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Prioritising climate action through a health and vulnerability lens

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- Prioritising action on climate in Pakistan requires focusing in areas that are high priority for both reducing greenhouse gas (GHG) emissions and yielding considerable local national benefits, such as improved health for all citizens, increased productivity, and reduced vulnerabilities of low-income households to health-related income shocks.
- The case for improving air quality is compelling: matching it to the current World Health Organization (WHO) standard can increase the average life expectancy of a Pakistani by 2.7 years and of a Lahori by 5.3, as well as decrease the risk of stunting in children.
- This brief describes a six-point policy agenda to tackle air pollution, focusing on actions that could involve a broader effort to tackle climate change.

This policy brief draws from the report "The path to a successful Pakistan" prepared by a team comprising Kulsum Ahmed (Director ILM, Honorary Fellow CDPR, former Sector Manager, World Bank), Ijaz Nabi (Chairman, CDPR and Country Director, IGC and former Sector Manager, World Bank), Sanval Nasim (Assistant Professor, LUMS), Amna Mahmood (Country Economist, IGC), and Farah Said (Associate Director, MHRC, LUMS). We are grateful to the International Growth Centre (IGC) for funding.

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Policy motivation for research

There are many different ways to prioritise action on climate. A compelling way could be to identify action in areas that are high priority for reducing greenhouse gas (GHG) emissions and yielding considerable local national benefits, such as improved health for all Pakistanis, increased productivity, and a reduction in vulnerability of low-income households to health-related income shocks.

Despite lacklustre economic growth, Pakistan has succeeded in sharply reducing endemic poverty. However, a large share of low-income households, engaged in low-productivity occupations, lies just above the poverty line (Jamal, 2021). Such households are vulnerable to economic shocks such as the ones associated with COVID-19, sharp energy price increases, food price inflation, and health emergencies, and can quickly slip back into poverty.

An analysis of Pakistan's health burden reveals that air quality significantly increases the risk of mortality and morbidity. Given the existing state of medical knowledge, we cannot cure non-communicable diseases caused by air pollution. These diseases result in a lifetime of illness, requiring constant management with burgeoning health costs and a reduced lifespan. Air pollution also has severe economic consequences, including lower physical and cognitive ability, which leads to lower productivity.

All Pakistani households are affected by air pollution: low-income households disproportionately so. Efforts to tackle air pollution should help improve quality of life for all Pakistanis but will particularly help the vulnerable households.

Policies designed to reduce air pollution considerably overlap with policies that address GHG emissions, which cause climate change. Limiting fossil fuel and solid fuel burning or improving their efficiency reduces not only air pollutants (particulate matters, sulfur dioxide) but also GHGs (carbon dioxide, methane).

This brief describes a six-point policy agenda to tackle air pollution, focusing on actions that could involve a broader effort to tackle climate change.

Key findings

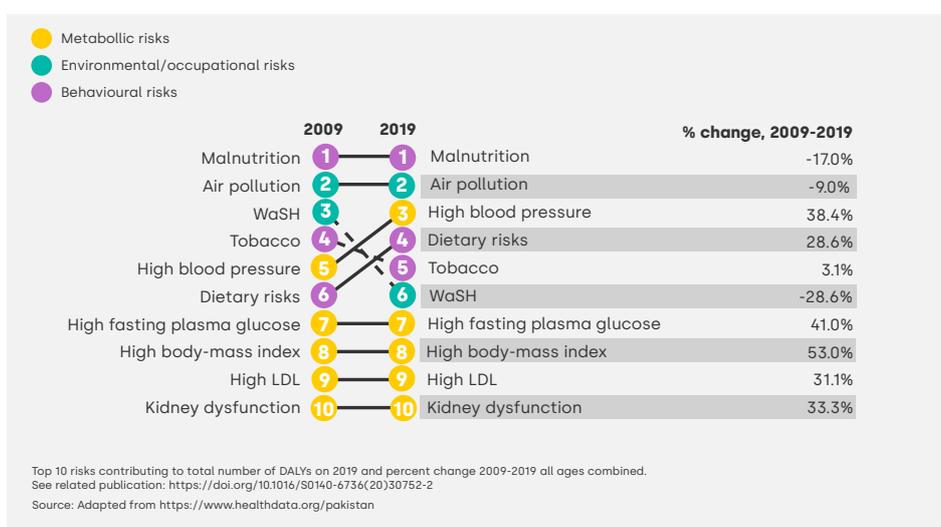
Pakistan's health burden and air pollution as a risk factor

Pakistan's health burden today is a complex mixture of communicable diseases and non-communicable diseases (NCDs). In the last 10 years, there has been a significant increase in ischemic heart disease and strokes. These NCDs, which form 60% of the health burden today cannot be treated (GBD, 2019). They need to either be prevented or managed

throughout a lifetime, resulting in increasing health costs and a reduced life span.

The air pollution risk factor captures both indoor air pollution (IAP) and outdoor air pollution. It is associated with increased risk of ischemic heart disease, stroke, lung cancer, neonatal morbidity, lower respiratory infections, diabetes, chronic obstructive pulmonary disease, tuberculosis, and blindness. A recent paper from Aga Khan University Hospital notes that about 1,000 people suffer a stroke every day in Pakistan, of which about 400 people die within 30 days. The authors suggest that by addressing air pollution exposure alone, 30% of strokes in Pakistan could be prevented (Fatmi, Mahmood, and Samad, 2020).

FIGURE 1: What risk factors drive the most death and disability combined in Pakistan?



Evidence from other countries suggests that air pollution causes respiratory-related hospitalisations, infant mortality, low birth weight, fetal shock and death, and reduced life span. It also causes reduced labour productivity and reduced human capital outcomes later in life, including lower performance in academic and cognitive tests, depressed earnings, and higher incarceration rates.

Air quality in several Pakistani cities has deteriorated considerably over the years. Cities such as Lahore (Punjab's capital and Pakistan's second largest city with over 10 million residents) ranks among some of the most polluted cities in the world, while Pakistan came third in the list of the most polluted countries in 2021 (IQ Air, 2021).

PM2.5 constitutes the most egregious pollutant. These are tiny particles—smaller than tenth the diameter of a hair strand—which can easily enter the bloodstream when inhaled. In all the Pakistani cities where air quality is formally measured, the annual average PM2.5 levels in 2021 exceeded the WHO standard (which is derived taking health impacts into account) by a considerable margin (IQ Air, 2021). The Air Quality Life Index—developed by the Energy Policy Institute at the University of Chicago—shows that improving the existing air quality to the WHO standard can increase the average life expectancy of a Pakistani by 2.7 years and of a Lahori by 5.3 years (EPIC, 2020).

According to Pakistan's Social and Living Standards Measurement Survey (PSLM) 2019-2020, only 37% of households have access to clean fuel technology for cooking and lighting. The poor rely on cheap fuel such as biomass and coal to meet their energy demands. Burning such fuels release toxic pollutants causing air pollution inside the household, with levels orders of magnitude higher than outdoor air pollution.

The effect of air pollution on vulnerable households

Since women mostly cook and their children often spend time with them, IAP disproportionately affects women and children in poor households. A study in Mirpurkhas and Nawabshah found that women were 5 to 6 times more at risk of acute coronary syndromes as a result of cooking with solid fuel, compared with women cooking with natural gas (Fatmi et al. 2020).

The risk of developing pneumonia in children is virtually doubled following exposure to air pollution, thereby accounting for approximately one million deaths globally (WHO 2021). Pakistan is one of only four countries in the world where most of these deaths occur. Indeed, pneumonia is the number one cause of children's deaths in Pakistan. Further, deaths from pneumonia appear to be correlated with income quintile, with lower-income quintiles suffering the most (Chang et al., 2018).

The malnutrition risk factor is also interconnected with air pollution. Poor intake of adequate nutrition, diarrhoea, and lower respiratory infection among children, particularly under the age of 2 years, due to unsafe drinking water and poor sanitation and poor air quality, result in poor absorption of food leading to stunting that affects future income (World Bank, 2008). Physical stunting is also an indication of mental stunting, thus affecting educational attainment in later years (Alam et al. 2020). Further, improved nutrition in later years cannot change the cognitive damage, and these children continue to underperform in educational tests (Sokolovic et al. 2014). This clearly indicates that stunting cannot be cured, only prevented, and that the lower productivity consequences are lifelong.

Pakistan's Demographic and Health Survey (DHS) 2017-2018 found that 57% of children under the age of 5 years are physically stunted in the lowest income quintile. This percentage decreases as income increases, yet there is a persistent 22% stunting in the highest income quintile. This may perhaps be an indication that repeated bouts of disease caused by poor air and water quality play a bigger role in stunting than just lack of adequate nutritional intake.

There is considerable overlap between air pollutants and GHGs that warm the atmosphere (such as black carbon or methane). Limiting fossil fuel and solid fuel burning or improving their efficiency reduces not only air pollutants (particulate matters, sulphur dioxide) but also GHGs (carbon dioxide, methane).

Interventions that improve air quality also help reduce GHG emissions, and therefore may also be eligible for climate finance. Examples of such interventions include better handling of solid waste to reduce methane

emissions, using cleaner fuels for household energy, reducing emissions from transport in cities, and eliminating burning of agricultural or solid waste residues.

Policy recommendations

Air quality management is a provincial responsibility under the 18th Amendment. Given that the mechanism for federal oversight of provincial mandates is still evolving in Pakistan, accountability currently only lies with citizens in a province putting pressure on their provincial governments. Yet, lack of understanding and awareness of the health effects of air quality in Pakistan means that the citizens cannot play this role effectively, even though the right to a clean and healthy environment is already a Constitutional right.

These six policy actions, despite not being comprehensive, will begin to encourage a better understanding of air quality and its consequences on health and productivity, as well as help to generate preliminary interventions to reduce air pollution. At the same time, the proposed actions are consistent with elements of a climate action plan for Pakistan.

- 1. Work with the Ministry of Energy to develop and implement a household energy strategy.** This is an immediate priority given the impact of use of solid fuels on infant and child mortality and stunting, particularly for low-income households, and because this area has been completely ignored in the past. Interventions could be financed partially also by utilising global climate finance windows, given that reducing solid fuel emissions result in less GHG emissions (see below).
- 2. Work with the health sector to create constituencies to advocate for cleaner air and facilitate climate actions.** Generally, there is poor understanding of the health impacts of air pollution in Pakistan. It is notable that Punjab's NCD Unit, despite highlighting incidence of strokes, heart disease and cancers as major NCDs in the province, does not link exposure to poor air quality with increased risk of these diseases on their website. Working with the health sector to ensure the new health curriculum on NCDs includes environmental risk factors will create a constituency for change in the health community.
- 3. Work with the provinces to improve health outcomes by updating standards to health-based ones and using technology that provides real-time source-specific publicly available pollution data.** Pakistan has strong pollution rules and regulations on paper but continues to experience hazardous air quality because of lack of health-based standards, weak monitoring, and enforcement. Health outcomes could be improved significantly if provincial environment departments revised standards based on health needs in specific cities and across different provinces. In addition, compliance could be improved by using new monitoring technologies —such as the Continuous Emission Monitoring System (CEMS), adopted by pollution regulators in several Indian state governments—that

transmit real-time pollution data from sources. Regulators can use this data to target non-compliant polluters or calculate pollution taxes for sources under a pollution tax regime. Access to source-specific pollution readings will also create public pressure on sources to improve compliance and incentivise researchers to help the regulator in designing better air quality measures and interventions.

- 4. Focus on tackling air quality in 2-3 major urban areas e.g. Lahore, Peshawar, and Karachi.** This will yield important lessons that could be used by other cities at a later stage, including on causes of pollution. It will also yield important local information on coordination across different stakeholders and sectors. This is of key importance as Pakistan already has several cities on the world's most polluted cities list. Further, infrastructure in cities is an investment that cannot easily be adjusted over time; so, planning information prior to infrastructure development that helps create cleaner cities is crucial. Again, climate finance can be tapped, as often co-benefits accrue, namely local (health) and global (reduced GHG emissions) benefits. An excellent summary of interventions and approaches that could be applied in Pakistan can be found in the [CDPR workshop summary](#) on air pollution.
- 5. Address transport related air pollution where provinces can realise large gains in air quality.** Existing studies—though imprecise—identify transport as the largest source of local pollutants. Though we do not have studies that apportion GHGs across sources in Pakistan, transport is an important source of GHGs in most countries. Therefore, tackling emissions in the transport sector can limit both local and global damages. Areas of intervention include: scaling-up existing public transportation projects such as the MetroBus and Orange Line in Lahore; implementing the national EV policy with a particular focus on two-wheelers and commercial vehicles; setting stringent vehicular emission standards, at least in the short run until EV adoption picks up; and enforcing congestion taxes within cities.
- 6. Work with Ministry of Finance to set up a Unit that focuses on the development of fiscal instruments for abating air pollution.** These could incentivise better environmental quality with related health outcomes, such as carbon taxes, beneficial property taxes, tax credits for household renewables/EVs, etc. This will help a shift in the right direction as well as yield revenues.

Such a unit could also help design and implement pollution taxes in the long run to achieve abatement at lower costs. Since regulators enforce uniform emission standards, marginal abatement costs can substantially differ across sources—especially across old and new plants. This leads to compliance at a considerably higher cost to society. Taxing source per unit of emission achieves several benefits: 1) it rests in the “polluter pays principle”—pollution causes damages to society hence you must pay for these damages—which appeals to citizens' sense of fairness; 2) it leads to cost-effective abatement since the tax equalizes marginal abatement costs across sources; 3) it yields a “double-dividend” — pollution abatement as well as revenue for the government, which can be allocated to other public projects.

In addition to the six policy actions, a program of policy coordination across several ministries will be needed to prepare grounds for accessing climate finance for reducing GHG emissions (including increasing the share of renewables in the energy mix) with spillover benefits of lowering health costs associated with air pollution.

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