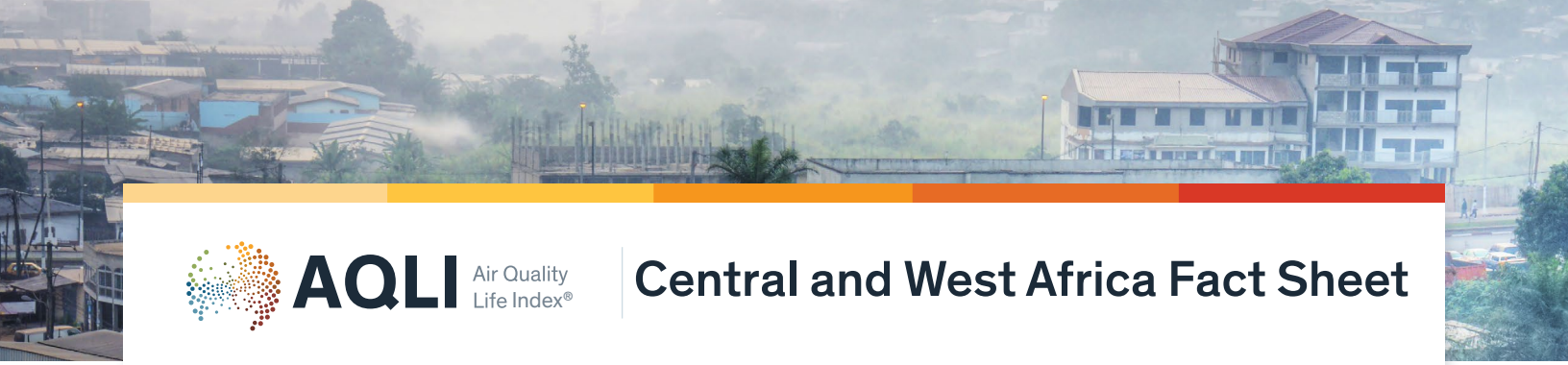


AQLI Air Quality Life Index®

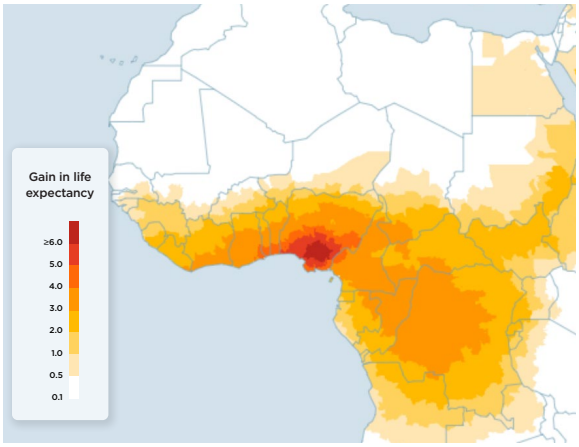
Central and West Africa Fact Sheet

In Central and West Africa[1], regions together comprised of 27 countries and 605 million people, the average person is exposed to particulate pollution levels that are double the World Health Organization's (WHO) guideline. If these particulate pollution levels persist, average life expectancy in the regions would be 2.1 years lower, and a total of 1.2 billion person-years would be lost, relative to if air quality met the WHO standard.

KEY TAKE-AWAYS

- During the last decade, Benin, the Democratic Republic of the Congo, the Republic of Congo, Ghana, Nigeria, and Togo have all been among the top ten most polluted countries in one or more years.
- **Nigeria:** Nigeria is one of the region's pollution hotspots, and the sixth most polluted country in the world. Air pollution is at the top of the list in terms of its impact on life expectancy—shaving off more years than HIV/AIDS, malaria, and water and sanitation concerns. The country's most populous city is Lagos, home to 20 million people and one of the fastest growing cities in the world. Residents there could gain 4.3 years in life expectancy if air quality complied with the WHO guideline. In Onitsha, the most polluted city in Nigeria, residents could gain 5.8 years.
- **Republic of the Congo:** Its capital, Brazzaville, is not only its most populous city with 1.4 million residents, but also one of its most polluted with a PM2.5 level of 34 g / m3 in 2019. Residents there could gain 2.3 years in life expectancy if air quality complied with the WHO guideline.
- **Democratic Republic of the Congo:** Air pollution in the Democratic Republic of Congo shaves more off life expectancy than any other comparable health threat except malaria. In Kinshasa, the capital and largest city of the Democratic Republic of the Congo and home to more than 10 million people, life expectancy is lowered by 2.2 years relative to what it could be if air quality complied with the WHO guideline.
- **Ghana:** Air pollution is the deadliest health threat in Ghana, when stacked up against similar diseases. The most polluted region of Ghana is the Volta Region, with a pollution level of 41.5 g / m3. Residents there could gain 3 years in life expectancy if air quality complied with the WHO guideline. In Accra, Ghana's capital, and its most populous city with 2.6 million residents, life expectancy is lowered by 3 years relative to what it could be if air quality complied with the WHO guideline.
- **Côte d'Ivoire:** In Cote d'Ivoire, air pollution shortens life by an amount greater than HIV/AIDS, malaria and water and sanitation concerns. In the economic capital of the Côte d'Ivoire, Abidjan with a population of 5 million, residents could gain 2.9 years in life expectancy if air quality complied with the WHO guideline.

Figure 1 · Potential Gain in Years of Life Expectancy Through Permanently Reducing $PM_{2.5}$ From 2019 Concentrations 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

1 Central Africa is here defined as the 11 countries in the Economic Community of Central African States. West Africa is defined following the United Nations' definition, which includes 16 countries.

Note: The WHO changed its particulate pollution guidance on September 22, 2021. The data here reflects the previous guidance.

POLICY IMPACTS

Going forward, the populations and economies of African countries will grow. In fact, growth in coal consumption in Africa over the next two decades is projected to be triple what it was in the past two decades. As such, the dual challenges of economic growth and environmental quality faced by Central and West Africa will become more difficult to balance. Countries and regions throughout the world, however, have demonstrated success in confronting these challenges during their periods of industrialization.

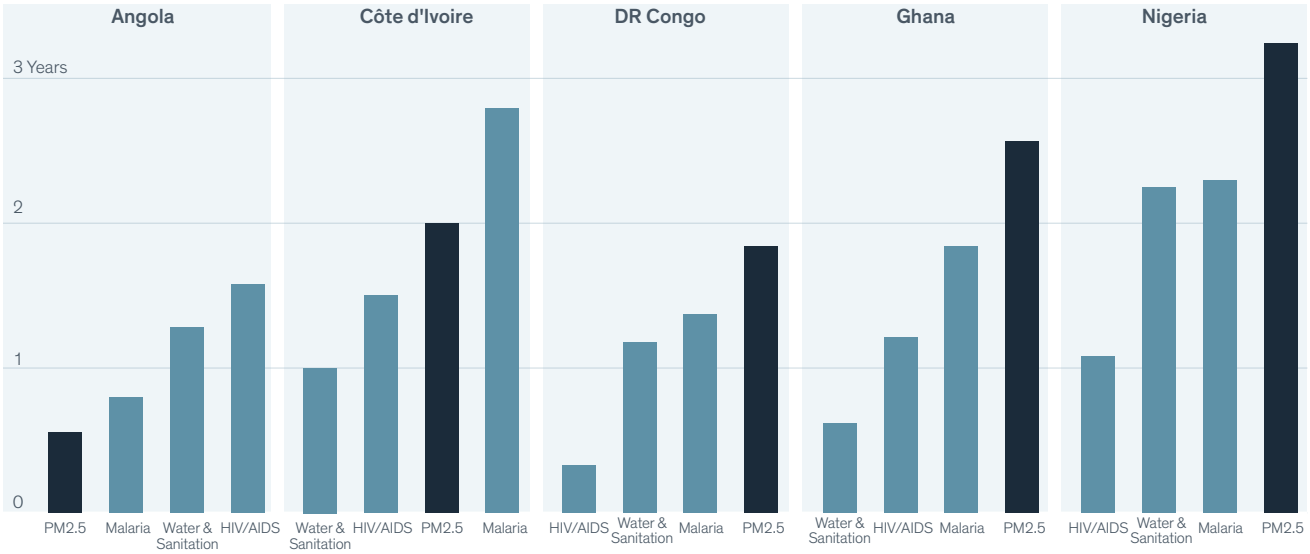
China has made tremendous progress since declaring a "war against pollution" in 2014, with cities cutting particulate pollution by almost 30 percent—improving life expectancy by 1.5 years if the reductions persist. India, having declared its own war against pollution in January 2019, has set an ambitious target to reduce pollution by 20-30 percent.

Central and West Africa has the opportunity to experience the same progress. If Central and West Africa were to achieve a 30 per cent reduction in pollution as experienced by China and targeted by India, its residents could live 0.63 years longer. Some countries in Central and West Africa would see even greater gains. For example, if the Republic of the Congo were to achieve China's reduction, its residents could live 0.8 years longer. Togo would gain 1.4 years if pollution levels met China's reduction; Benin would gain 1.2 years.

On the policy front, Central and West Africa does have a long way to go. Of all 27 Central and West African countries, only one – Cameroon – has set a national standard for particulate pollution. Further, only three real-time time air quality monitoring stations exist throughout the entire region to provide transparent pollution data to the public[2]. As a point of comparison, about 200 of these monitors exist in India, a land mass smaller than Central and West Africa.

2 UNICEF, 2019

Figure 2 · Life Expectancy Impacts of Particulate Pollution and Other Health Threats in the Five Most Populous Countries in Central and West Africa



Note: "DR Congo" refers to the Democratic Republic of the Congo.

$PM_{2.5}$ Concentration and Potential Life Expectancy Gains by Country and in Most Polluted Region and Most Populous City of Each Country.

Location	$PM_{2.5}$ Concentration, 2019 (μg/m³)	Years of Life Expectancy Gain through Reducing $PM_{2.5}$ from 2019 Concentration		Percent of Population in Areas above WHO Guideline
		To WHO Guideline of 10 μg/m³	By 30%	
Angola	16	0.6	0.5	90
Chitato, Lunda Norte	30	2.0	0.9	
Viana, Luanda	14	0.4	0.4	
Benin	40	2.9	1.2	100
Ifangni, Plateau	51	4.0	1.5	
Cotonou, Littoral	151	4.0	1.5	
Burkina Faso	15	0.5	0.5	95
Kadiogo, Centre	15	0.5	0.4	
Noumbiel, Sud-Ouest	23	1.3	0.7	
Burundi	20	0.9	0.6	100
Gitega, Gitega	18	0.8	0.5	
Bwiza, Bujumbura Mairie	28	1.8	0.8	
Cameroon	35	2.4	1.0	100
Wouri, Littoral	36	2.6	1.1	
Manyu, Sud-Ouest	47	3.7	1.4	
Cape Verde	2	0.0	0.1	0
Santa Cruz	2	0.0	0.1	
Praia	2	0.0	0.1	
Central African Republic	30	1.9	0.9	100
Bimbo, Ombella-M'Poko	37	2.6	1.1	
Chad	22	1.2	0.6	90
N'Djamena, Ville de N'Djamena	31	2.1	0.9	
Mayo-Kebbi Ouest	37	2.6	1.1	
Côte d'Ivoire	28	1.8	0.8	100
Abidjan, Abidjan	37	2.7	1.1	
Democratic Republic of the Congo	28	1.8	0.8	100
Bandundu, Kwilu	40	3.0	1.2	
Kinshasa, Kinshasa	33	2.2	1.0	
Equatorial Guinea	24	1.4	0.7	100
Malabo, Bioko Norte	32	2.2	0.9	
Gabon	23	1.2	0.7	100
Komo-Mondah, Estuaire	20	0.9	0.6	
Haut-Ntem, Wouleu-Ntem	33	2.2	1.0	
Gambia	10	0.0	0.3	25
Kombo Saint Mary, Western	13	0.3	0.4	
Kantora, Upper River	13	0.3	0.4	
Ghana	35	2.4	1.0	100
Ketu, Volta	45	3.4	1.3	
Accra, Greater Accra	40	3.0	1.2	

Location	$PM_{2.5}$ Concentration, 2019 (μg/m³)	Years of Life Expectancy Gain through Reducing $PM_{2.5}$ from 2019 Concentration		Percent of Population in Areas above WHO Guideline
		To WHO Guideline of 10 μg/m³	By 30%	
Guinea	17	0.7	0.5	100
Yamour Nzérékoré	24	1.3	0.7	
Conakry, Conakry	18	0.8	0.5	
Guinea-Bissau	13	0.3	0.4	100
Bissau, Bissau	12	0.2	0.4	
Boe, Gabv∫	15	0.5	0.4	
Liberia	26	1.6	0.8	100
Pleebo/Sodeken, Maryland	32	2.2	0.9	
Greater Monrovia, Montserrado	26	1.6	0.8	
Mali	9	0.1	0.3	51
Bamako, Bamako	11	0.1	0.3	
Kadiolo, Sikasso	16	0.6	0.5	
Mauritania	4	0.0	0.1	0
Sélibaby, Guidimaka	8	0.0	0.2	
Nouakchott, Nouakchott	2	0.0	0.1	
Niger	14	0.5	0.4	95
Mirriah, Zinder	16	0.6	0.5	
Gaya, Dosso	22	1.2	0.7	
Nigeria	44	3.4	1.3	100
Enugu East, Enugu	71	6.0	2.1	
Alimosho, Lagos	53	4.2	1.6	
Republic of Congo		28	1.8	0.8
Brazzaville, Brazzaville	34	2.3	1.0	
Impfondo, Likouala	39	2.8	1.1	
Rwanda	23	1.3	0.7	100
Musanze, Amajyaruguru	26	1.6	0.8	
Gasabo, Umujyi wa Kigali	23	1.3	0.7	
Saint Helena	2	0.0	0.1	0
Ascension, Ascension	4	0.0	0.1	
Longwood, Saint Helena	2	0.0	0.1	
Senegal	8	0.1	0.2	15
Dakar, Dakar	5	0.0	0.1	
Kédougou	16	0.6	0.5	
Sierra Leone	7	0.0	0.2	16
Western Urban, Western	19	0.8	0.5	
Pujehun, Southern	24	1.4	0.7	
São Tomé and Príncipe	22	1.1	0.6	100
Água Grande, São Tomé	13	0.3	0.4	
Pagué, Príncipe	17	0.7	0.5	
Togo	36	2.6	1.1	100
Lacs, Maritime	47	3.6	1.4	
Golfe (incl Lomé), Maritime	46	3.6	1.4	

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 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