

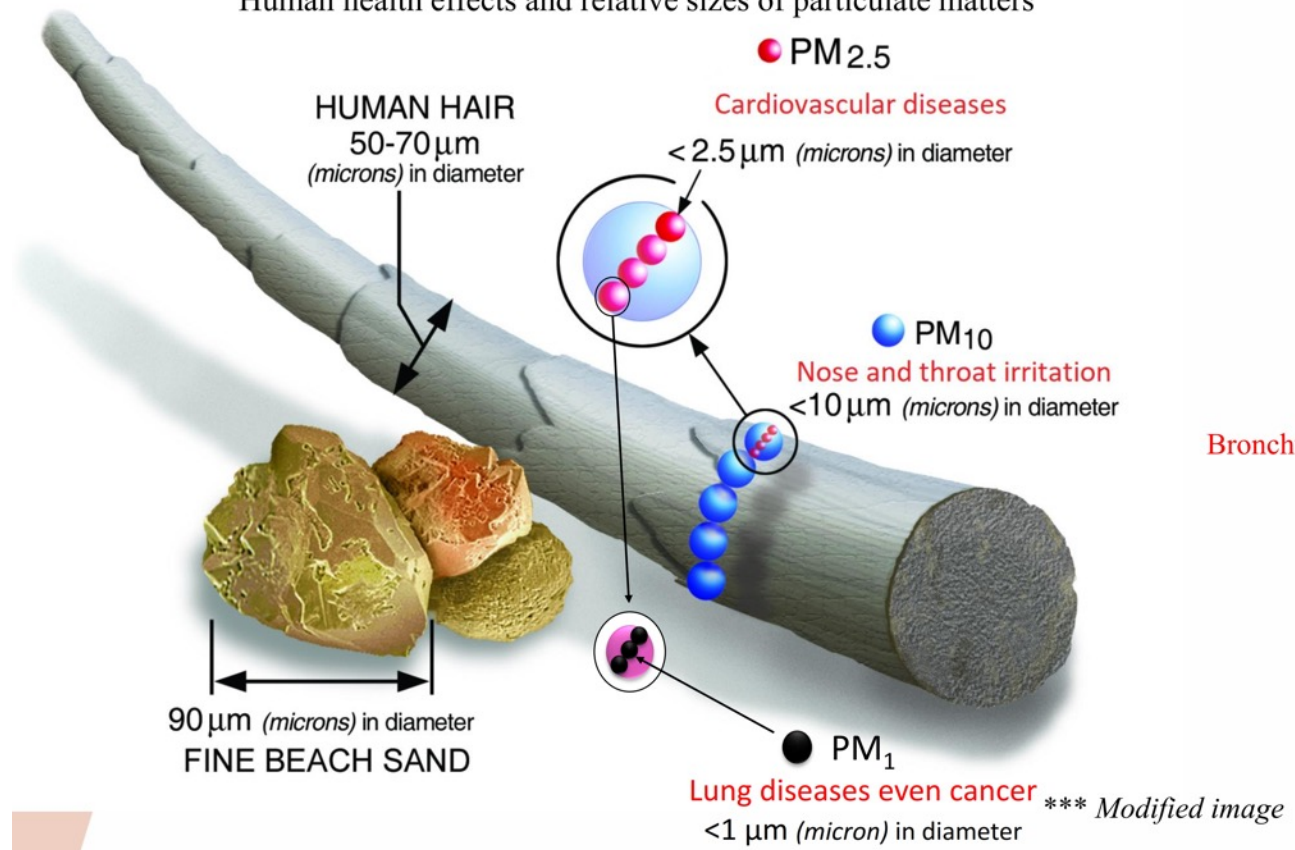


# Understanding the sources of Air Pollution and Influence of Topography, Weather, and Climate in Cambodia's Air Quality

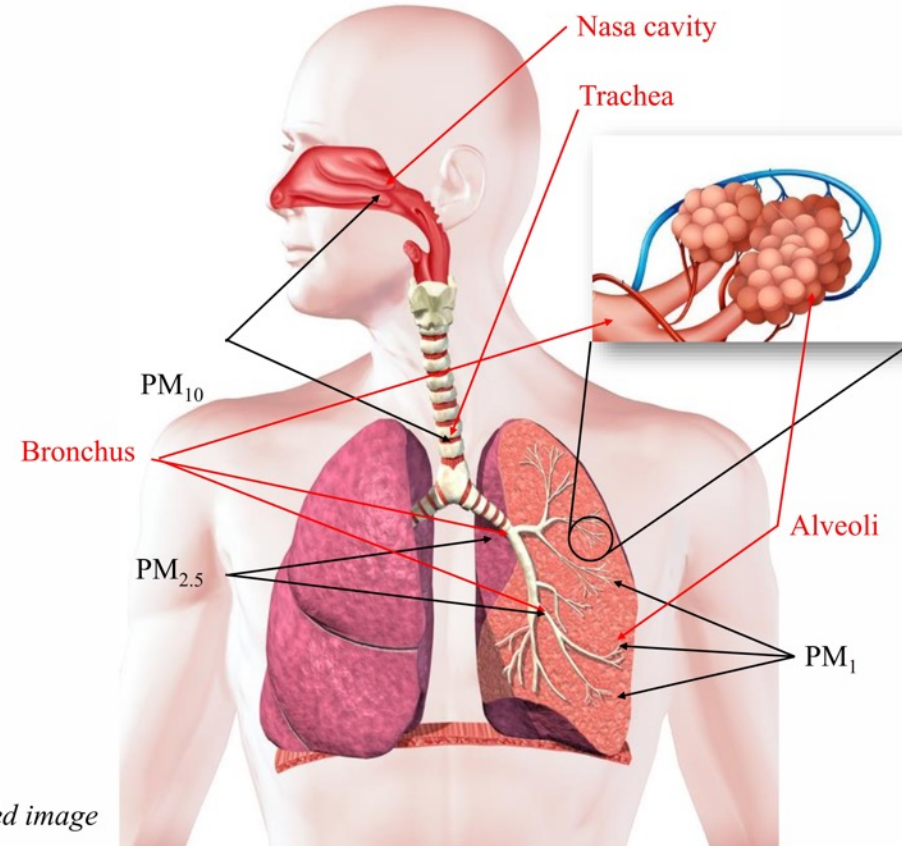
**EANET National Stakeholder  
Awareness Workshop in Cambodia**

Or Chanmoly  
Research and Innovation Center  
19 March 2024

Human health effects and relative sizes of particulate matters



Respiratory system relative to penetrations of PM



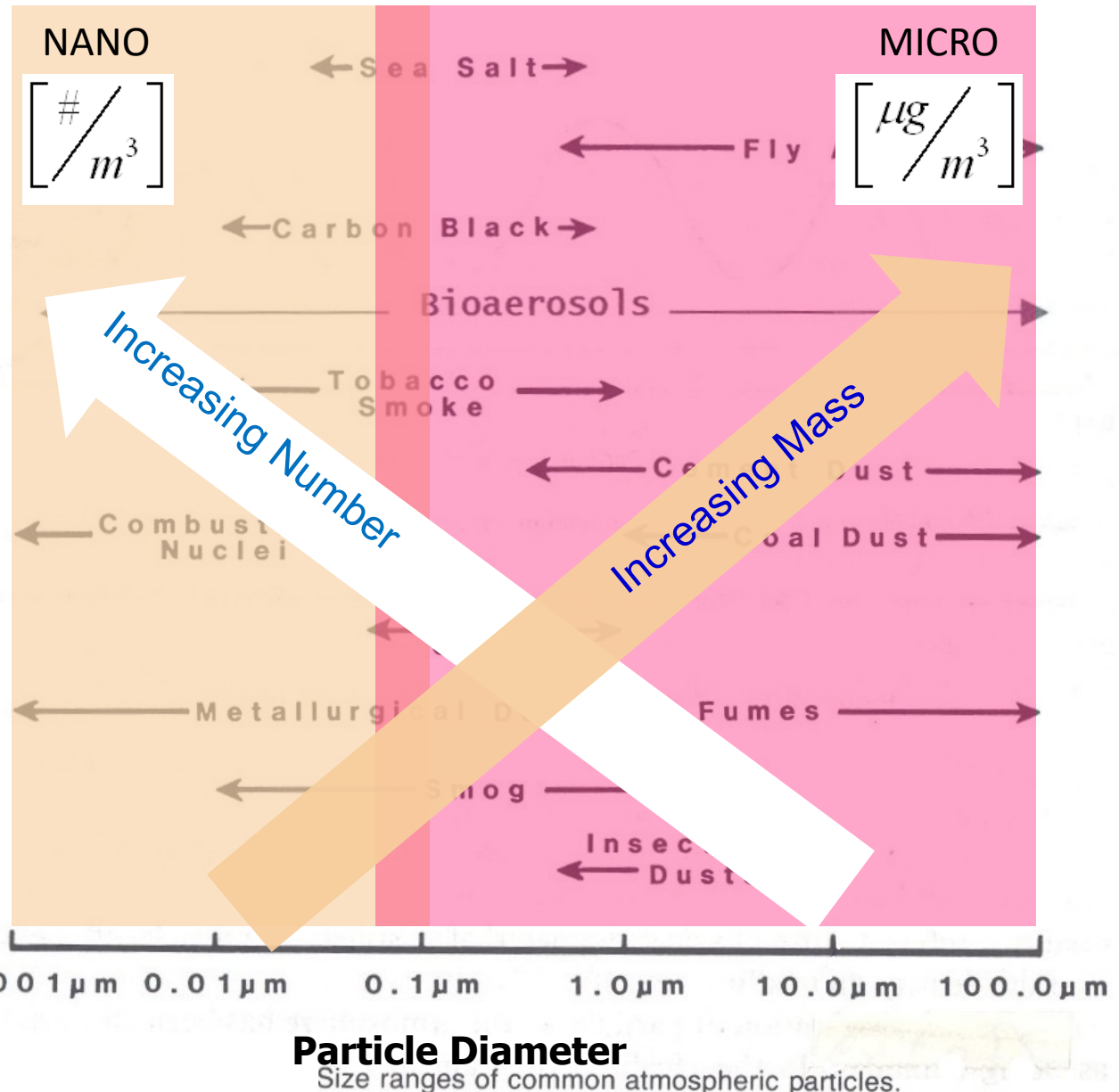
The finer PM, the more serious health impact

# Size range of airborne particles (aerosols)

## What air pollution?



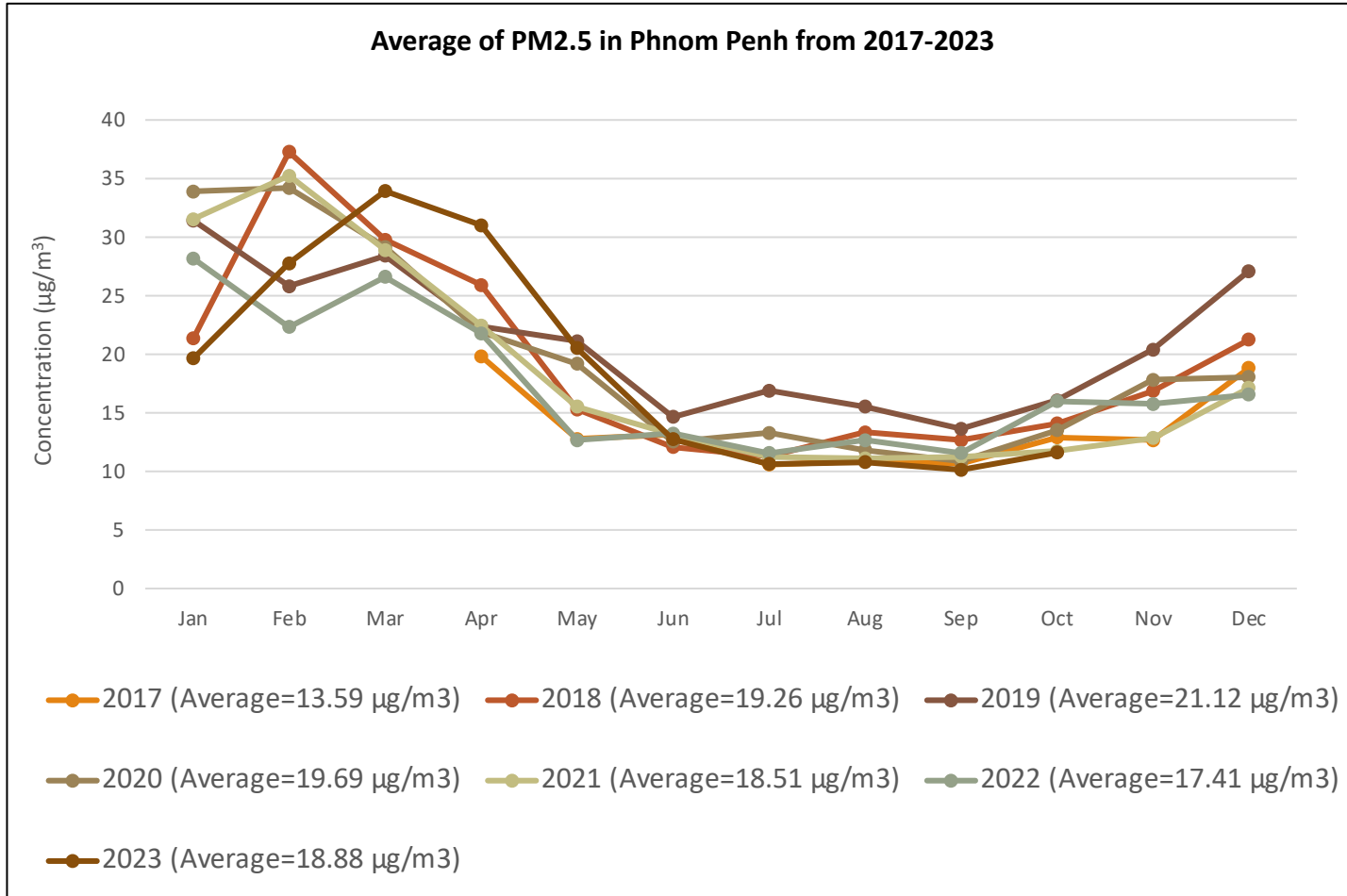
Size Distribution?  
 Monodisperse?  
 Polydisperse?



# Where?



# Phnom Penh Air Quality



➤ 2017> Data Valid=254 days (69.5%)

- Average = **13.12 ± 5.8** µg/m<sup>3</sup>

- Exceeded 50 µg/m<sup>3</sup>=**0** days

➤ 2018> Data Valid=353 days (96.7%)

- Average = **19.12 ± 9.9** µg/m<sup>3</sup>

- Exceeded 50 µg/m<sup>3</sup>=**5** days (1.41%)

➤ 2019> Data Valid=338 days (92.6%)

- Average = **21.3 ± 8.3** µg/m<sup>3</sup>

- Exceeded 50 µg/m<sup>3</sup>=**1** days (0.3%)

➤ 2020> Data Valid=353 days (96.7%)

- Average = **19.73 ± 10.3** µg/m<sup>3</sup>

- Exceeded 50 µg/m<sup>3</sup>=**5** days (1.4%)

➤ 2021> Data Valid=362 days (99.2%)

- Average = **18.43 ± 10.4** µg/m<sup>3</sup>

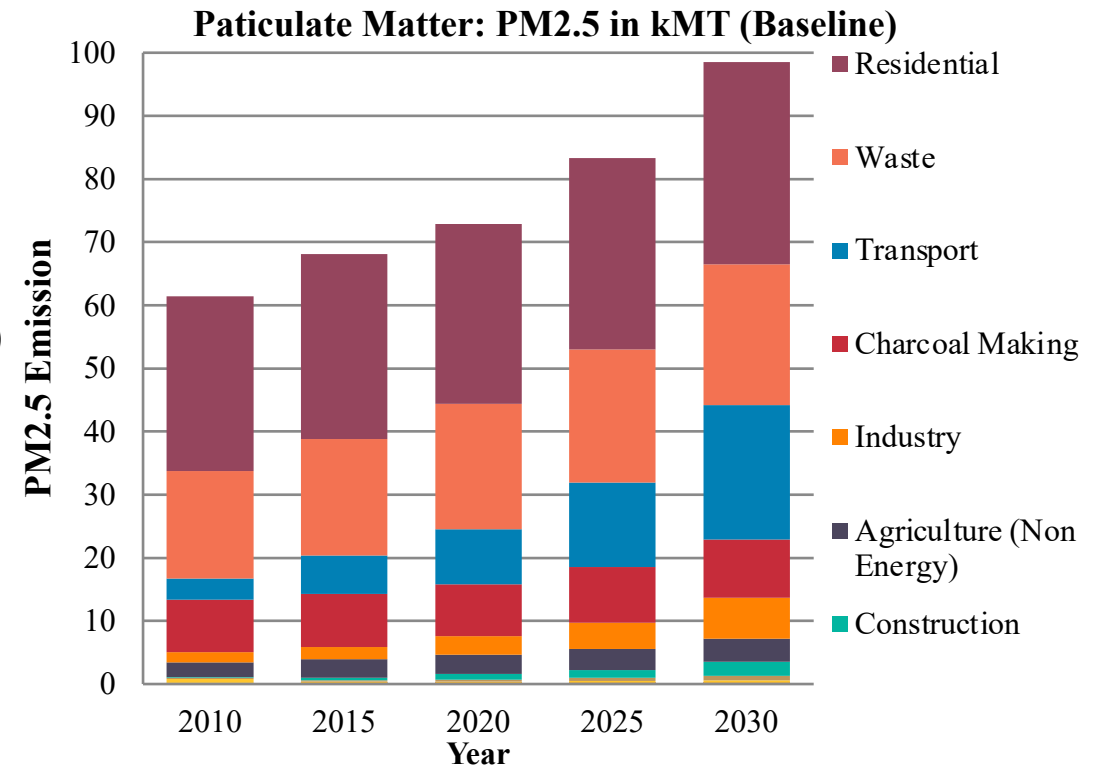
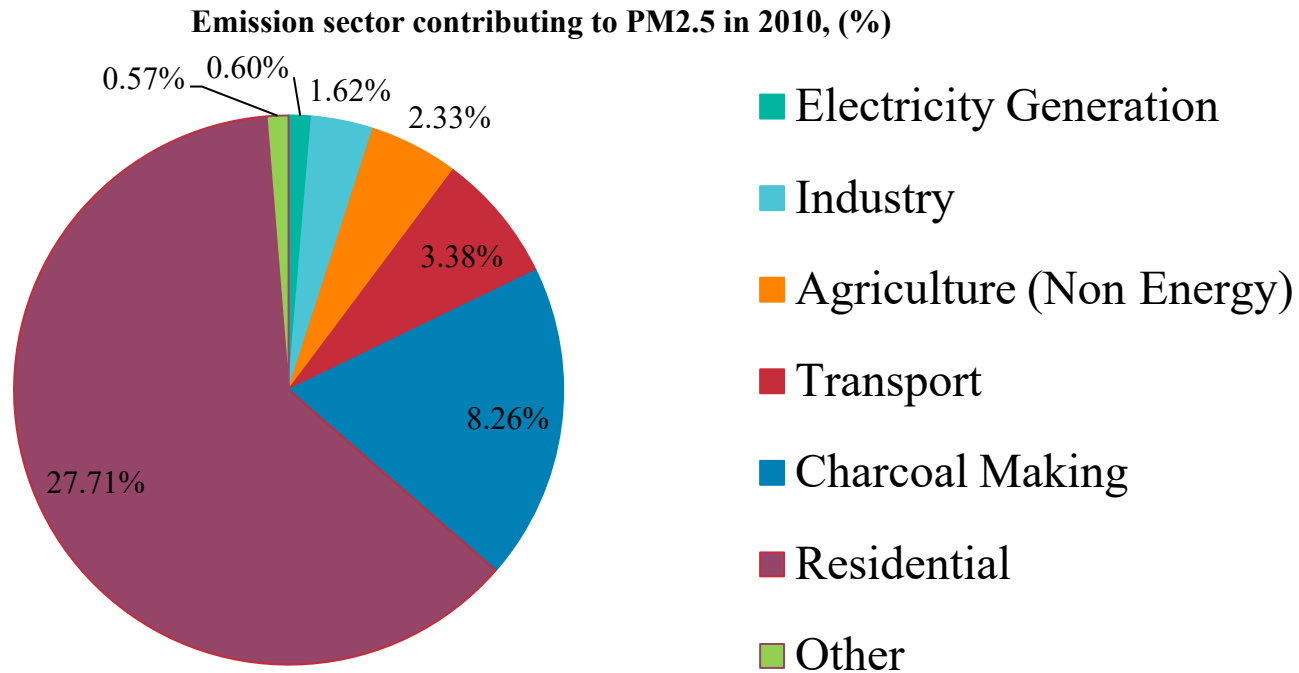
- Exceeded 50 µg/m<sup>3</sup>=**2** days (0.5%)

➤ 2022> Data Valid=362 days (99.2%)

- Average = **17.40 ± 8.25** µg/m<sup>3</sup>

- Exceeded 50 µg/m<sup>3</sup>=**0** days

# Statistical Analysis of MP2.5 Source



# Influent factors on air quality

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The meteorological factors which influence air pollution and dispersion of air pollutants are:

## **The primary factors:**

- Wind direction and speed
- Atmospheric temperature
- Atmospheric pressure

## **The secondary factors:**

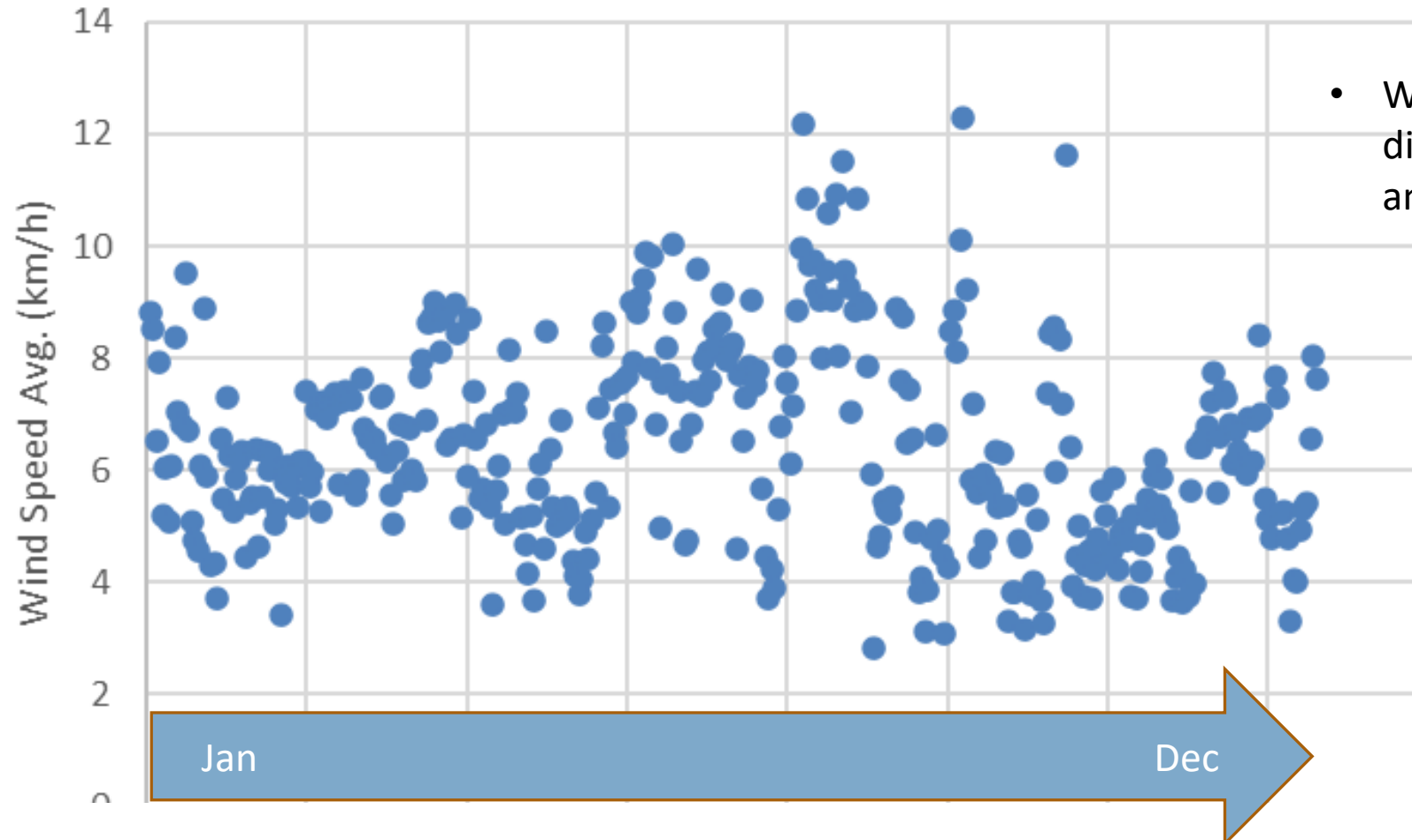
- Precipitation
- Humidity

# Topography



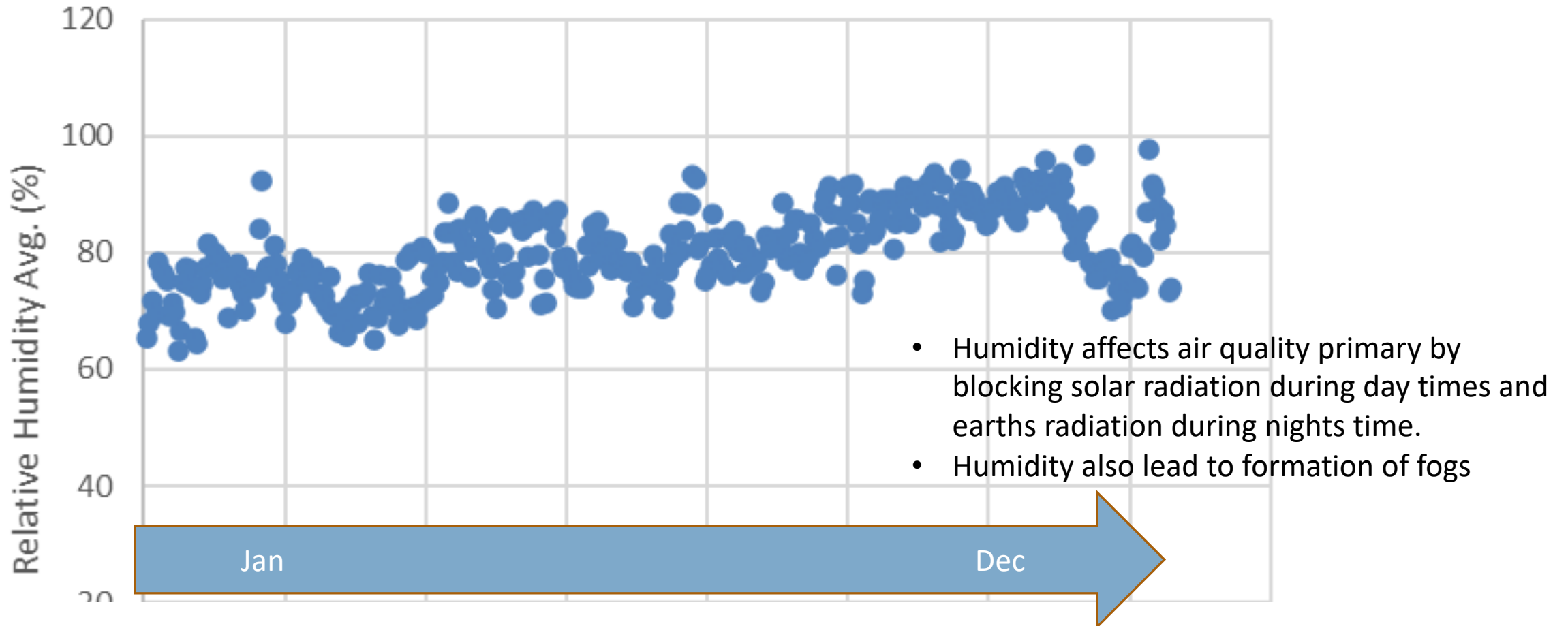


# Wind Speed



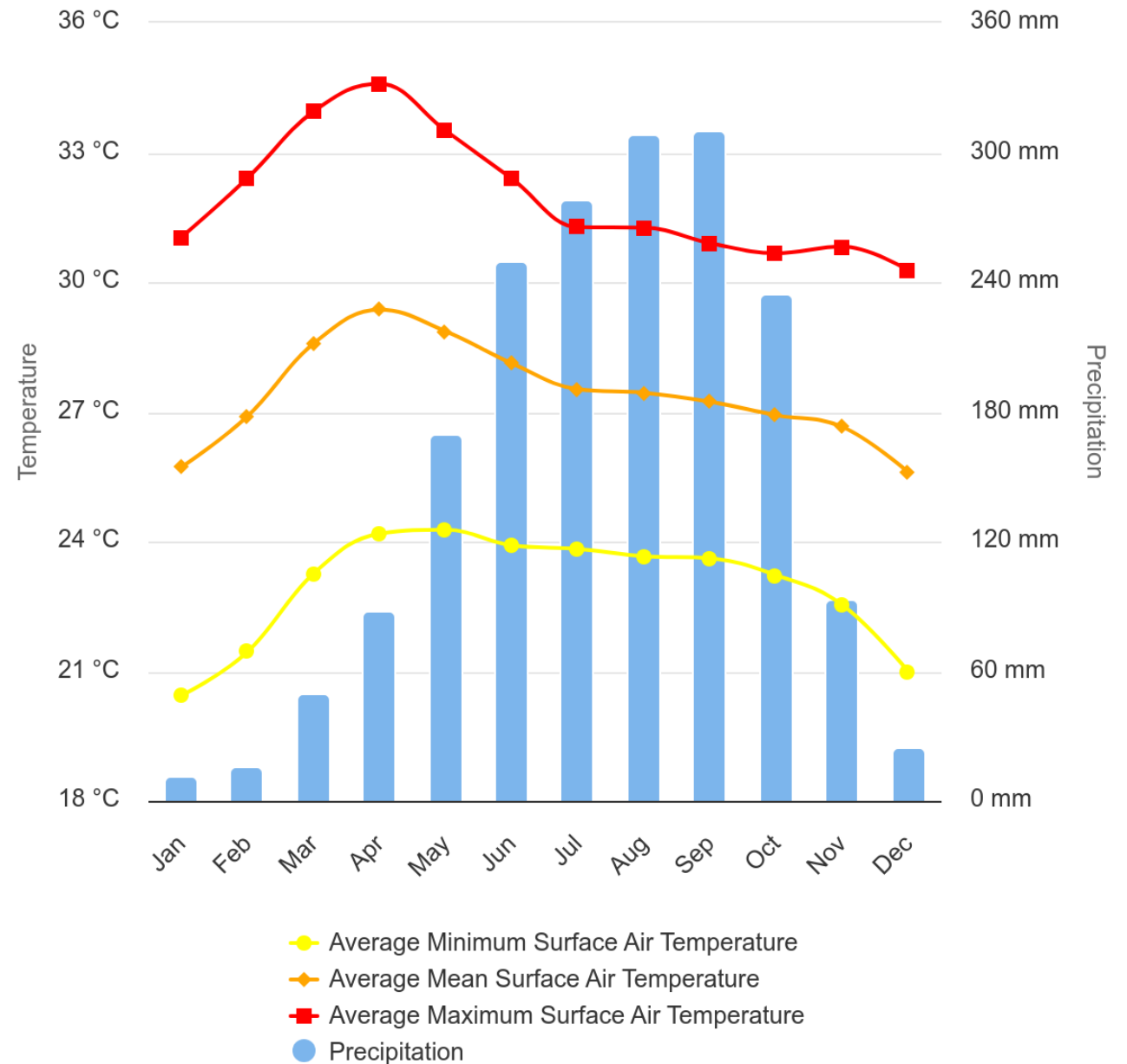
- Wind speed increases dispersion, transportation, and mixing the air pollutant.

# Relative Humidity



# Temperature

- The dispersion of air pollutants influenced by the atmospheric temperature.
- Higher the atmospheric temperature without any humidity, higher the dispersion in vertical direction.



# Conclusion

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The inventory of air pollution sources should be updated, the main sources of air pollution in city should be transportation and construction while main sources of air pollution in the rural area should be open burning and agriculture.

Geographical and weather condition in Cambodia allow the air pollutants mix up and disperse into the atmosphere which result on low concentration of air pollution. Precipitation is relatively high, more than half year which allows to clean the pollutants from the atmosphere.

Relatively high humidity with increasing pollutants may reduce the visibility (fogs) and keep the temperature warm at the ground. This topic should be deeply investigated and links with climate change for prediction of climate's influence.