



# Air Quality Sensor Monitoring Network

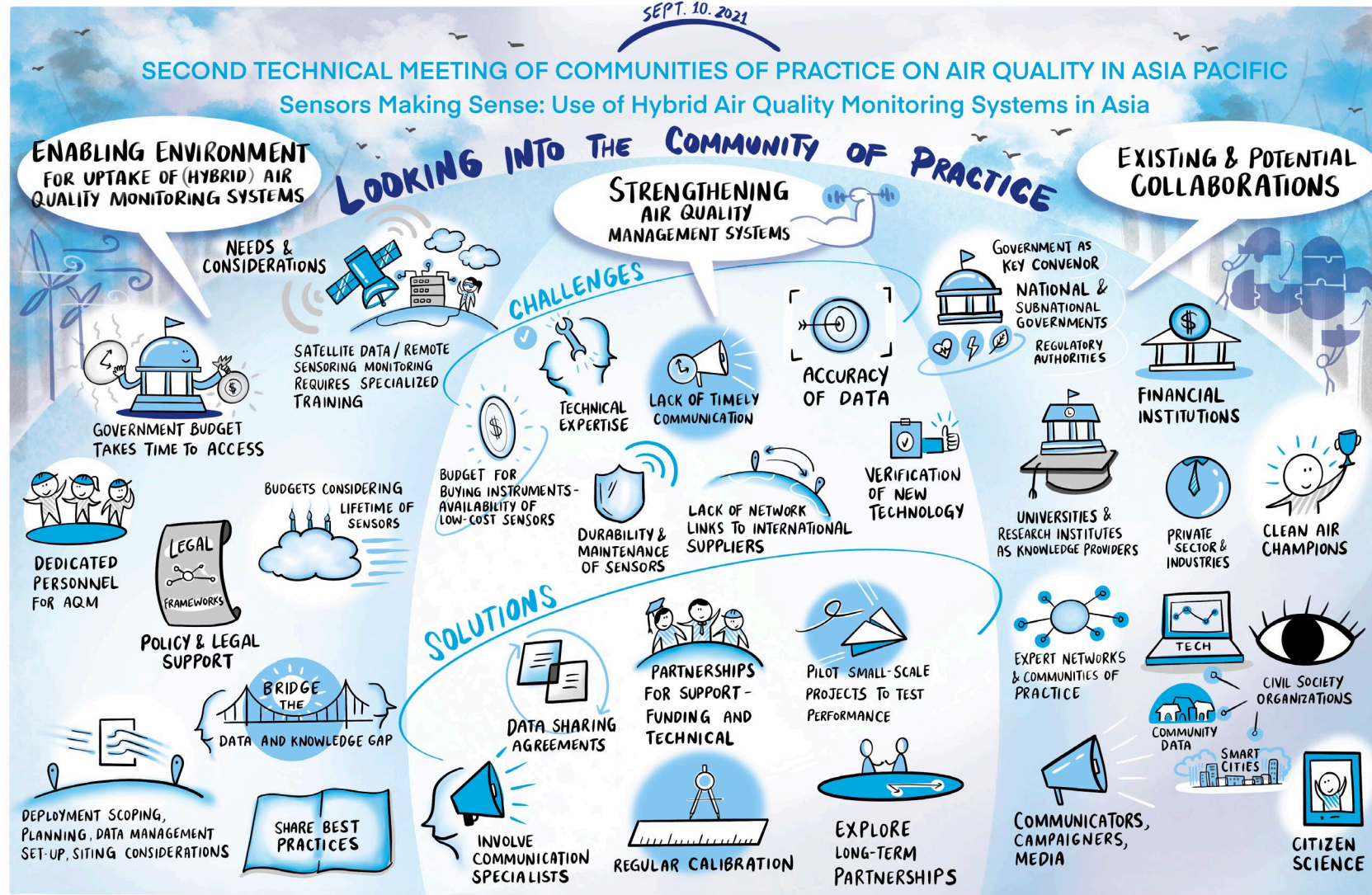
HYBRID MONITORING TOWARDS CLEAN AIR ACTION

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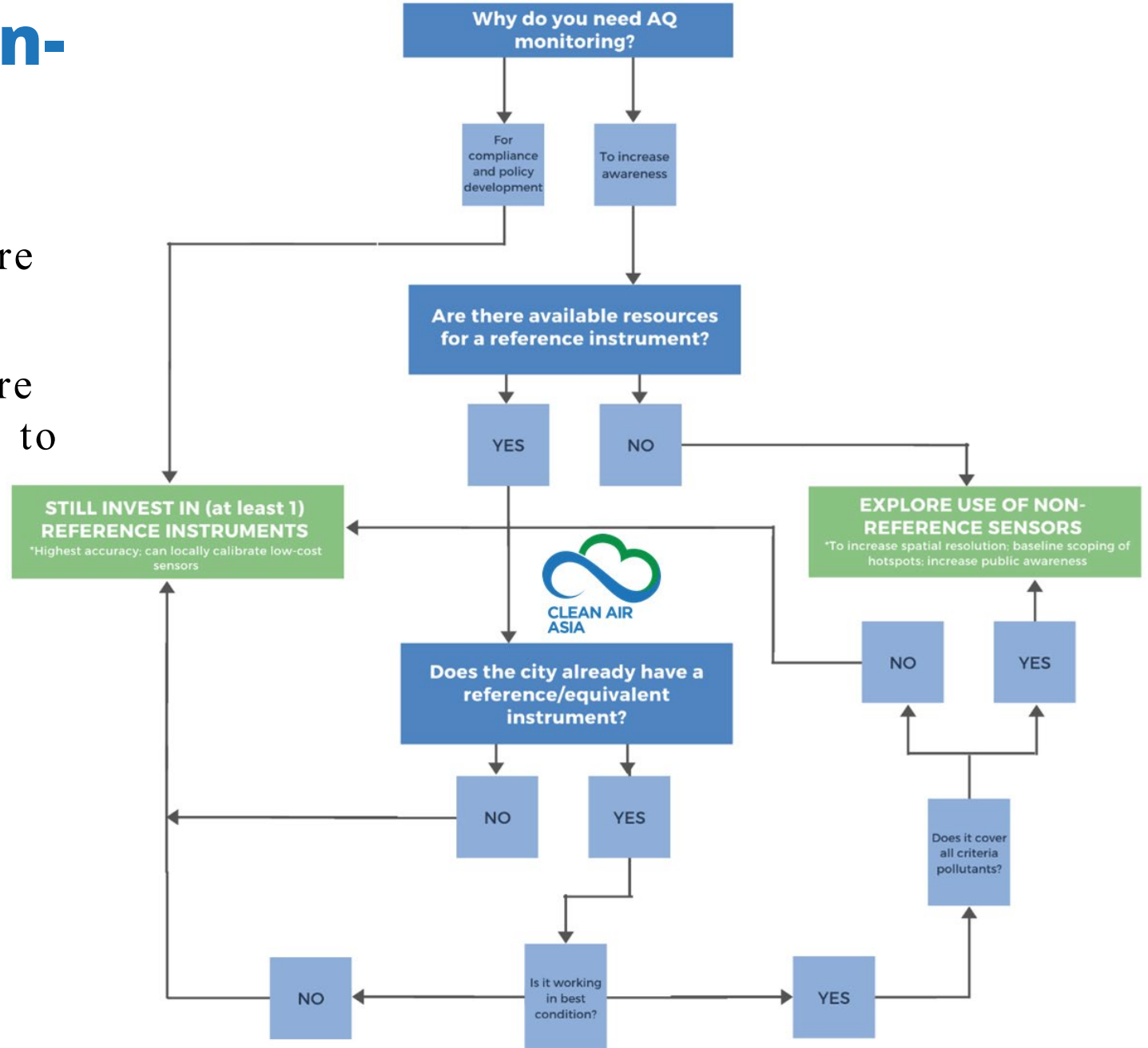
Philippines-Japan Environment Week | January 14, 2025

# Hybrid Monitoring: Challenges and Solutions



# Guidance on use of non-reference monitors

- To ensure data quality, **collocation experiments (local calibration)** are performed
- All data from the sensor network are **corrected before communicating** to the public to avoid confusion



# Benchmark study: Manila collocation

## Comparison of all corrected values

The comparison of pearson coefficient ( $R^2$ ), root mean square error (RMSE) and mean average error (MAE) show the **need for a multiple linear regression correction of raw sensor data to ensure higher accuracy of air quality measurements.**

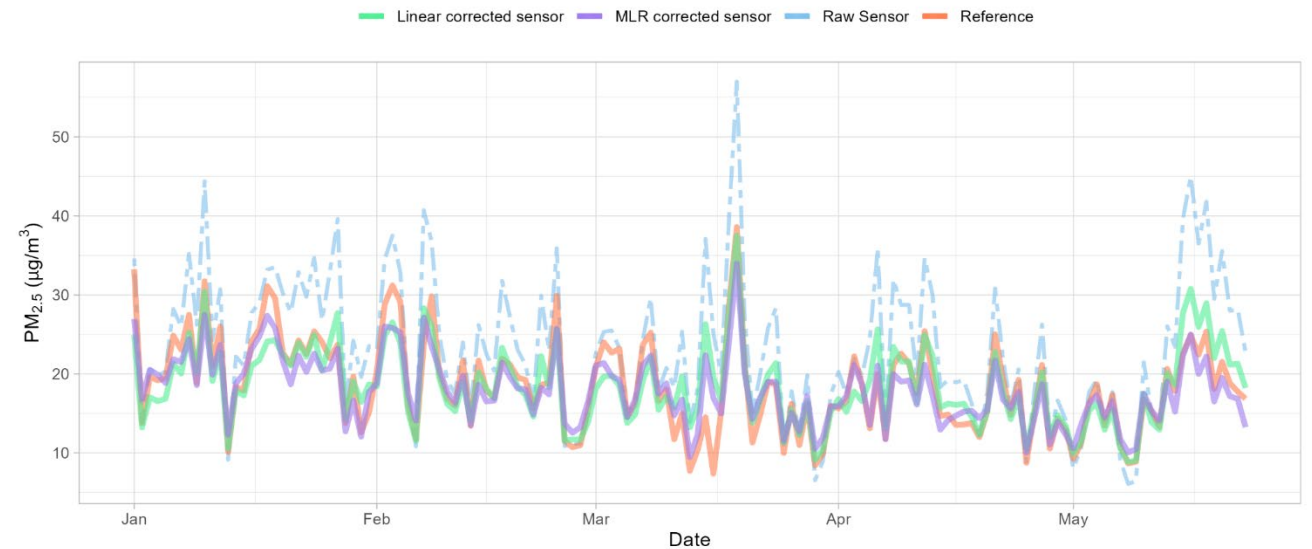
Correction approach	$R^2$	RMSE	MAE
None (raw)	0.6383813	11.02748	8.199052
Linear regression	0.6911611	3.601986	2.796485
Clarity built-in correction	0.6490282	4.265189	3.283891
MLR	0.8133975	2.74652	2.148919

Year	Reference	Experimental (corrected sensor)	Relative Accuracy (%)
2020 (Aug-Dec)	16.6	18	91.6
2021 (Jan-Dec)	18.2	18.1	99.5
2022 (Jan-May)	18.6	18	97.1

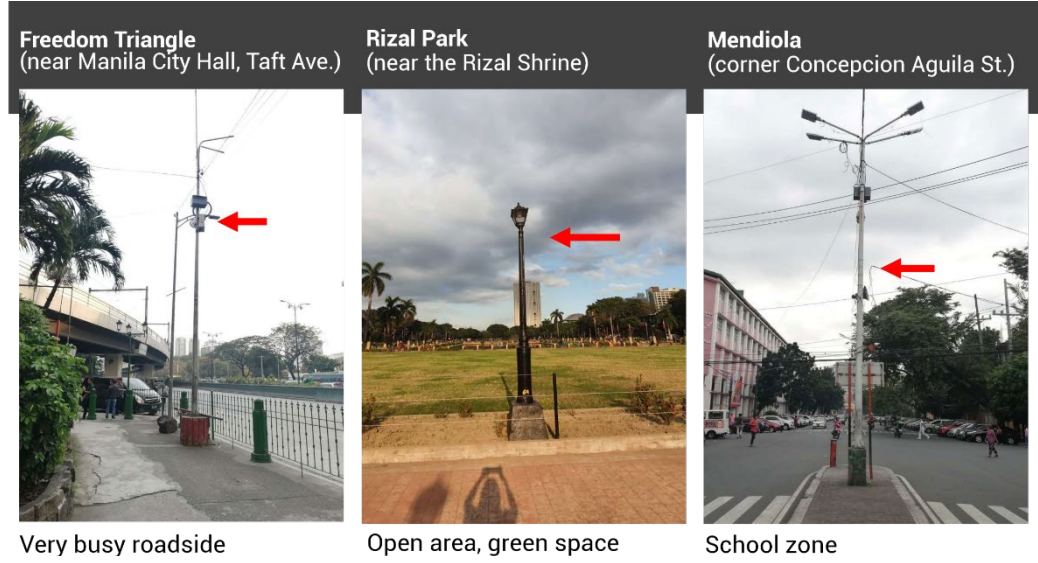
Clean Air Asia (2023). Sensor collocation data analysis in Mehan Garden, Manila

Time series of reference and sensor  $PM_{2.5}$  data ( $\mu\text{g}/\text{m}^3$ ) in Mehan Garden 2022

Linear and multiple regression correction of raw sensor data



# Asia Blue Skies Program in Manila, Philippines Baseline Air Quality Monitoring towards AQM



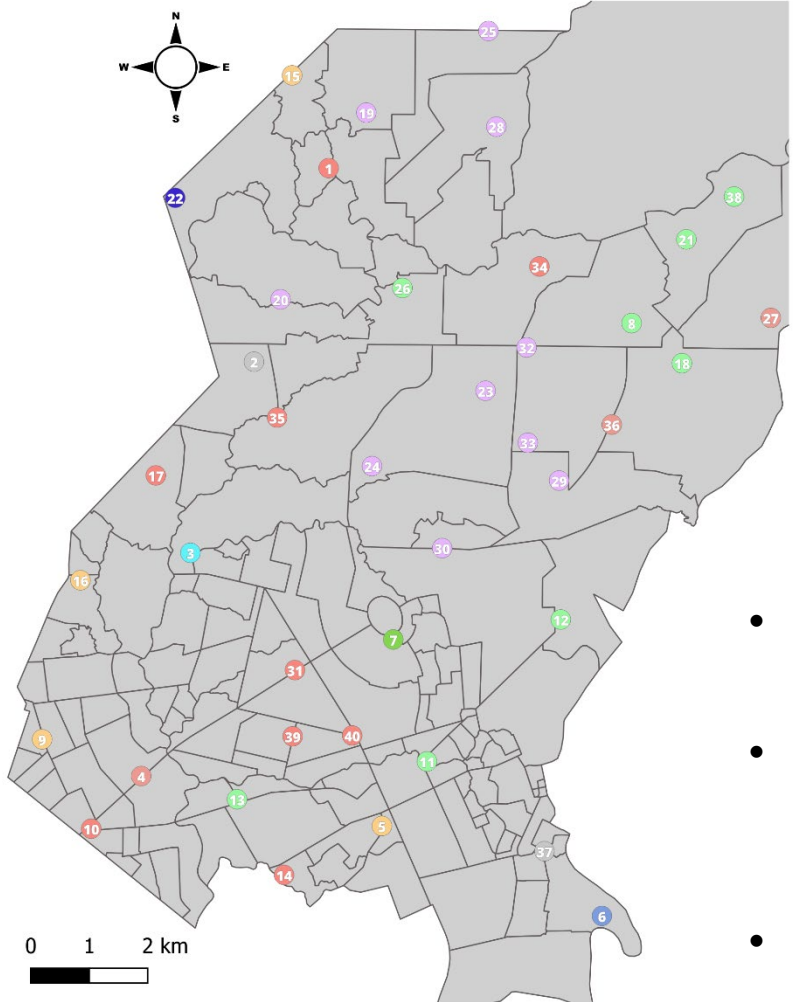
# Quezon City Air Quality Monitoring Network

## From air quality data to action

ID	Sensor
1	Nova_Market
2	Quirino_cor_Mindanao
3	QCGH
4	StoDomingo_Church
5	Cubao_Arayat
6	Obrero_Industria
7	QCPL
8	Commonwealth_BH
9	LaLoma_PS
10	Erod_Ave
11	Silangan_BH
12	Pansol_BH
13	Kalusugan_BHC
14	N_Domingo
15	Susano_Rd
16	Balintawak_Cloverleaf
17	Quirino_Dominic
18	BatasanHills_BH
19	Kaligayahan_ElemS
20	Korphil_QCU
21	Payatas_SHC
22	PDelaCruz
23	FEU_Diliman
24	PasongTamo_ES
25	Maligaya_EHS
26	Sauyo_BH
27	SanIsidro_Church
28	Lagro_HS
29	OldBalara_EHS
30	NewEra_Univ
31	QAve_SEsguerra_FB
32	Jose_Rizal_HS

ID	Sensor
33	Holy_Spirit_ES
34	Pearl_Drive_FB
35	TandangSora_BH_FB
36	StPeterChurch_FB
37	Libis_BH_FB
38	Payatas_CDF
39	TomasMorato_SFernandez
40	EDSA_Timog_FB

- Marker Location Types**
- Church
  - Commercial
  - Commercial, Residential
  - Green Space
  - Hospital
  - Industrial, Residential
  - Residential
  - School
  - Traffic
  - Industrial
- Primary Roads  
— Trunk Roads



2022 - 2023  
**Quezon City Air Quality Management Project**

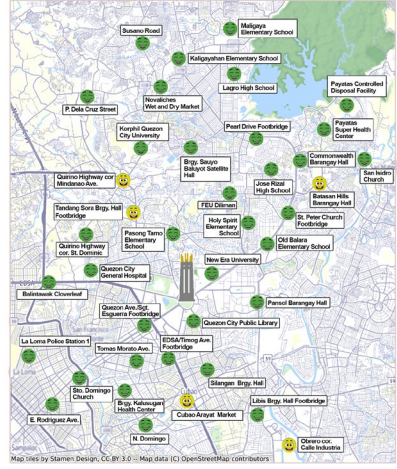
**Air Quality in Quezon City**

24 Hour PM<sub>2.5</sub> AQI  
8AM December 10 to 8AM December 11, 2024

**Air Quality Index (AQI)**

Ang AQI ay ginagamit upang mataman ang air quality at mga pakikiala upang malawian ang masamang epekto na dulot nila sa kalusugan ng tao.

- **Good** (0 - 25 ug/m<sup>3</sup>) - Walang babala
- **Fair** (25.1 - 50 ug/m<sup>3</sup>) - Walang babala
- **Unhealthy for Sensitive Groups** (50.1 - 100 ug/m<sup>3</sup>) - Iwasang lumabas kung mayroong respiratory disease labad ng hika
- **Very Unhealthy** (100.1 - 150 ug/m<sup>3</sup>) - Iwasang lumabas ng bahay at limitahang punanin ng kasapihan. Iwasan ang mga paglalakbay sa bahay kung may heart/respiratory disease.
- **Acutely Unhealthy** (150.1 - 200 ug/m<sup>3</sup>) - Iwasang lumabas ng bahay. Maaaring alagaan ang mga sakit sa respiratory system at bawasan ang mga gawing pang-industriya.
- **Emergency** (above 200 ug/m<sup>3</sup>) - Ang lahat ay dapat manatili sa loob ng bahay. Iingatlaharin ang mga tagapag-alaga ng kasapihan kung medical emergency ang dahilan. Kailangan bantayan ang mga gawing pang-industriya matnang kung makakaapekto sa kalusugan at kaligtasan.



- In combination with EI, LEAP-IBC, informed **AQMP development**
- Used to provide regular **AQ updates** and in the development of **school suspension guidelines** during pollution episodes
- Key in the implementation of **AQMP measures**



# Clean Air Asia's key takeaways and lessons learned

## KNOWLEDGE BASE



## SOLUTIONS

**PARTNERSHIPS  
= PROGRESS**

- **Partnerships and collaborations** lead to more efficient use of resources
- **Capacity building** of partners pushes sustainability of efforts



**GOOD  
QUALITY DATA  
IS KEY!**

- **Comprehensive data collection and analysis** is essential in
  - Justifying the need for urgent action and identification of priorities
  - Guiding decision -making with high level of certainty

**Real-time air quality data from the sensor network  
increased engagement and action** from stakeholders in the  
implementation of measures to improve air quality

**But ensure that aside from focusing on data quantity,  
we ensure DATA QUALITY**



**Thank you!**