond the scope of this paper, however, the pandemic demonstrates the need for a robust healthcare system to be ready to address such a crisis should a similar one occur again.

Financing the SDGs will be challenging and requires a multifaceted approach. The high fiscal deficit and the need for fiscal consolidation to reduce public debt limit the availability of resources to move towards achieving the SDGs in the short run. The substantial additional spending required to meet the SDGs underlines the urgency of creating considerable fiscal space and calls for multiple and stable sources of financing. Pakistan's tax-to-GDP ratio, at 11 percent, is low compared to its peers. A medium-term revenue strategy with structural tax reforms are crucial to create space for SDG spending. Private financing is also critical while development assistance may also be needed to fill remaining gaps. Strong national ownership and strong governance frameworks are necessary, requiring other key aspects of public financial management such as sectorial planning, public investment management, and spending reviews. Structural reforms to boost growth and increase efficiency have a role to play to mobilize these financing sources and ensure their optimal use in achieving a high SDG performance. Beyond resources, institutional and capacity constraints need to be addressed in order to increase spending efficiency. The estimates assume that Pakistan will be able to combine different inputs efficiently to deliver across the analyzed sectors. This would require important reforms. For example, in education, reducing class sizes in primary education and increasing enrollment in secondary and tertiary education would require a higher number of qualified teachers. In health, in addition to raising the quantity and quality of inputs (health workers and facilities), it is critical

to address the financial vulnerability to healthcare shocks of disadvantaged groups in the population by lowering out-of-pocket expenses. In infrastructure, raising institutional and technical capacity remains key, particularly in rural areas.

Strengthening coordination between the federal and provincial governments will be essential for meeting the SDGs. The eighteenth amendment of 2010 to the Constitution of Pakistan devolved a range of responsibilities to Pakistan's four provinces, including those related to health, education, and water and sanitation. As such, the provinces have discretion over public spending that is key for achieving the SDGs. The national SDG framework prepared by the federal government is based on targets set at the provincial level. The bulk of the additional public spending would come from the provinces for health, education, and water and sanitation and from the federal government for roads and electricity. SDG support units have been established to support coordination between the different levels of government. However, coordination needs to be further strengthened, notably in collecting data to monitor progress towards the SDG targets. Better coordination is also essential on the revenue side, as greater harmonization of tax regulations and procedures will improve the efficiency and transparency of the tax system as a whole, reduce the administrative burden for taxpayers, and improve revenue performance.

Annex

This annex describes the IMF SDG costing methodology to estimate the additional spending needs assuming that development outcomes are a function of a mix of inputs.[15] For a particular country, the methodology for health and education sets the level of key inputs (such as the number of doctors and teachers) and their unit costs at the values for countries with a similar GDP per capita that perform well in the SDG index scores. For electricity, roads, and water and sanitation, the estimates consider the additional investment required to support economic growth and expand coverage following the SDG targets.

The methodology to estimate the necessary spending assumes that development outcomes are a function of a mix of inputs. The methodology quantifies the annual cost of achieving a high performance across five SDG areas—education, health, roads, electricity, and water and sanitation. Countries that perform well have higher spending efficiency and, therefore, the estimates assume not only higher spending but also "better" spending. If efficiency does not improve to the level of efficiency among high performers, the necessary spending level would be higher. The estimates take into account country-specific factors such as demographics and GDP per capita projected in 2030.

Table 1A. Input-Outcome Approach in Selected Areas

	Education	Health	Roads	Electricity	Water and Sanitation
Outcome indicator	SDG4 index	SDG3 index	SDG9.1.1 Index (Rural Access Index)	SDG7.1.1.1 Index	SDG6.1 and 6.2 indices
Inputs	Number of teachers Other current and capital spending	Number of health care workers (doctors/others)	Kilometer of all-weather road	On/off grid mix	Households with safely managed water and sanitation
Unit cost	Teacher wage	Health care workers wage	Unit cost of all-weather road kilometer	Unit cost of access to a certain consumption level	Unit cost of access
Other factors	Population growth Demographics Enrollment rates GDP per capita	Population growth GDP per capita	Topography GDP per capita Population density	Population growth Demographics GDP per capita	Population growth GDP per capita

Estimates are presented as additional annual spending in 2030. For education and health care, additional spending is reported as the difference between the required spending in 2030 and the current level of spending. For physical capital (roads, electricity, and water and sanitation) additional spending is presented as the annualized spending required to achieve the SDG

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[15] The costing is conducted following the methodology developed by Gaspar and others, 2019, Fiscal Policy and Development: Human, Social, and Physical Investment for the SDGs, IMF Staff Discussion Note SDN/19/03.

performance. After 2030, annual education and health spending is recurrent, while infrastructure spending would decrease to about 60 percent to cover depreciation of the capital stock built through 2030. The presented estimates are a lower bound of the cost of achieving the SDGs as the methodology assumes higher efficiency and focuses only on selected areas of the SDGs. Though estimates refer to 2030, the scale-up of the spending would need to start before 2030.

Education

Current education spending is a function of the teacher to student ratio (TSR), enrollment rate (ER), school age-population (SAP), teacher salaries (AWAGE), share of non-wage current spending (y), and share of capital spending (z).

$$\text{Current Education Spending} = (TSR*ER*SAP*AWAGE)/(1-y-z)$$

The total education spending needed to achieve a high performance for the education SDG index is derived by setting values for the TSR, AWAGE, y, and z at the median values observed in benchmark countries with a high performance in the education SDG index. The estimates take into account economic growth and school-age demographics.

Health

Current health spending is a function of doctor salaries (DAWAGE), the number of doctors and other medical personnel per 1,000 habitants (which is derived using doctor density (DPR), total population (pop), and ratio of doctors to all other health staff (ρ)), the ratio of all non-doctor wages to doctor wages (α), the share of non-wage current expenses (y), and the share of capital expenses (z).

$$\text{Current Health Spending} = (DPR*pop*(1+\alpha/\rho)*DAWAGE)/(1-y-z)$$

The total needed health care spending to achieve a high performance for the health care SDG index is then derived by using Pakistan-specific projections for economic growth and population growth and setting values for DAWAGE, DPR, and ρ at the median values observed in benchmark countries with a high performance in the health SDG index.

Water and Sanitation

Achieving universal access to safe drinking water and to adequate sanitation and hygiene is estimated based on the WASH (water, sanitation, and hygiene) World Bank model (Hutton and Varughese, 2016). The model assesses three types of cost estimates for this SDG. First, the annual cost of ending open defecation through simple, traditional, lower-cost latrines. Second, and as a first step toward safely managed services, the costs of achieving lower-level services are estimated because many countries have still to provide basic WASH to their populations[16]. Third,

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[16] Basic water supply includes an improved community water source within a 30-minute round-trip; basic sanitation includes an improved toilet; and basic hygiene includes a hand-washing station with soap and water for every household.

the "safely managed" category includes an on-plot water supply for every household and for sanitation it includes a toilet with safe management of fecal waste.

Electricity

The cost to achieve a high performance for the SDG related to electricity is based on estimating the additional electricity network needed provide access to electricity to 100 percent of the projected population by 2030 and accounting for an increase in per capita consumption based on projections for real GDP per capita. The total cost of the necessary additional electricity infrastructure is then estimated by multiplying it by Pakistan's unit cost per kilowatt.

Roads

The regression in Gaspar and others (2019) is used to derive the determinants of network needs. Road density is regressed on variables capturing the size and composition of the economy, including GDP per capita, population density, agriculture, and manufacturing sector shares in the economy, and urbanization rate, as well as the Rural Access Index (RAI), for a cross-section of low-income developing countries and emerging market economies. The RAI measures the share of the rural population living within 2 km of an all-season road. An all-season road is "a road that is motorable all year round by the prevailing means of rural transport" (Mikou and others, 2019). Based on the regression results for Pakistan, the additional kilometers of roads needed to ensure road access for all is estimated considering population and GDP per capita in 2030[17]. The total cost for the road network is estimated using the Pakistan-specific unit cost per kilometer.

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[17] Road access for all is proxied by raising the RAI to at least 75 percent.

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