AQLI Air Quality Life Index®

Indonesia Fact Sheet

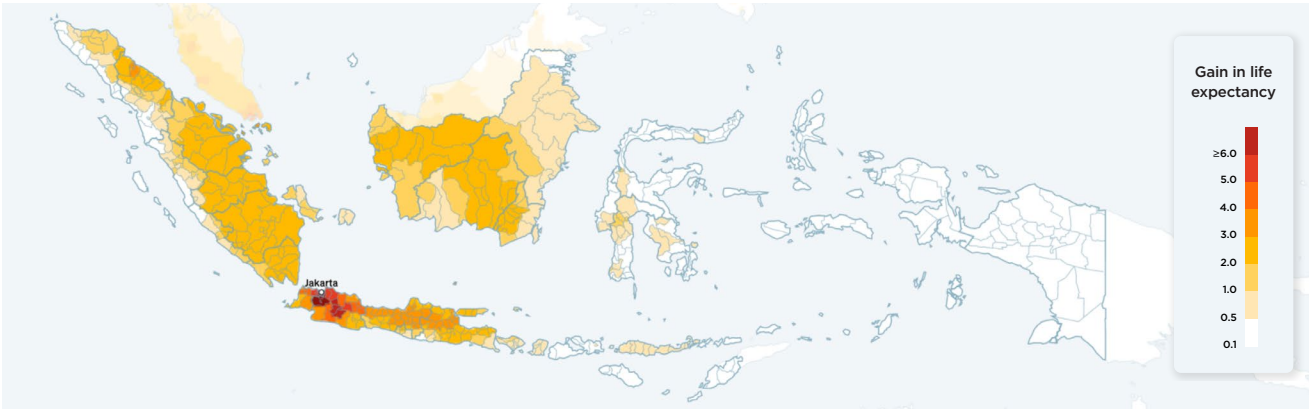
Indonesia is today the world's twentieth most polluted country. Air pollution shortens the average Indonesian's life expectancy by 2 years, relative to what it would have been if the World Health Organization (WHO) guideline was met. Some areas of Indonesia fare much worse than average, with air pollution shortening lives by more than 6 years in the most polluted region.

KEY TAKE-AWAYS

- 91 percent of Indonesia's 268 million people live in areas where the annual average particulate pollution level exceeds the WHO guideline.
- In the capital Jakarta, home to 11 million people in the city proper, particulate pollution levels are six times the WHO guideline. If this pollution persists, residents would lose 5.5 years of life expectancy relative to if the air quality complied with the WHO guideline.
- West Java is the most polluted province of Indonesia, where particulate pollution is cutting the lives of 48 million people by 4.1 years. The city of Depok is the worst. Residents there see their lifespans cut short by 6.4 years.

Jakarta and Banten also have high particulate pollution. Aside from vehicles, coal, and industrial plants, biomass burning is a source of intense seasonal air pollution for much of the region. On the Indonesian islands of Sumatra and Kalimantan, forest and peatland fire , 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 ea h year means that residents are exposed to a high long-term average pollution concentration. In the cities of Palangka Raya in Central Kalimantan and Palembang in South Sumatra, and their surrounding areas, the 10-year average particulate concentration is about three times the WHO guideline. Life expectancy for the residents of these cities is 2 years lower than what it would be if the long-term average particulate matter exposure were instead at the WHO guideline. Moreover, the fires crea e transboundary pollution with especially significant reper ussions in Indonesia's neighboring downwind countries.

Figure 1 ·Potential Gain in Life Expectancy through Permanently Reducing PM2.5 from 2018 Concentration to the WHO Guideline



"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

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

Province	Population (Millions)	$PM_{2.5}$ Concentration, 2018 (μg/m³)	Years of Life Expectancy Gain through Reducing $PM_{2.5}$ from 2018 Concentration: To WHO Guideline of 10 μg/m³	Years of Life Expectancy Gain through Reducing $PM_{2.5}$ from 2018 Concentration: By 30%
West Java	48.7	52	4.1	1.5
East Java	39	26	1.6	0.8
Central Java	34.3	31	2.1	0.9
North Sumatra	14.4	24	1.5	0.7
Banten	12.7	48	3.7	1.4
Jakarta	10.4	63	5.2	1.9
South Sulawesi	8.6	12	0.2	0.4
South Sumatra	8.4	27	1.6	0.8
Lampung	8.3	24	1.4	0.7
Riau	6.8	23	1.3	0.7
West Sumatra	5.4	15	0.5	0.4
East Nusa Tenggara	5.3	10	0.1	0.3
Aceh	5.3	12	0.4	0.4
West Kalimantan	5	21	1.1	0.6
West Nusa Tenggara	4.9	12	0.2	0.4
East Kalimantan	4.3	12	0.2	0.4
Bali	4.2	14	0.4	0.4
South Kalimantan	4.2	21	1.1	0.6
Yogyakarta	3.8	21	1.1	0.6
Jambi	3.6	24	1.4	0.7
Papua	3.2	5	0	0.1
Central Sulawesi	2.9	9	0.1	0.3
Central Kalimantan	2.7	21	1.1	0.6
Southeast Sulawesi	2.6	10	0.1	0.3
North Sulawesi	2.4	7	0	0.2
Riau Islands	2.1	28	1.8	0.8
Bengkulu	1.9	17	0.7	0.5
Maluku	1.6	5	0	0.1
Bangka Belitung	1.5	15	0.5	0.4
West Sulawesi	1.3	11	0.1	0.3
Gorontalo	1.2	8	0.1	0.2

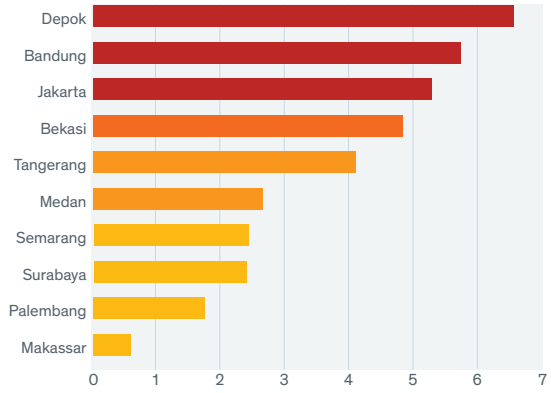
POLICY IMPACTS

The dual challenges of economic growth and environmental quality faced by Indonesia 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, with cities cutting particulate pollution by about 30 percent—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.

Indonesia has the opportunity to experience the same progress. If Indonesia were to achieve the same reduction in pollution experienced by China, its residents could live 1.2 years longer; 0.7 years longer if it achieves India's target.

Figure 2 · Potential Gain in Life Expectancy through Permanently Reducing PM2.5 from 2018 Concentration to the WHO Guideline in 10 Largest Cities



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 Dinstinguished 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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*This document replaces an earlier version that erroneously used satellite data that did not include PM2.5 from biomass burning sources.