#### ASIA CLEAN BLUE SKIES PROGRAM | KNOWLEDGE SHARING EVENT SYNERGIES AND CO-BENEFITS OF AIR QUALITY AND CLIMATE CHANGE ACTION



This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.

# **Setting the Scene in Asia:**

Overview of air quality and climate status, policies, and plans in the region

Miko Cosep Senior Researcher, *Clean Air Asia* enrique.cosep@cleanairasia.org



## Air Quality in Asia: Status and Trends

Flagship publication of Clean Air Asia which aims to provide stakeholders with an overview of the status of air pollution in Asian cities and the **air quality management approach and needs of governments**.



Air Quality in Asia: Status and Trends 2010 Edition





BAQ 2023

2023 Air Quality in Asia Status and Trends KEY FINDINGS

Everlyn Tamayo (everlyn.tamayo@cleanairasia.org) Air Quality and Climate Change Science Lead, Clean Air As



STATUS AND TRENDS 2018

In Asia, information and knowledge on air quality management has increased. More data has been generated, made available and made accessible to the public through different reports, fact sheets, and websites.

As more stakeholders gain interest in using air quality data for informing action, a comprehensive and systematic analysis becomes necessary to avoid misinterpretation of

### What is the total extent of AQ monitoring stations and accessibility of AQ data in Asia?



Official AQ Monitoring Stations Stations with PM2.5 Data in 2022

Clean Air Asia (2023). 2023 Air Quality in Asia Status and Trends

ADB Cogika Noise  $\sim$ Synergies and Co-Benefits of Air Quality and Climate Change Action

## What air pollutants are monitored by Asian governments?



The impacts of air pollution vary in extent depending on the type of pollutant. It is important to monitor and report as many criteria air pollutants, especially those with higher health impacts (e.g., ultrafine particles, black carbon (BC)).

This is also aligned with the WHO 2021 AQGs guidance.

SEA countries must also increase monitoring and reporting of gases, especially **ozone** (**O**<sub>3</sub>) which can directly impact health.

\*with publicly accessible and usable official government data

ADB 🔜 🔿 🕬 | Synergies and Co-Benefits of Air Quality and Climate Change Action

## Source sector contribution to ambient PM<sub>2.5</sub> in Asia



McDuffie E. et al. (2021). Fine Particulate Matter and Global Health: Fuel and Sector Contributions to Ambient PM2.5 and its Disease Burden Across Multiple Scales. Nature Communications, 2021 <u>http://dx.doi.org/10.1038/s41467-021-23853-y</u>.

ADB 🔜 🔿 🕬 💭 I Synergies and Co-Benefits of Air Quality and Climate Change Action



## Main contributors in local emission inventories



Central and West Asia East Asia South Asia Southeast Asia

#### **The transport sector** is

identified as the top source of air pollution  $(PM_{25})$  in most national inventories and local studies

Desert dust plays a key contribution in CW Asia; For all regions there is a need for more comprehensive Els, SAs, modelling studies that are cityspecific, not just national.

6

\*Data based on official national air pollution inventories and published journals

Synergies and Co-Benefits of Air Quality and Climate Change Action

### The percent of cities with better $PM_{25}$ WHO AQG levels increased, but still requires action



Percent of Asian Cities per PM<sub>2.5</sub> WHO AQG from 2012 to 2022

Percent of cities with annual  $PM_{25}$ higher than 35  $\mu$ g/m<sup>3</sup> has generally decreased, while those between >15 and 25  $\mu$ g/m<sup>3</sup> has increased

Break in trends is observed by 2021 ٠

#### Percent of cities meeting the 2005 **WHO AQG** (≤10 µg/m<sup>3</sup>) has increased since 2018

A closer look is needed on the distribution of cities to understand targeted action

Synergies and Co-Benefits of Air Quality and Climate Change Action

# 99.8% of Asian cities are at risk from the health impacts of PM<sub>2.5</sub> exposure

Distribution of Asian cities relative to 2022 PM<sub>2.5</sub> average vs WHO AQG



Central and West East South Southeast

## Only 2 of the 849 cities met the PM<sub>2.5</sub> WHO AQG (2021)

- 2 of the 557 cities in East Asia
- 46 cities were able to meet the 2005 WHO AQG, majority from East Asia.
- Majority of Asian cities (esp. East and SEA) met WHO IT-2.

\*with publicly accessible and official government data

8

Asian cities must continue to strive for better air quality, especially those with cities that are far from the 2021 WHO AQG.

ADB 🔜 🔿 🕬 📯 | Synergies and Co-Benefits of Air Quality and Climate Change Action

## Annual national standards versus WHO AQG



\*Based on data accessed as of November 2023

Countries have yet to meet the 2021 WHO AQG for  $PM_{2.5}$ ,  $PM_{10}$ , and  $NO_2$ .

Majority of countries have PM standards aiming to meet the WHO IT-3 and IT-2 for PM2.5 and PM10, respectively. Majority of countries have NO2 standards aiming to meet the WHO IT-1.

ADB 🔜 🔿 🕬 💭 | Synergies and Co-Benefits of Air Quality and Climate Change Action

Clean Air Asia (2023). 2023 Air Quality in Asia Status and Trends

9

## Motivation: Health impacts (and associated costs) of air pollution

## In 2019, air pollution contributed to 6.67 million deaths worldwide.

FIGURE 12 Percentage of global deaths attributable to individual pollutants.

 7%
 1%

 4%
 Ambient ozone

 Ambient PM2.5
 Household air pollution

 88%
 Other risk factors

**FIGURE 13** Percentage of global deaths from specific causes attributable to total air pollution.



### Pollutant: Ambient PM<sub>2.5</sub> Household air pollution



A BURDEN BORNE BY THE YOUNG AND OLD

### Neonatal deaths

Stroke

26%

peak in pollution-related deaths among babies in the early (0 to 6 days) and the late (7 to 27 days) neonatal groups (reflecting the influence of PM on adverse birth outcomes and lower respiratory Infections)

10

Ambient ozone

Health Effects Institute. 2020. State of Global Air 2020.

B 🔜 🔿 🕬 💫 📔 Synergies and Co-Benefits of Air Quality and Climate Change Action

## Air pollution and climate change impacts health globally

#### **AIR POLLUTION - THE SILENT KILLER** Air pollution is a major environmental risk to health. By reducing air pollution levels, countries Every year, aroun can reduce: MILLON DEATHS ind household air Heart Lung cancer, and disease both chronic and acute respiratory diseases, including asthma **REGIONAL ESTIMATES ACCORDING Over 2 million TO WHO REGIONAL GROUPINGS:** in South-East Asia Region **Over 2 million** Western Pacific Region **Nearly 1 million** Africa Region About 500 000 is in Eastern Mediterranean // About 500 000 More than 300 000 n the Region of the Americas World Health #AirPollution **CLEAN AIR FOR HEALTH** Organization The most vulnerable are most affected!

ADB 🔜 🔿 🕬 😵 | Synergies and Co-Benefits of Air Quality and Climate Change Action

## World's largest study of global climate related mortality



#### Image from: https://www.monash.edu

Data from: Zhao et al (2021). Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study



MONASH

## **Co-benefits of air pollution and climate change mitigation**



ADB 🔜 🔿 🕬 📯 | Synergies and Co-Benefits of Air Quality and Climate Change Action

# PM<sub>2.5</sub>-related mortality and policies/plans recognizing air pollution health impacts



 $\infty$ 

| Synergies and Co-Benefits of Air Quality and Climate Change Action

While all countries have some form of clean air act or air pollution policy/standards, most countries **do not have policies which directly aim to understand air pollution health impacts, nor national health action plans which recognize the health impacts of poor air quality** 

 Only 12 out of 48 have any of the following: Health and Pollution Action Plan; Environment and Health Action Plan; Environmental Health Strategy; Healthy City Action Plan; Air Quality Action Plans with specific health targets; or something similar



No

Yes

Mortality data from Health Effects Institute. 2020. State of Global Air 2020. Data source: Global Burden of Disease Study 2019. IHME, 2020.

*Policy data from accessible official government websites, documents, and reports.* 



## Summary of key messages

Air quality monitoring networks must be expanded while increasing ease of access to data, especially in areas where it is most needed

• Ease of access to (real-time) data provide guidance to the public on risks related to air pollution, and can be used to develop and further improve air quality policies and action

## Identified sources of air pollution vary depending on the method and approach, but key sources are transport and residential energy use

- Geographical features of the study area can impact air quality (i.e., desert/soil dust); more detailed (city-level) analyses can provide more insight since sources can vary per location
- The implementation of stricter vehicle emission and fuel standards, together with other sustainable transport solutions, can play a big role in the overall improvement of air quality in Asian nations
- The combined contribution of energy production and use in the residential and industry sectors reiterates need for a **just energy transition** in Asia

## Air quality and climate change are linked with public health and must thus be included in the national health plans

 Aside from air pollution and climate change mitigation plans, having specific health targets (reduction in air pollution and climate change-related mortality and morbidity) can reinforce actions to improve air quality



## Summary of key messages

Air quality and climate change issues are inherently connected, so actions and efforts must be integrated

- Measures addressing air quality issues also impact climate change and vice versa, so efforts must be harmonized to increase the efficiency in using resources.
- Efforts in the development of GHG inventories can be harmonized with efforts in the development of criteria air pollutant inventories since both have similar activity data.

#### Air quality improvement must be a continuous goal especially in countries far from the WHO AQGs

- Overall progress in complying with less strict WHO IT values has been observed, but majority of the countries are still far from the 2005 WHO AQG, especially the more stringent 2021 WHO AQG
- Countries must continue towards legally aiming to meet WHO AQGs by aligning national standards
- Best practice of countries with progress must be continuously shared, fostering a co-learning approach that can help all nations achieve better air quality.



Clean Air Asia (2023). 2023 Air Quality in Asia Status and Trends

15

ASIA CLEAN BLUE SKIES PROGRAM | KNOWLEDGE SHARING EVENT SYNERGIES AND CO-BENEFITS OF AIR QUALITY AND CLIMATE CHANGE ACTION



## Thank you for your attention! For questions, kindly email: aqccmanila@cleanairasia.org

Invitation to contribute to the "Status and Trends Report" study

To further increase coverage of the report, we encourage submission or sharing of official government data. Kindly email: <u>aqccmanila@cleanairasia.org</u>.





**(#)** 

## ASIA CLEAN BLUE SKIES PROGRAM | KNOWLEDGE SHARING EVENT SYNERGIES AND CO-BENEFITS OF AIR QUALITY AND CLIMATE CHANGE ACTION

APRIL 29 - 30, 2024 | 9:30 - 16:00 (GMT +7) JAKARTA, INDONESIA

Join via Zoom: https://bit.ly/KSE\_APandCC