AQLI Air Quality Life Index®

Indonesia Fact Sheet

Air pollution shortens the average Indonesian's life expectancy by 1.2 years, relative to what it would have been if the World Health Organization (WHO) guideline (5 µg/m³) was met.[1] Some areas of Indonesia fare much worse than average, with air pollution shortening lives by more than 2.8 years in the most polluted region (Depok city in the Province of Jawa Barat).

KEY TAKE-AWAYS

- Virtually all of Indonesia's 263 million people live in areas where the annual average particulate pollution level exceeds the WHO guideline.
- Measured in terms of life expectancy, particulate pollution is amongst the top three greatest threats to human health in Indonesia, reducing life expectancy by almost 1.2 years. In contrast, child and maternal malnutrition reduces average life expectancy by about 1 year, while dietary risks reduce life expectancy by 2.1 years (see Figure 3).
- In and around the city of Jakarta (Raya), home to 10.3 million people, residents would on average lose 2.4 years of life expectancy relative to if the air quality complied with the WHO guideline.
- West Java (Jawa Barat) is the most polluted province of Indonesia, where particulate pollution is cutting the lives of 48 million people short by 1.6 years on average.
- On the Indonesian islands of Sumatra and Kalimantan, forest and peatland fires, often set illegally to clear land for agricultural plantations, create annual haze events. Though fire intensity and hotspots vary across time, the recurrence of fires in these areas each year means that residents are exposed to a high long-term average pollution concentration.

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

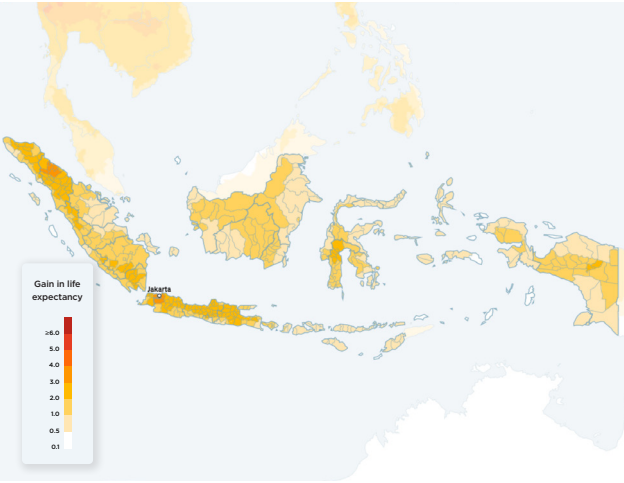
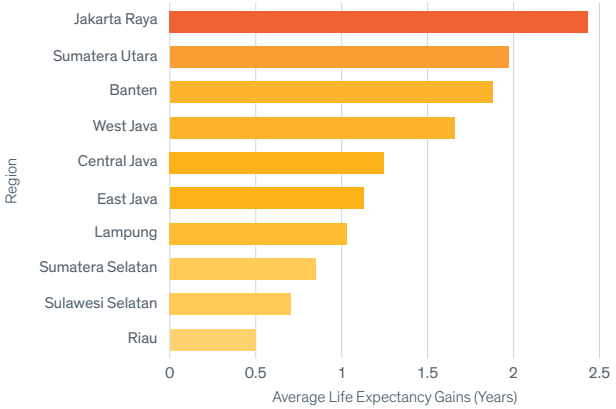


Figure 2 · Potential Gain in Life Expectancy through Permanently Reducing $PM_{2.5}$ from 2020 Concentration to the WHO Guideline in 10 Most Populous Regions of Indonesia



1 All average $PM_{2.5}$ values (measured in micrograms per cubic meter: µg/m³) are population weighted.

$PM_{2.5}$ Concentrations and Potential Life Expectancy Gains by Province.

Province	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	By 30%
Aceh	5.3	14.7	0.9	0.4
Bali	4.2	10.1	0.5	0.3
Bangka Belitung	1.5	8.8	0.4	0.3
Banten	12.7	24.1	1.9	0.7
Bengkulu	2	12.4	0.7	0.4
Central Java	34.3	17.6	1.2	0.5
East Java	39	16.5	1.1	0.5
Gorontalo	1.2	8.3	0.3	0.2
Jakarta Raya	10.4	29.9	2.4	0.9
Jambi	3.6	10.8	0.6	0.3
Kalimantan Barat	5	11.1	0.6	0.3
Kalimantan Selatan	4.2	11.7	0.7	0.3
Kalimantan Tengah	2.7	10.8	0.6	0.3
Kalimantan Timur	4.3	9.2	0.4	0.3
Kepulauan Riau	2.1	8.7	0.4	0.2
Lampung	8.3	15.5	1	0.4

Province	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	By 30%
Maluku	1.6	6.5	0.1	0.2
Maluku Utara	1.1	7.8	0.3	0.2
Nusa Tenggara Barat	4.9	9.1	0.4	0.3
Nusa Tenggara Timur	5.3	7.7	0.3	0.2
Papua	3.2	10.2	0.5	0.3
Papua Barat	0.9	7.8	0.3	0.2
Riau	6.8	10.2	0.5	0.3
Sulawesi Barat	1.3	11.8	0.7	0.3
Sulawesi Selatan	8.6	12.3	0.7	0.4
Sulawesi Tengah	2.9	10.9	0.6	0.3
Sulawesi Tenggara	2.6	8.8	0.4	0.3
Sulawesi Utara	2.4	9	0.4	0.3
Sumatera Barat	5.4	14.2	0.9	0.4
Sumatera Selatan	8.4	13.7	0.8	0.4
Sumatera Utara	14.4	25.1	2	0.7
West Java	48.7	21.9	1.6	0.6
Yogyakarta	3.8	12.1	0.7	0.4

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

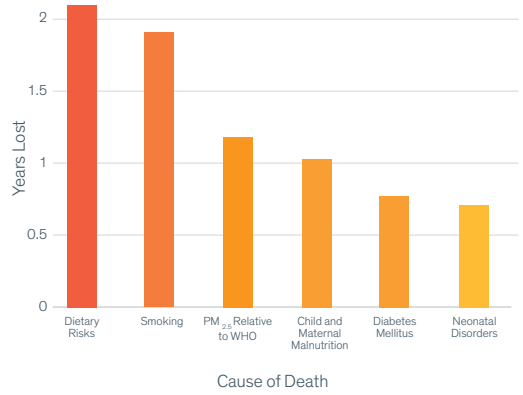
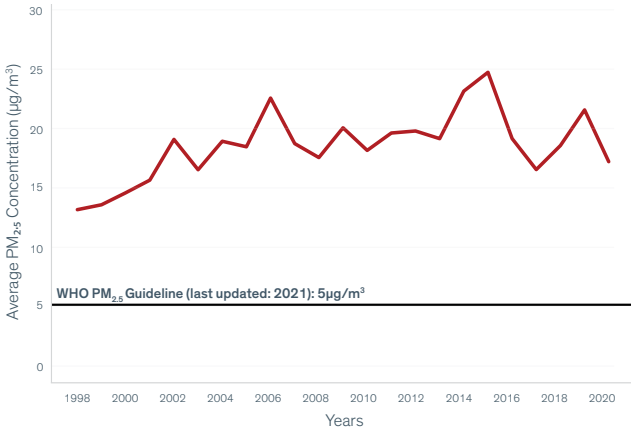


Figure 4 · Average $PM_{2.5}$ Concentration in Indonesia from 1998-2020



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