# Air Quality Life Index (AQLI) 2024

**For Prelims: Air Quality Life Index (AQLI) 2024, PM2.5, World Health Organization (WHO), Malnutrition, Middle East and North Africa (MENA), Water and Sanitation, National Air Quality Standards, Pollution.**

**For Mains:** Impact of Air Pollution on Health and Life Expectancy.

**Source: TOI**

## Why in News?

Recently, the **Energy Policy Institute at the University of Chicago (EPIC)** released the **Air Quality Life Index (AQLI) 2024.**

- In India, where the annual **PM2.5** standard is **40 µg/m³,** more than **40%** of the population breathes air that **exceeds the standard.**

## What are the Key Findings of the Air Quality Life Index (AQLI) 2024?

- **Impact of Air Pollution on Life Expectancy:** The report revealed that if **PM2.5 (particulate matter that are 2.5 micrometres or less in diameter)** pollution were reduced to meet the guidelines set by the **World Health Organization (WHO),** the average person could live **1.9 years longer,** adding a total of 14.9 billion life years globally.
    - The **WHO guidelines** state that annual average concentrations of **PM2.5** should not exceed 5 micrograms per cubic meter (µg/m3).
- **Deadlier than Chronic Diseases: The effects** of air pollution **surpass** those of smoking, heavy drinking and are several times greater than other major health risks like **HIV/AIDS** **and malnutrition.**
- **Uneven Distribution of Pollution:** The burden of pollution is **not evenly distributed.**
    - People in the **most polluted areas** breathe **six times more polluted air** than those in the cleanest regions, **reducing** their life expectancy by an average of **2.7 years.**
- **Non-Compliance:** While many countries have established **national air quality standards,** the report finds that enforcement and compliance remain significant challenges.
    - According to the report, **94 countries** have established **PM 2.5 standards,** of which **37 fail** to meet their own guidelines. Additionally, **158 countries** have **not set any standards at all.**
- **Potential Benefits:** The potential benefits of meeting WHO pollution standards are **substantial.**
- If all countries achieved their goals, the average person in these regions would **gain 1.2 years** of life expectancy.

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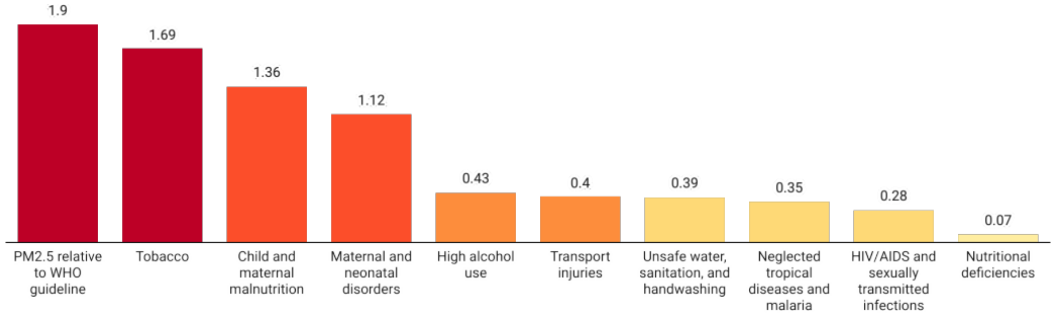
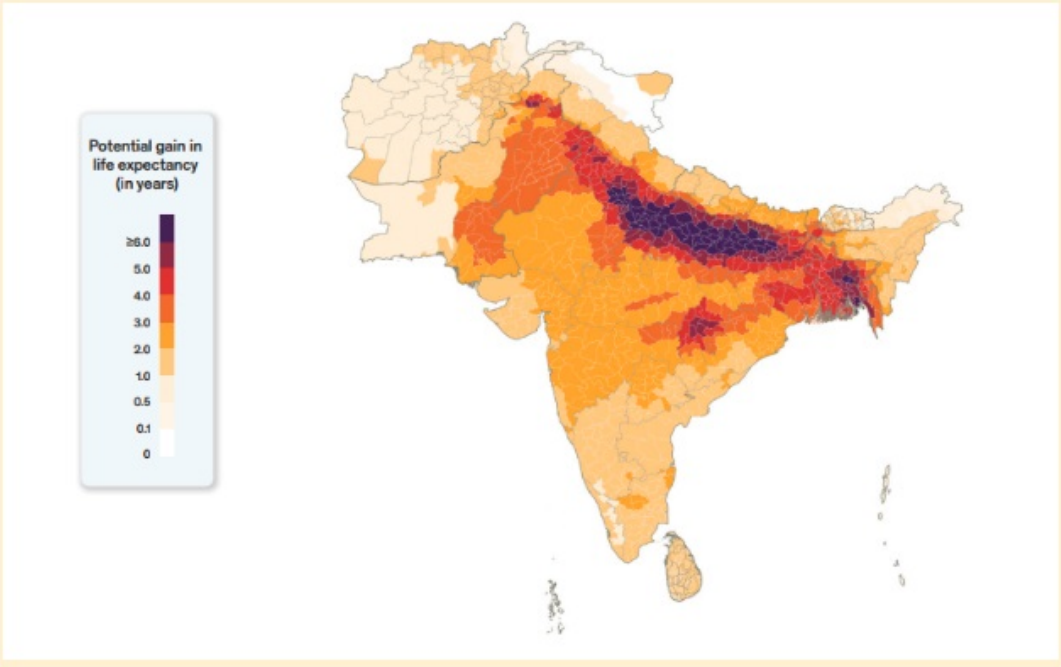



- **Global Scenario:**
  - **US, China, Europe:** The **United States, Europe, and China** have implemented stringent policies, leading to significant reductions in pollution levels.
    - In **China**, air pollution has decreased by **41% since 2014** and extended the life of Chinese by **2 years.**
    - The **US** has reduced pollution by **67.2%** since 1970, extending the average lifespan by **1.5 years.**
    - **Europe** has seen a **30.2% reduction** since 1998, adding **5.6 months** to life expectancy.
  - **South and Southeast Asia:** South and Southeast Asia saw notable improvements in 2022, observing a **4% decline in PM2.5** levels compared to 2012.
    - Despite this improvement, **South Asia** remains the world's **most polluted** region, accounting for **45% of global life years lost** due to high pollution.
    - **Bangladesh, India, Nepal, and Pakistan are among the most polluted countries globally.**
    - In **Myanmar,** air pollution is reducing life expectancy by **2.9 years.**
  - **Africa:** Air pollution in Central and West Africa has remained **largely unchanged** in 2022.
    - The region's average **PM2.5 concentration is 22.2** micrograms per cubic meter (µg/m3), **4.4 times higher** than the WHO guideline.
    - This pollution level is reducing life expectancy by an average of **1.7 years** across the region.
    - However, **Nigeria, Rwanda and Ghana** have recently implemented air quality regulations and standards.
  - **West Asia:** **Middle East and North Africa (MENA)** region has emerged as a new pollution hotspot, reducing life expectancy by an average of **1.3 years** across the region.
    - **Qatar and Iraq** are the most polluted countries in the region.
  - **Latin America:** Latin America's PM2.5 levels increased by **4.8%** from 2021 and 3% from 1998.
    - **Bolivia** is the **most polluted** country in Latin America; air pollution in Guatemala reduces life expectancy by 2.1 years.
    - Cities like **Bogotá, Mexico City, and Quito** implement driving restrictions and improve public transport to combat pollution.

## What are India Specific Findings in Air Quality Life Index (AQLI) 2024?

- **Impact of Cleaner Air on Life Expectancy in Delhi:** Cleaner air that meets **WHO guidelines** of 5 µg/m³ can **increase** the life expectancy of Delhi's 18.7 million residents by **7.8 years.**
  - Achieving **India's national air quality standard (40 µg/m³)** could increase life expectancy by **4.3 years.**
- **Current Air Quality and Trends in Delhi:** Delhi is the **most polluted city** in India, with an average PM2.5 level of **84.3 µg/m³ in 2022.**
  - However, with an average annual PM2.5 concentration of 84.3 µg/m3 in 2022, Delhi has seen **significant improvement.**
- **Improvement in Air Quality Across India**: India saw a **decrease** in particulate pollution from an average of **49 µg/m³** over the last decade to **41.4 µg/m³** in 2022.
  - If this reduction continues, the average Indian could live **9 months longer** than if exposed to the previous decade's pollution levels.

- **Comparison with Other Health Risks:** While particulate pollution takes 3.6 years off the life of an Indian resident, **malnutrition** takes off 1.6 years, **tobacco** 1.5 years, and **unsafe water and sanitation** 8.4 months.




## What is the Air Quality Life Index (AQLI)?

- The AQLI is a **pollution index** that translates th**e effect of particulate air pollution** into its impact on life expectancy.
- The Index then **combines the** relationship between long-term **human exposure to air pollution and life expectancy** to provide 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 **WHO's guideline** for what is considered a safe level of exposure, existing national air quality standards, or user-defined air quality levels.

# Air Pollutants

## Sulphur Dioxide ($SO_2$)

It comes from the consumption of fossil fuels (oil, coal and natural gas). Reacts with water to form acid rain.

**Impact:** Causes respiratory problems.

## Ozone ($O_3$)

Secondary pollutant formed from other pollutants (NOx and VOC) under the action of the sun.

**Impact:** Irritation of the eye and respiratory mucous membranes, asthma attacks.

## Nitrogen Dioxide ($NO_2$)

Emissions from road transport, industry and energy production sectors. Contributes to Ozone and PM formation.

**Impact:** Chronic lung disease.

## Carbon Monoxide (CO)

It is a product of the incomplete combustion of carbon-containing compounds.

**Impact:** Fatigue, confusion, and dizziness due to inadequate oxygen delivery to the brain.

## Ammonia ($NH_3$)

Produced by the metabolism of amino acids and other compounds which contain nitrogen.

**Impact:** Immediate burning of the eyes, nose, throat and respiratory tract and can result in blindness, lung damage.

## Lead (Pb)

Released as a waste product from extraction of metals such as silver, platinum, and iron from their respective ores.

**Impact:** Anemia, weakness, and kidney and brain damage.

## Particulate Matter (PM)

**PM10:** Inhalable particles, with diameters that are generally 10 micrometers and smaller.

**PM2.5:** Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

**Source:** Emitted from construction sites, unpaved roads, fields, fires.

**Impact:** Irregular heartbeat, aggravated asthma, decreased lung function.

***Note:*** *These major air pollutants are included in the Air quality index for which short-term National Ambient Air Quality Standards are prescribed.*


## How Can We Control Air Pollution?

- **Prevention:** Adopt pollution prevention approaches to **reduce, eliminate, or prevent** pollution at its source.
    - Examples are to use less toxic raw materials or **fuels**, use a less-polluting industrial process, and to improve the efficiency of the process. E.g., **BSVI engine.**
- **Adoption of Clean Air Technology:** Air pollution prevention and control technologies can help in controlling air pollution.
    - It includes **wet scrubbers,** fabric filters (baghouses), **electrostatic precipitators,** condensers, absorbers, adsorbers, and **biological degradation.**
- **Economic Incentives:** Economic incentives such as **emissions trading** and emissions caps can be used for polluting industries.
- **Scrapping Old Vehicles:** Scrapping of the current **End-of-life vehicles (ELVs)** burden of the country will lead to **15-20% reduction** in emissions due to **vehicular pollution.**
- **Work-from-Home:** To combat air pollution, the government may promote **work-from-home policies** during high pollution days like winters.
- **Artificial Rain:** It can **wash away** pollutants that are suspended in the air, such as particulate matter (PM), nitrogen oxides (NOx), and sulphur dioxide (SO2).
- **Behavioural Change:** Promoting the use of **public transportation, walking, and cycling** can reduce the number of individual vehicles on the road, leading to lower emissions and **lower air pollution.**

## What are the Government Initiatives Taken for Controlling Air Pollution?

- **System of Air Quality and Weather Forecasting and Research (SAFAR) Portal**
- **Air Quality Index**
- Graded Response Action Plan **(for Delhi)**
- **New Commission for Air Quality Management**
- **National Air Quality Monitoring Programme (NAMP)**

## Conclusion

Air pollution poses a major threat to India, reducing life expectancy **more than other risks like malnutrition or tobacco use.** Despite recent improvements, sustained progress demands stronger policies, enforcement, and **commitment to cleaner air.** Meeting WHO guidelines could **significantly enhance life expectancy and overall public health nationwide.**

***Drishti Mains Question:***

Q. Air pollution is a significant public health challenge in India, impacting life expectancy and quality of life. Suggest additional strategies to achieve sustainable air quality improvement.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### *Prelims*

**Q.**In the context of proposals to the use of hydrogen enriched CNG (H-CNG) as fuel for buses in public transport, consider the following statements: **(2019)**

1. The main advantage of the use of H-CNG is the elimination of carbon monoxide emissions.
2. H-CNG as fuel reduces carbon dioxide and hydrocarbon emissions.
3. Hydrogen up to one-fifth by volume can be blended with CNG as fuel for buses.
4. H-CNG makes the fuel less expensive than CNG.Which of the statements given above is/are correct?

**(a)** 1 only
**(b)** 2 and 3 only
**(c)** 4 only
**(d)** 1, 2, 3 and 4

**Ans: (b)**

**Q.**Consider the following: **(2019)**

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into the atmosphere due to the burning of crop/biomass residue?

**(a)** 1 and 2 only
**(b)** 2, 3 and 4 only
**(c)** 1 and 4 only
**(d)** 1, 2, 3 and 4

**Ans: (d)**

**Q** How is the National Green Tribunal (NGT) different from the Central Pollution Control Board (CPCB)? **(2018)**

1. The NGT has been established by an Act whereas the CPCB has been created by an executive order of the Government.
2. The NGT provides environmental justice and helps reduce the burden of litigation in the higher courts whereas the CPCB promotes cleanliness of streams and wells, and aims to improve the quality of air in the country.

Which of the statements given above is/are correct?

**(a)** 1 only
**(b)** 2 only