AQLI Air Quality Life Index®

Bangladesh Fact Sheet

Bangladesh is the world's most polluted country. Air pollution shortens the average Bangladeshi's life expectancy by 6.9 years, relative to what it would be if the World Health Organization (WHO) guideline of 5 µg/m³ was met[1]. Some areas of Bangladesh fare much worse than average, with air pollution shortening lives by nearly 9 years in Dhaka, the country's most polluted city.

KEY TAKE-AWAYS

- All of Bangladesh's 16 million people live in areas where the annual average particulate pollution level exceeds both the WHO guideline and the country's own national standard of 15 µg/m³.
- Measured in terms of life expectancy, particulate pollution is the greatest threat to human health in Bangladesh, reducing life expectancy by almost 7 years on average. In contrast, child and maternal malnutrition reduces average life expectancy by about 1.4 years, while smoking reduces average life expectancy by 1.6 years.
- The annual particulate pollution level increased by 13.1 percent from 2019 to 2020, despite the fact that Covid-19 lockdowns were in place. This continued the country's trend. Since 1998, the average annual particulate pollution has increased 65 percent, cutting average life expectancies by an additional 3 years. In each of the country's 64 districts, particulate pollution levels far exceed the WHO guideline.
- In Dhaka, the largest city in Bangladesh, air pollution is significantly higher than the national average of 88.9 µg/m³, and residents are losing more than 8 years of life expectancy on average. In Chittagong, residents are losing 6.6 years.

Figure 1 · Potential Gain in Years of Life Expectancy through Permanently Reducing $PM_{2.5}$ from 2020 Concentration to the WHO

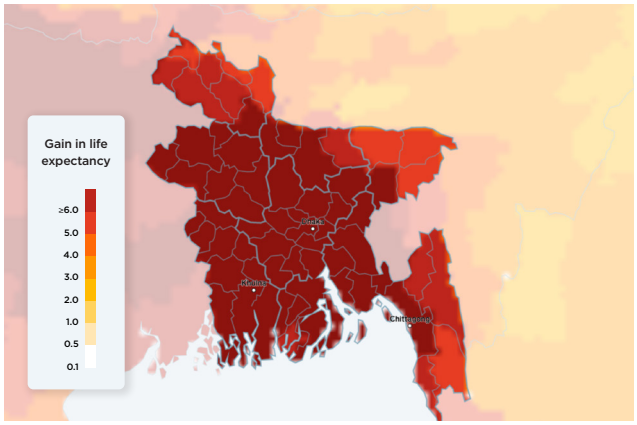
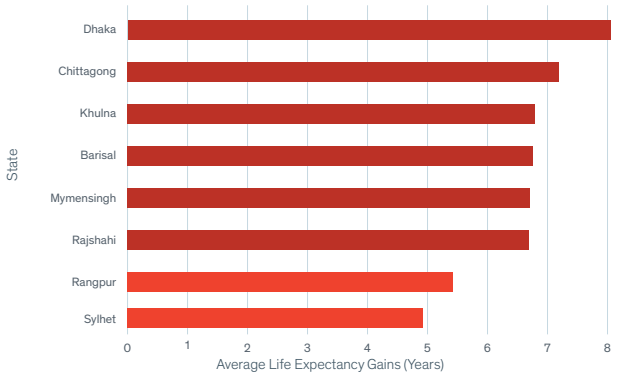


Figure 2 · Potential Gain in Life Expectancy from Reducing $PM_{2.5}$ to the WHO Guideline in all Major Regions of Bangladesh



1 All average PM2.5 values (measured in micrograms per cubic meter: µg/m³) are population weighted.

$PM_{2.5}$ Concentration and Potential Life Expectancy Gains in 25 Most Populous Regions of Bangladesh

Region	Population (Millions)	$PM_{2.5}$ Concentration, 2020 (µg/m³)	Years of Life Expectancy Gain Through Reducing $PM_{2.5}$ from 2020 Concentration: To WHO Guideline of 5 µg/m³	To National Standard of 15 µg/m³	By 30%
Dhaka	13.5	88.9	8.2	7.2	2.6
Chittagong	8.5	72.6	6.6	5.7	2.1
Comilla	6	86.7	8	7	2.5
Mymensingh	5.7	79.1	7.3	6.3	2.3
Tangail	4	86.3	8	7	2.5
Gazipur	3.9	94.6	8.8	7.8	2.8
Sylhet	3.8	46.4	4.1	3.1	1.4
Bogra	3.8	74.7	6.8	5.8	2.2
Noakhali	3.5	91.3	8.4	7.5	2.7
Sirajganj	3.5	78.7	7.2	6.2	2.3
Cox'S Bazar	3.4	57.8	5.2	4.2	1.7
Dinajpur	3.4	66.2	6	5	1.9
Kishoreganj	3.3	86.2	8	7	2.5
Rangpur	3.3	61.2	5.5	4.5	1.8
Brahamanbaria	3.2	84	7.8	6.8	2.5
Narayanganj	3.1	89	8.2	7.2	2.6
Jessore	3.1	74.5	6.8	5.8	2.2
Naogaon	2.9	72.7	6.6	5.7	2.1
Rajshahi	2.9	70.8	6.4	5.5	2.1
Pabna	2.8	75	6.9	5.9	2.2
Sunamganj	2.8	53.4	4.8	3.8	1.6
Chandpur	2.7	88.5	8.2	7.2	2.6
Gaibandha	2.7	68.5	6.2	5.2	2
Barisal	2.6	77.4	7.1	6.1	2.3
Khulna	2.6	79.1	7.3	6.3	2.3

Figure 3 · Life Expectancy Impact of $PM_{2.5}$ and Unassociated Causes/ Risks of Death

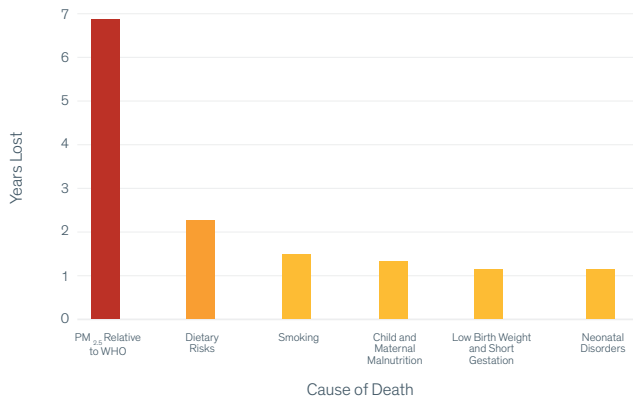
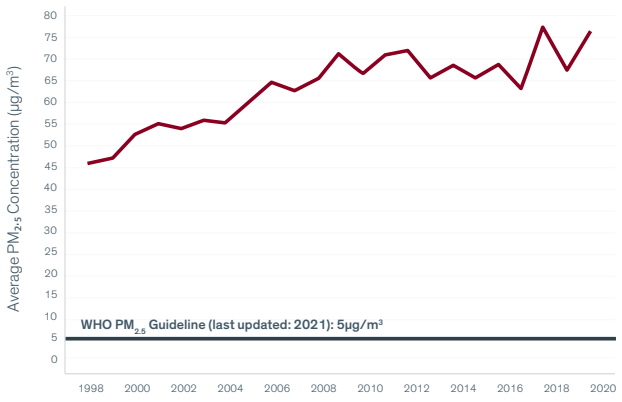


Figure 4 · Average $PM_{2.5}$ Concentrations in Bangladesh, 1998-2020



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 PM_{10} reduces life expectancy by 0.64 years. In terms of $PM_{2.5}$, this translates to the relationship that an additional 10 µg/m³ of $PM_{2.5}$ reduces life expectancy by 0.98 years. To learn more about the methodology used by the AQLI, visit: aqli.epic.uchicago.edu/about/methodology