AQLI Air Quality Life Index®

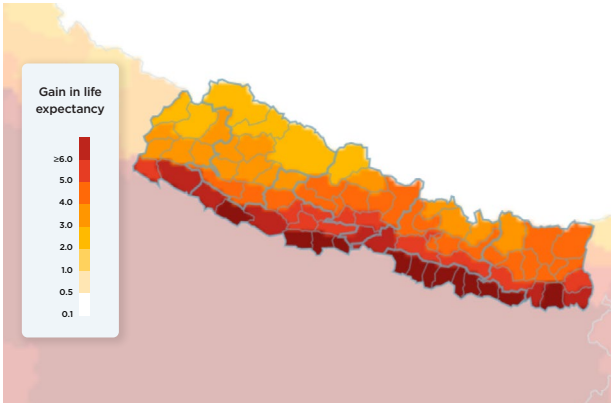
Nepal Fact Sheet

In 2019, Nepal's average PM2.5 concentration was 61.2 µg/m³ – six times more than the permissible limit of 10 µg/m³ set by the World Health Organization (WHO), making Nepal the third most polluted country in the world. The Nepalese are on track to lose 5 years of life expectancy if these pollution levels persist. The highest concentrations were observed in Nepal's southwestern districts which share their borders with the highly polluted Indo Gangetic Plain (IGP).

KEY TAKE-AWAYS

- All of Nepal's 30 million people live in areas where the average particulate matter pollution exceeds the WHO guideline.
- Since 1998, Nepal has seen an 8.2% increase in its average annual particulate matter concentrations, shaving off .5 life years of life expectancy for the average resident.
- Half of Nepal's population resides in the Outer Terai region which sees particulate matter concentrations that are seven to eight times the WHO standard. Its residents can expect to lose 6.4 years of life expectancy, on average.
- In Kathmandu, Nepal's largest city and capital, average annual particulate matter concentrations are five times the WHO guideline, reducing life expectancy by an average of 4.1 years.

Figure 1 · Potential Gains in Life Expectancy through Permanently Reducing $PM_{2.5}$ from 2019 Concentration to the WHO Guideline



POLICY IMPACTS

The dual challenges of economic growth and environmental quality faced by Nepal today are no different from those once confronted by other countries during periods of industrialization. Nor is this dynamic limited to the world's wealthiest countries.

China has made tremendous progress since declaring a "war against pollution" in 2014, cutting country-wide average pollution levels by about 30%—improving life expectancy by 1.5 years if the reductions persist. India, having declared its own war against pollution in January 2019, has likewise declared an ambitious target of 20-30 percent reduction. If it achieves a 25 percent reduction in pollution nationwide, it has the potential to also improve life expectancy by 1.8 years.

Nepal could experience the same progress. If Nepal were to achieve the same reduction in pollution experienced by China, its residents could live 1.8 years longer; 1.5 years longer if it achieves India's target.

"The legacy of environmental improvement in former pollution capitals is evidence that today's pollution does not need to be tomorrow's fate. As countries navigate the dual challenges of sustaining economic growth and protecting the environment and public health, the AQLI shows not only the damage caused by pollution but also the enormous gains that can be made with policies to address it."

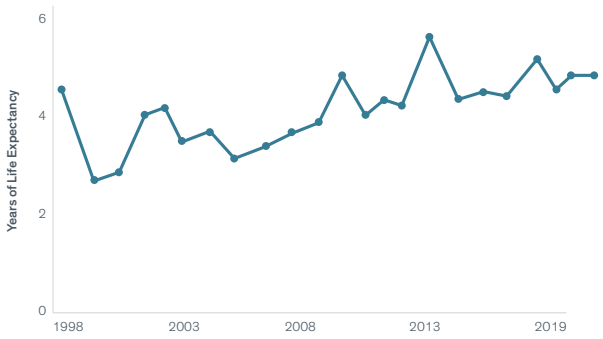
Michael Greenstone, The Milton Friedman Distinguished Service Professor in Economics, the College, and the Harris School; Director, EPIC

Note: The WHO changed its particulate pollution guidance on September 22, 2021. The data here reflects the previous guidance.

$PM_{2.5}$ Concentration and Potential Life Expectancy Gains in 25 Most Populous Districts

District	Population (Millions)	$PM_{2.5}$ Concentration, 2019 (μg/m³)	Years of Life Expectancy Gain through Reducing $PM_{2.5}$ from 2019 Concentration: From 2019 Concentration to WHO Guideline of 10 μg/m³	Years of Life Expectancy Gain through Reducing $PM_{2.5}$ from 2019 Concentration: By 30%
Kathmandu	2.0	52	4.1	1.5
Morang	1.1	72	6.1	2.1
Rupandehi	1.0	84	7.3	2.5
Jhapa	0.9	67	5.6	2.0
Sarlahi	0.9	82	7.1	2.4
Dhanusha	0.9	82	7.1	2.4
Sunsari	0.8	68	5.7	2.0
Bara	0.8	85	7.4	2.5
Rautahat	0.8	86	7.4	2.5
Saptari	0.7	75	6.3	2.2
Siraha	0.7	79	6.8	2.3
Mahottari	0.7	85	7.3	2.5
Parsa	0.7	85	7.3	2.5
Chitawan	0.7	69	5.8	2.0
Kapilbastu	0.7	83	7.1	2.4
Dang	0.6	61	5.0	1.8
Banke	0.6	74	6.3	2.2
Kaski	0.6	50	3.9	1.5
Kanchanpur	0.5	60	4.9	1.8
Lalitpur	0.5	50	4.0	1.5
Bardiya	0.5	70	5.9	2.1
Makawanpur	0.5	59	4.8	1.7
Kabhrepalanchok	0.4	45	3.4	1.3
Surkhet	0.4	46	3.5	1.3

Figure 2 · Average Years of Life Expectancy Lost due to $PM_{2.5}$ Relative to the WHO Guideline, 1998-2019



ABOUT THE AIR QUALITY LIFE INDEX (AQLI)

The AQLI is a pollution index that translates particulate air pollution into perhaps the most important metric that exists: its impact on life expectancy. Developed by the University of Chicago's Milton Friedman Distinguished Service Professor in Economics Michael Greenstone and his team at the Energy Policy Institute at the University of Chicago (EPIC), the AQLI is rooted in recent research that quantifies the causal relationship between long-term human exposure to air pollution and life expectancy. The Index then combines this research with hyper-localized, global particulate measurements, yielding unprecedented insight into the true cost of particulate pollution in communities around the world. The Index also illustrates how air pollution policies can increase life expectancy when they meet the World Health Organization's guideline for what is considered a safe level of exposure, existing national air quality standards, or user-defined air quality levels. This information can help to inform local communities and policymakers about the importance of air pollution policies in concrete terms.

Methodology: The life expectancy calculations made by the AQLI are based on a pair of peer-reviewed studies, Chen et al. (2013) and Ebenstein et al. (2017), co-authored by Michael Greenstone, that exploit a unique natural experiment in China. By comparing two subgroups of the population that experienced prolonged exposure to different levels of particulate air pollution, the studies were able to plausibly isolate the effect of particulates air pollution from other factors that affect health. The more recent of the two studies found that sustained exposure to an additional 10 μg/m3 of PM10 reduces life expectancy by 0.64 years. In terms of PM2.5, this translates to the relationship that an additional 10 μg/m3 of PM2.5 reduces life expectancy by 0.98 years. To learn more about the methodology used by the AQLI, visit: aqli.epic.uchicago.edu/about/methodology

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