

Thailand is among the most polluted countries in Southeast Asia with particulate pollution reaching $23.8 \mu\text{g}/\text{m}^3$ in 2020, nearly 5 times higher than the World Health Organization (WHO) guideline. At current pollution levels, air pollution is shortening the average Thai resident's life expectancy by 1.8 years relative to what it would be if the WHO guideline was permanently met. But in the Northern region (Lanna), air pollution levels are 18 to 52 percent higher than the national average, and the gains from clean air are 2 to 3 years.

KEY TAKE-AWAYS

- Despite pandemic lockdowns, pollution continued to rise in Thailand, with pollution increasing from 2019 to 2020 by 10.8 percent, making Thailand the fourth most polluted country in Southeast Asia slightly trailing Vietnam.
- All of Thailand's 68 million people live in areas where annual particulate pollution exceeds the WHO guideline, and it has been this way since 2000.
- Overall, pollution in Thailand has risen 22.7 percent since 2000. In the Northern (Lanna) and Northeastern (Isan) regions, average pollution levels have risen by 30 percent and 28.9 percent, respectively. In Central (Siam) and Southern (Tambralinga) Thailand, pollution levels have risen by 18.2 percent and only 6.7 percent, respectively.
- The health burden of air pollution is the highest in the provinces of Bangkok Metropolis, Nakhon Ratchasima and Chiang Mai where residents are losing 4.1 to 13.9 million total life years, and where the average gain in life expectancy from clean air ranges from 1.5 to 2.4 years.
- Measured in terms of life expectancy, particulate pollution is the greatest threat to human health in Thailand, reducing life expectancy by 1.8 years. In contrast, first-hand cigarette smoke reduces average Thai life expectancy by about 1.7 years and road injuries reduce life expectancy by around 9 months.

Figure 1 · $\text{PM}_{2.5}$ Concentrations in Southeast Asian Countries in 2020

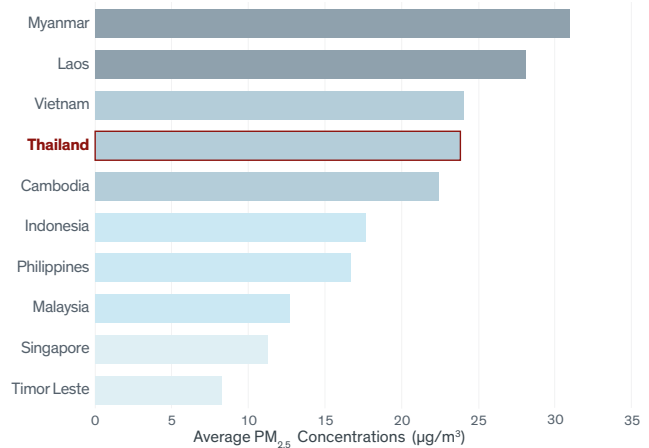
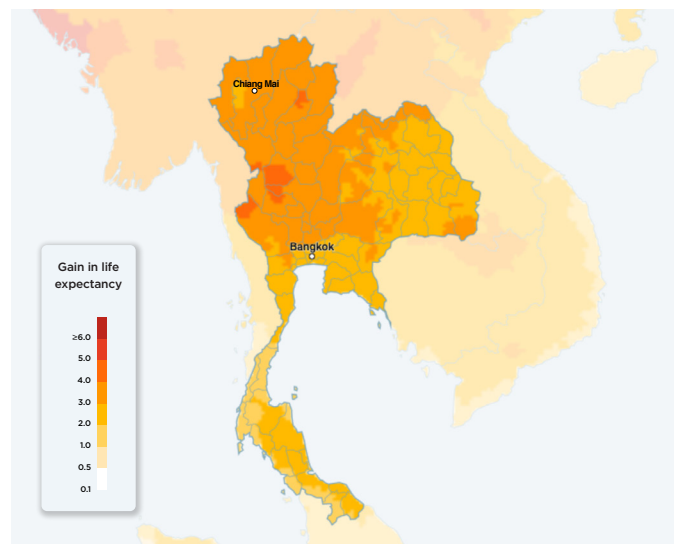


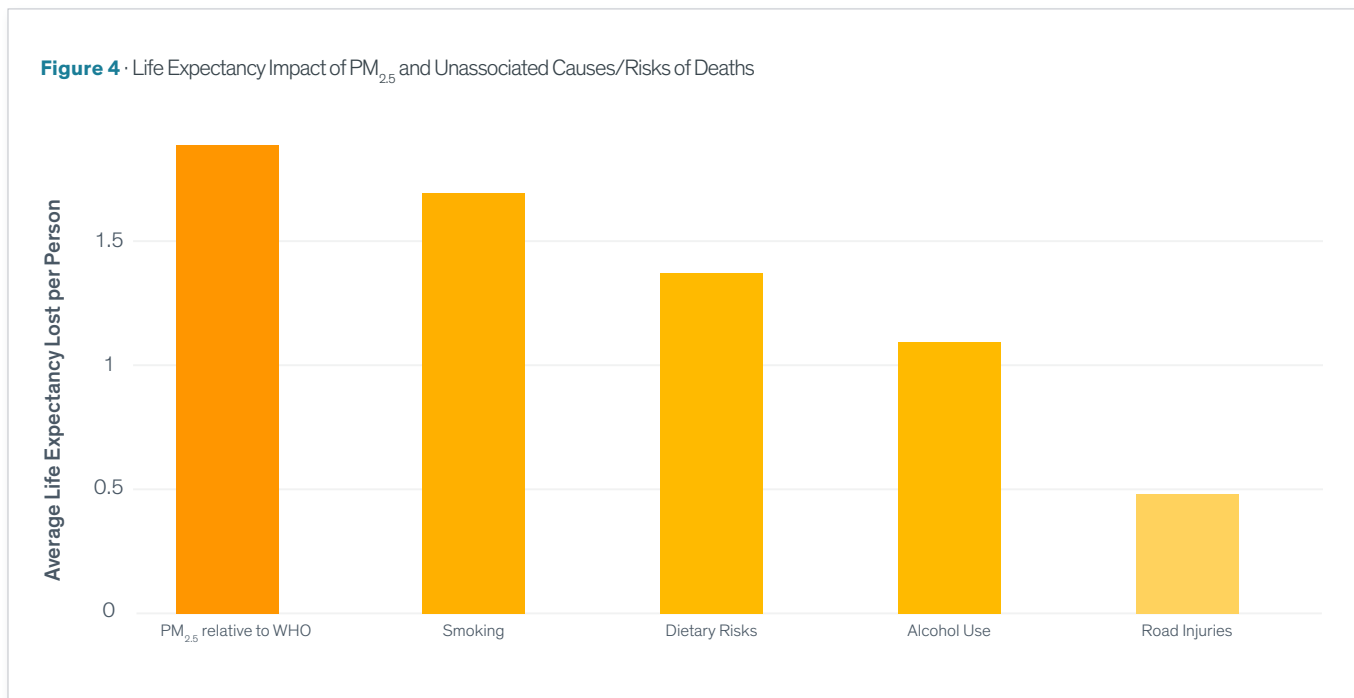
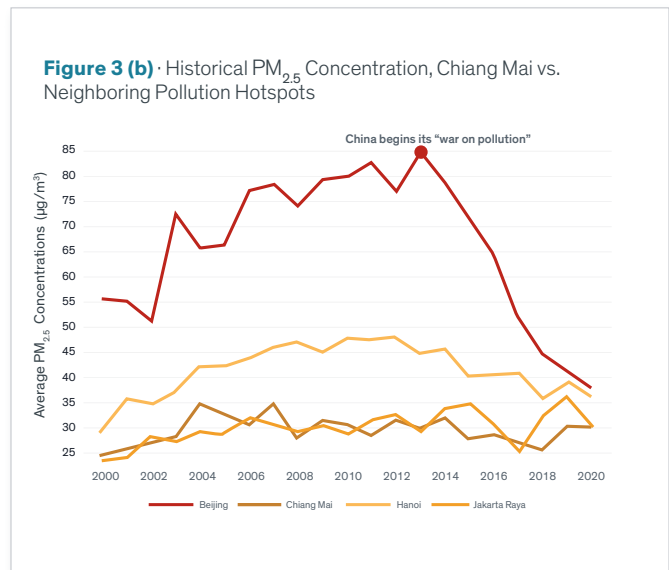
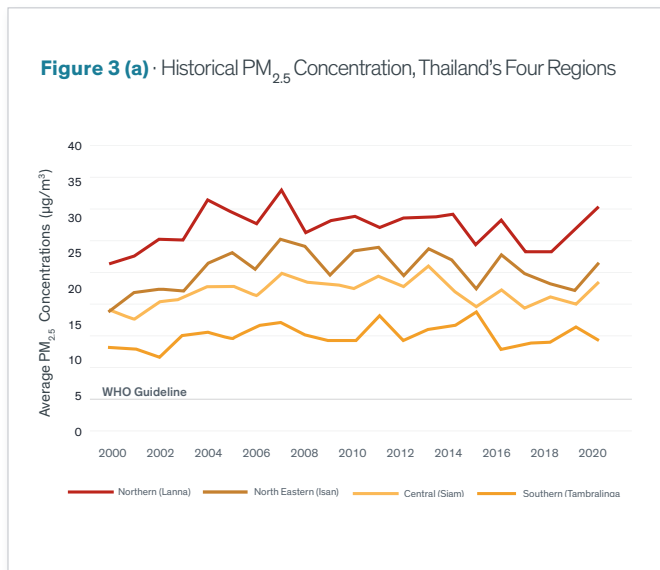
Figure 2 · Potential Gain in Life Expectancy from Reducing $\text{PM}_{2.5}$ to the WHO Guideline



POLICY IMPACTS

The dual challenges of economic growth and environmental quality faced by Thailand today are no different from those once confronted by London, England, Los Angeles, California, or Osaka, Japan — once respectively known as “the big smoke,” “the smog capital of the world,” and the “smoke capital” — during their periods of industrialization. Yet the legacy of environmental improvement in these former pollution hotspots is evidence that today’s pollution does not need to be tomorrow’s fate. These countries have largely been successful in confronting their pollution challenge thanks to a demand for change from their citizens and subsequent strong policies.

More recently, China has seen tremendous progress since declaring a “war against pollution” in 2014, with its pollution levels declining by roughly 40 percent since then. Due to these pollution reductions, the average Chinese resident stands to gain about 2 years of additional life expectancy. With stronger clean air policies, Thailand has an opportunity to experience the same progress. If Thailand were to achieve a 30 percent reduction in air pollution, its residents would live 9 to 10 months longer, on average.



Note: All PM_{2.5} averages are population weighted

Potential Gain in Years of Life Expectancy through Reducing PM_{2.5} Concentrations in the 25 Most Populous Provinces

Gain in Years of Life Expectancy if 2020 Concentration is Reduced to

Province	Population (Millions)	2020 PM _{2.5} Concentration (µg/m ³)	National Standard (25 µg/m ³)	WHO Guideline (5 µg/m ³)	70% of 2020 Level
Bangkok Metropolis	9.0	21	0.0	1.5	0.6
Nakhon Ratchasima	2.5	27	0.2	2.2	0.8
Samut Prakan	2.2	21	0.0	1.6	0.6
Khon Kaen	1.7	25	0.0	1.9	0.7
Ubon Ratchathani	1.7	25	0.0	1.9	0.7
Chon Buri	1.7	19	0.0	1.3	0.5
Chiang Mai	1.7	30	0.5	2.4	0.9
Pathum Thani	1.6	23	0.0	1.8	0.7
Nakhon Si Thammarat	1.6	17	0.0	1.2	0.5
Songkhla	1.6	16	0.0	1.1	0.5
Nonthaburi	1.5	22	0.0	1.6	0.6
Udon Thani	1.3	25	0.1	2.0	0.7
Buri Ram	1.3	25	0.0	2.0	0.7
Chiang Rai	1.1	33	0.8	2.7	1.0
Nakhon Pathom	1.1	24	0.0	1.9	0.7
Surin	1.1	24	0.0	1.9	0.7
Roi Et	1.1	24	0.0	1.8	0.7
Surat Thani	1.1	16	0.0	1.1	0.5
Si Sa Ket	1.0	24	0.0	1.9	0.7
Nakhon Sawan	1.0	32	0.7	2.6	0.9
Samut Sakhon	1.0	22	0.0	1.6	0.6
Chaiyaphum	1.0	26	0.1	2.0	0.8
Rayong	0.9	17	0.0	1.2	0.5
Sakon Nakhon	0.9	23	0.0	1.8	0.7
Phetchabun	0.9	28	0.3	2.3	0.8

Figure 5 · Potential Gain in Life Expectancy from Reducing PM_{2.5} to the WHO Guideline in 10 Most Populated Provinces

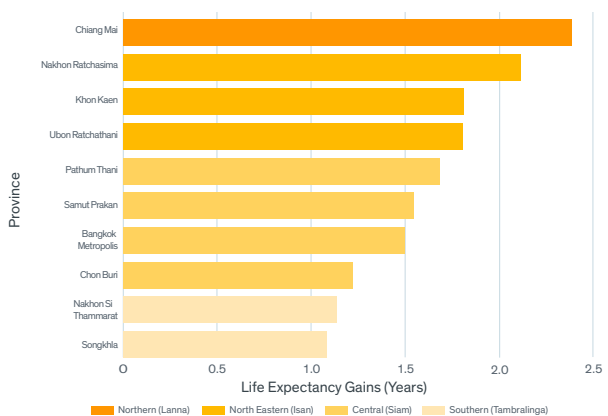
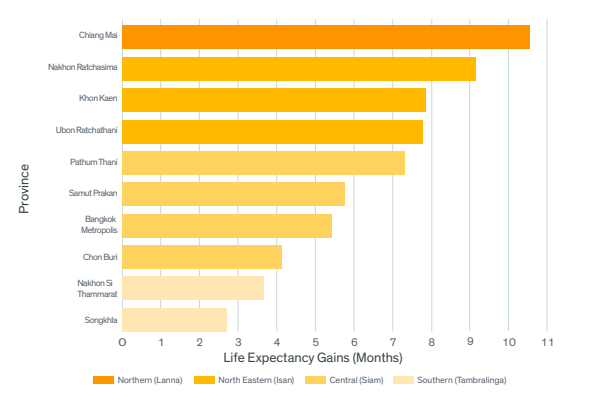


Figure 6 · Life Expectancy Gained from a 30% Reduction in 2020 PM_{2.5} Concentration in 10 Most Populated Provinces



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 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