AQLI Air Quality Life Index®

India Fact Sheet

India is today the world's second most polluted country, slightly trailing only Nepal. Particulate pollution is so severe that it shortens the average Indian's life expectancy by more than four years relative to what it would be if World Health Organization (WHO) air quality guidelines were met. This is up from about two years in the late 1990s due to a 69 percent increase in particulate pollution. Concentrations in India's northern states of Bihar, Uttar Pradesh, Haryana, Punjab, and the National Capital Territory of Delhi are substantially higher, and the impact on life expectancy exceeds six years.

KEY TAKE-AWAYS

- Over the past two decades, the concentration of fine particulates increased by 69 percent on average across India. As a result, sustained exposure to particulate pollution now reduces the life expectancy of the typical Indian citizen by 4.3 years compared to 2.2 years in 1998.
- In 1998, Delhi and the north Indian states of Uttar Pradesh, Haryana, and Bihar already suffered from particulate concentrations that exceeded WHO safe levels by factors of 3 to 6 and reduced life expectancy for residents there by between 2 and 5 years. Over the ensuing two decades, pollution in these regions increased to as much as 10 times the WHO safe limit in the case of Uttar Pradesh, where air pollution levels now reduce life expectancy by 8.6 years.
- Air quality in India's capital city, Delhi, is among the most deadly in the country. Pollution concentrations there averaged 113 micrograms per cubic meter in 2016, reducing life expectancy by more than 10 years for the typical resident.
- In 2016, the added life-years from compliance with the WHO guideline would raise the average life expectancy at birth from 69 to 73 years—a larger gain than from eliminating unsafe water and poor sanitation, perhaps the second greatest environmental health risk in the country.

EPIC-India is working to confront particulate pollution in India. In partnership with the Maharashtra and Odisha governments, EPIC-India has implemented star rating programs (mpcb.info; ospcb.info) that allow the public to view the most- and least-polluting industrial plants in their areas. EPIC-India is also working with Gujarat officials to pilot the country's—and world's—first emissions trading program for particulate pollution.

Figure 1 · Increase in Pollution, 1998-2016

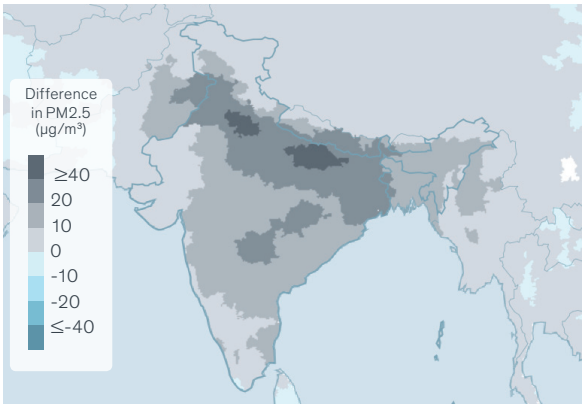
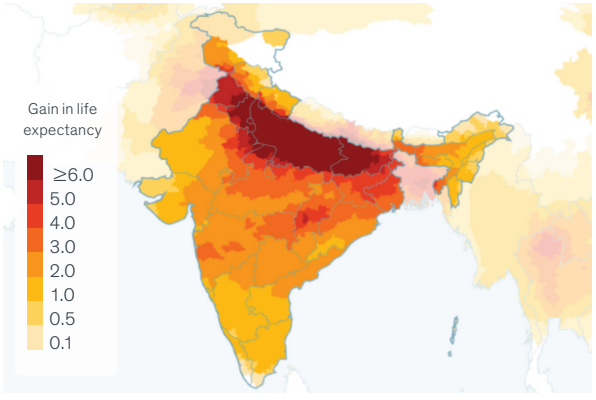


Figure 2 · Potential Gain in Life Expectancy through Meeting WHO Guideline, 2016



"High levels of air pollution are a part of people's lives in India, just as they were in the United States, United Kingdom, Japan and other countries in the past. The last several decades have seen tremendous progress in many of these countries, but this progress did not happen by accident—it was the result of policy choices. As India navigates the dual challenges of sustaining economic growth and protecting environmental quality, the AQLI provides a tool to make the benefits of policies to reduce air pollution concrete."

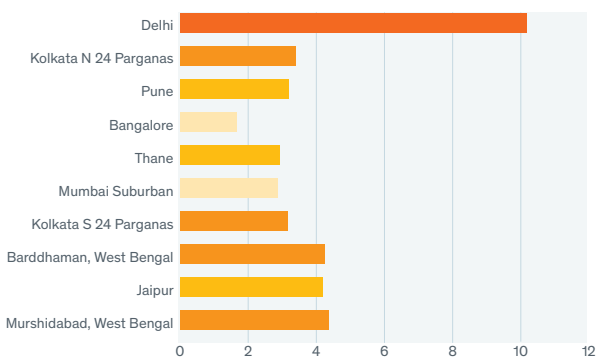
Michael Greenstone, The Milton Friedman Professor in Economics; Director, EPIC

50 Most Populous Districts

District	Population (Millions)	$PM_{2.5}$ Concentration, 2016 (µg/m³)	$PM_{2.5}$ Concentration, 1998 (µg/m3)	Increase in Life Expectancy if District Meets National Standard (40 µg/m³)	Increase in Life Expectancy if District Meets WHO Guideline (10 µg/m³)	Change in Life Expectancy Due to Change in $PM_{2.5}$, 1998-2016 (years)
NCT of Delhi	16.9	114	70	7.2	10.2	-4.3
North 24 Parganas, West Bengal	10.3	45	22	0.5	3.4	-2.2
Pune, Maharashtra	9.9	43	28	0.3	3.2	-1.4
Bangalore, Karnataka	9.9	27	19	0	1.7	-0.8
Thane, Maharashtra	9.3	40	29	0.1	2.9	-1.1
Mumbai Suburban, Maharashtra	8.9	39	30	0	2.9	-0.9
South 24 Parganas, West Bengal	8.6	42	21	0.3	3.2	-2.0
Barddhaman, West Bengal	8.1	53	27	1.3	4.2	-2.5
Jaipur, Rajasthan	7.5	53	33	1.2	4.2	-1.9
Murshidabad, West Bengal	7.3	55	31	1.4	4.4	-2.3
Pashchim Medinipur, West Bengal	7.3	48	24	0.7	3.7	-2.3
Ahmadabad, Gujarat	7.3	32	25	0	2.2	-0.7
Nashik, Maharashtra	6.3	35	22	0	2.4	-1.2
Patna, Bihar	6.2	88	51	4.8	7.7	-3.7
Surat, Gujarat	6.2	33	23	0	2.2	-1.0
Madhubani, Bihar	5.9	76	45	3.5	6.5	-3.1
Purba Champaran, Bihar	5.8	91	53	5	8.0	-3.8
Hugli, West Bengal	5.7	47	24	0.7	3.7	-2.3
Ranga Reddy, Telangana	5.5	34	15	0	2.3	-1.8
Kanpur Nagar, Uttar Pradesh	5.4	98	63	5.7	8.6	-3.4
East Godavari, Andhra Pradesh	5.4	33	19	0	2.3	-1.4
Nadia, West Bengal	5.3	50	25	1	3.9	-2.4
Muzaffarpur, Bihar	5.1	95	55	5.4	8.4	-4.0
Haora, West Bengal	5.1	45	22	0.5	3.4	-2.2
Guntur, Andhra Pradesh	5.0	33	18	0	2.3	-1.5
Belgaum, Karnataka	4.9	29	18	0	1.9	-1.1
Nagpur, Maharashtra	4.8	44	26	0.4	3.4	-1.8
Allahabad, Uttar Pradesh	4.8	82	47	4.1	7.1	-3.4
Lucknow, Uttar Pradesh	4.8	106	62	6.5	9.5	-4.4
Krishna, Andhra Pradesh	4.7	33	19	0	2.3	-1.4
Sitapur, Uttar Pradesh	4.7	100	61	5.9	8.8	-3.8
Chennai, Tamil Nadu	4.6	30	17	0	1.9	-1.3
Jaunpur, Uttar Pradesh	4.6	97	54	5.6	8.5	-4.2
Bareilly, Uttar Pradesh	4.6	102	68	6	9.0	-3.3
Ahmadnagar, Maharashtra	4.6	40	26	0.1	3.0	-1.4
Kancheepuram, Tamil Nadu	4.5	29	17	0	1.9	-1.2
Bulandshahr, Uttar Pradesh	4.5	124	80	8.2	11.1	-4.3
Kolkata, West Bengal	4.5	46	22	0.5	3.5	-2.3
Agra, Uttar Pradesh	4.5	101	67	6	8.9	-3.3
Azamgarh, Uttar Pradesh	4.5	101	56	6	8.9	-4.5
Solapur, Maharashtra	4.4	37	21	0	2.7	-1.6
Gaya, Bihar	4.4	73	43	3.3	6.2	-3.0
Visakhapatnam, Andhra Pradesh	4.4	33	18	0	2.2	-1.5
Pashchim Champaran, Bihar	4.4	83	45	4.2	7.2	-3.7
Chittoor, Andhra Pradesh	4.3	26	17	0	1.6	-0.9
Jalgaon, Maharashtra	4.3	38	24	0	2.8	-1.4
Malappuram, Kerala	4.2	23	14	0	1.3	-0.9
Kurnool, Andhra Pradesh	4.2	29	15	0	1.9	-1.5
Hardoi, Uttar Pradesh	4.2	106	69	6.5	9.4	-3.7
Anantapur, Andhra Pradesh	4.2	27	15	0	1.7	-1.1

Figure 3

10 Most Populous Districts: Average Gain in Life Expectancy if WHO Guideline were Met



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 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.

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