ENVIRONMENTAL MONITORING SYSTEM FOR CLIMATE CHANGE RESEARCH

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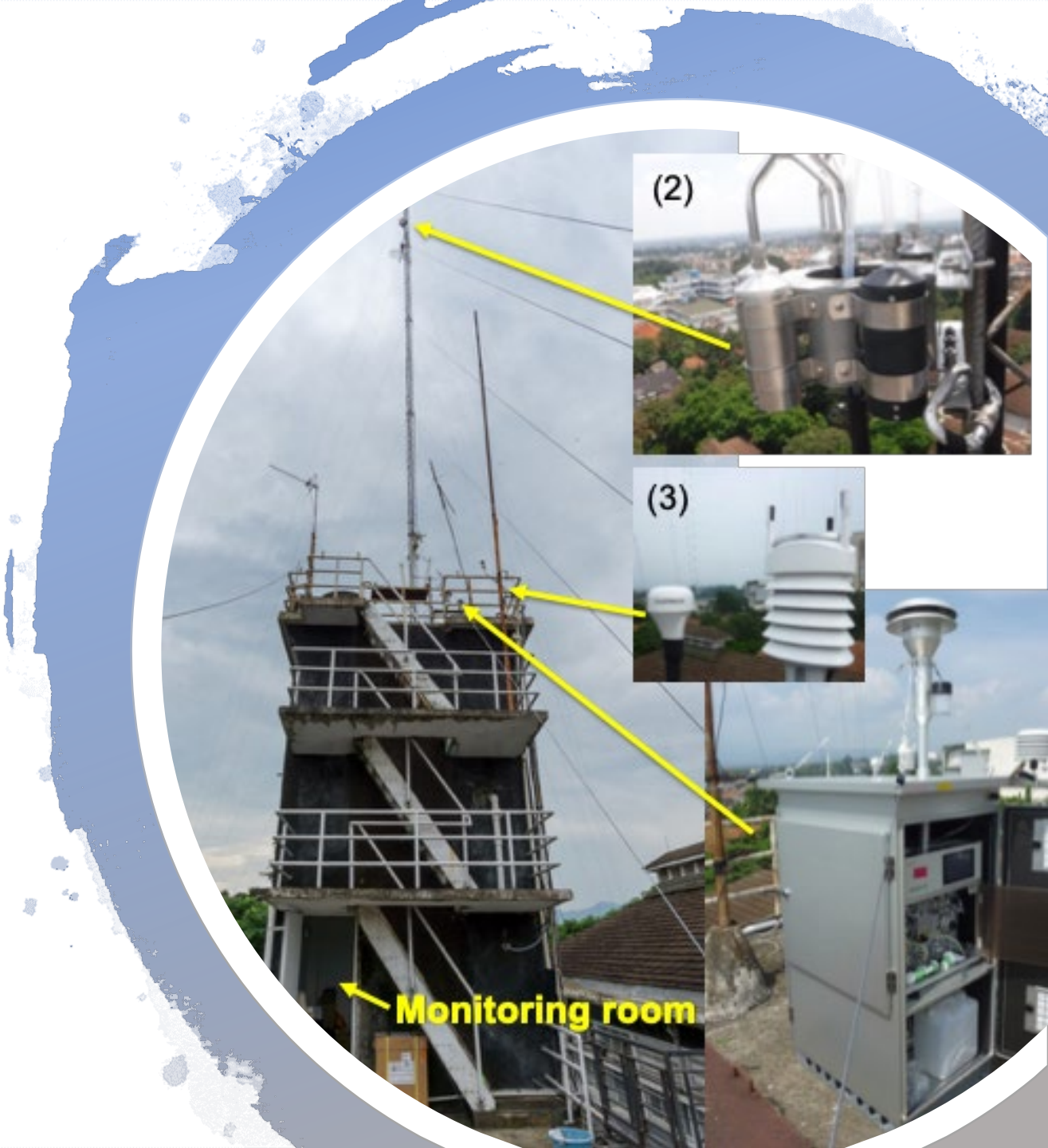
BACKGROUND

Center for Climate Risk and Opportunity Management in Southeast Asia Pacific (CCROM-SEAP) of IPB University, Agency for the Assessment and Application of Technology (BPPT) and National Agency for Meteorology, Climatology, and Geophysics (BMKG) are implementing a joint monitoring of air pollutants and greenhouse gases with the National Institute for Environmental Studies (NIES) Japan.

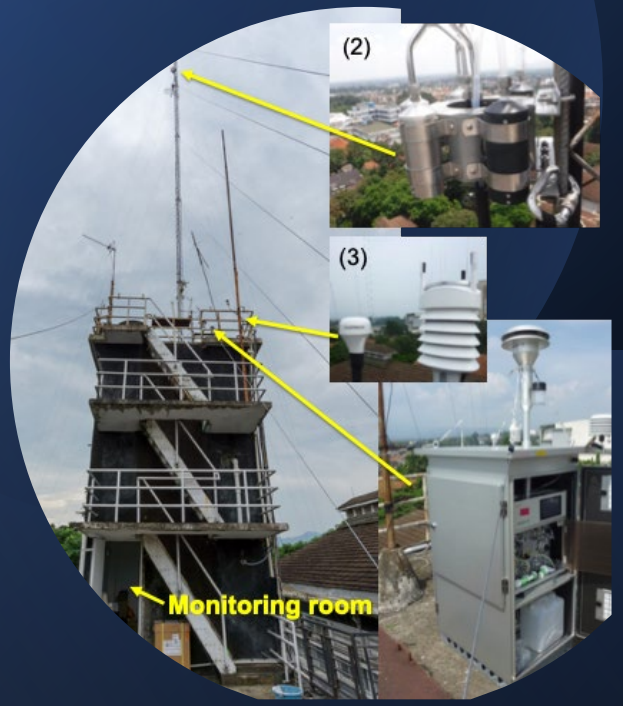
The monitoring systems are ground base system installed at three sites in 2016-2017:

- Bogor (Center of Bogor City) installed at IPB Campus
- Serpong (Jakarta suburb), and
- Cibeureum (mountainous area, background-like site).

The system monitors many air quality parameters continuously consisting of GHGs and air pollutants (CO2, CH4, O3, CO, NOx, SO2, aerosol concentrations PM2.5, PM10, Black Carbon, chemical components and flask sampling of air).



AIR QUALITY DATA



- Period: 2016-Present
- Resolution: Minute
- GHGs, Pollutant, Weather

CHALLENGES

- NIES Monitoring system has limited coverage area
- IPB develop portable air quality monitoring instrument
  - Calibration of the mobile instruments
- Impact analysis of mitigation on city air quality and human health (other **co-benefits**)

Research Plan

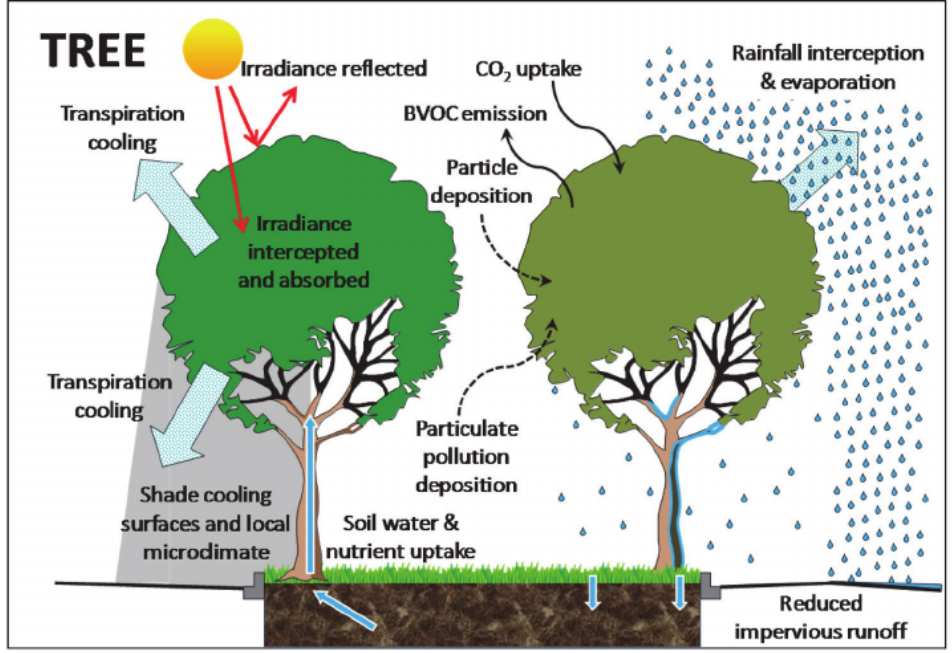
Climate change mitigation, air pollution and human health:

- Air pollution accounted for 1.36 million deaths in Indonesia in 2016, equivalent to 73% of all deaths in the country" (Overland, et al., 2021)
- Successful implementation of climate change mitigation may have significance benefit in reducing air pollution and will directly impact on human health
  - Life expectancy
  - Human productivity

Research Plan

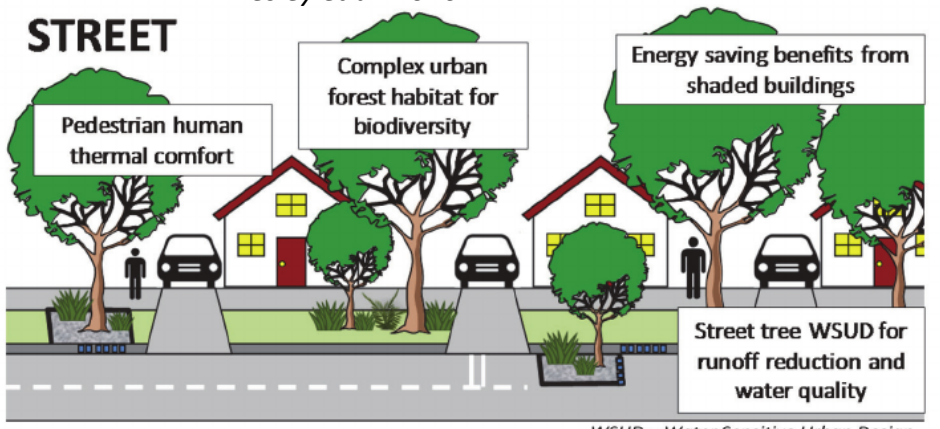
- Urban Forest and Climate: Elevated temperatures can have on human thermal comfort and health and how green infrastructure (urban forest-botanical garden) can help lessen this impact
  - In light of climate change, the need for cooling by trees and greenspaces is expected to increase in the future (How much of green space, spatial arrangement etc ?)
  - Ecosystem services of urban forest are provided: energy conservation, carbon storage, reduced stormwater runoff, improve air quality, and enhanced human health and well being (Brack, 2002, Escobedo et al. 2011; Liversley et al. 2014

https://www.intheblack.com/articles/2016/04/01/singapore-takes-first-steps-to-green-hypercities

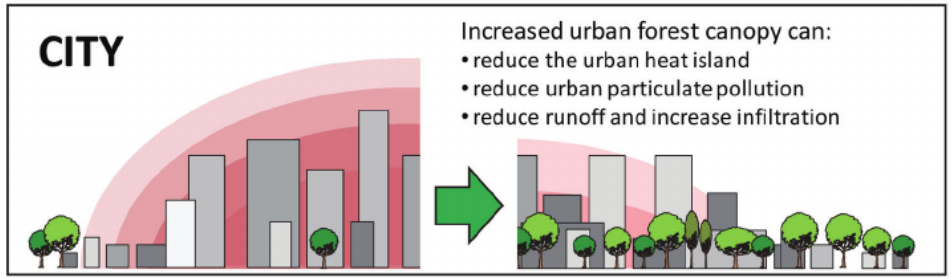


Livesley et al. 2016

BVOC = Biological volatile organic compounds



WSUD = Water Sensitive Urban Design

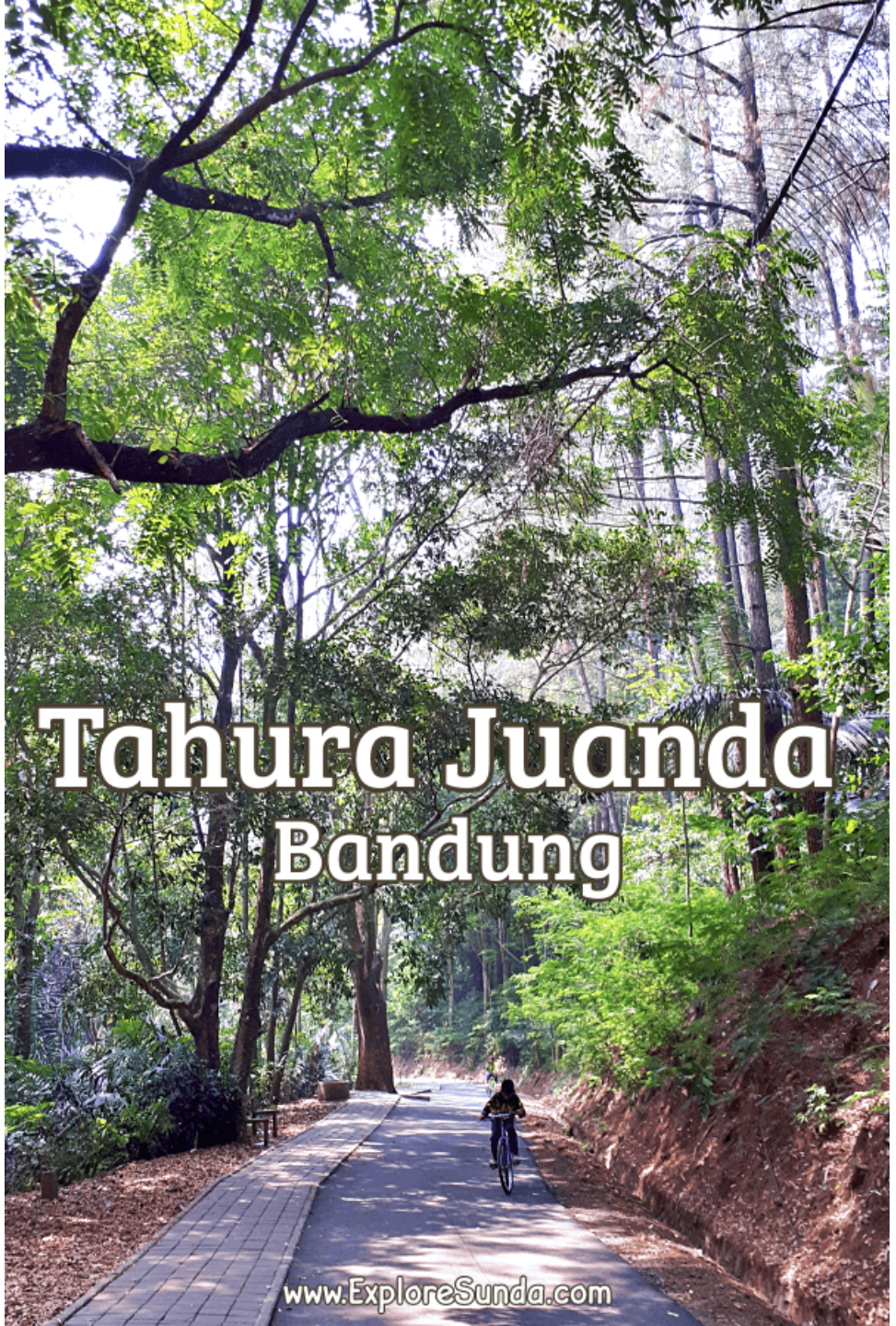


22 KAWASAN TAMAN HUTAN RAYA (TAHURA: GRAND FOREST PARK)

- The virtue of the existence of the Grand Forest Park is the benefits of preservation for flora and fauna as well as a place where people gather to get to know and enjoy nature. In addition, TAHURA is also the guardian of the ecosystem in an area
- This area is a place for collection, preservation of all existing biodiversity. This can be achieved through research, education, socio-culture and sustainable development of local/indigenous peoples.
- TAHURA also has the potential to store natural resources that can be used in the future to support human life

22 GRAND FOREST PARK (TAHURA)

No.	Grand Forest Park	Propinsi	Luas (ha)
1.	Pecut Merah Intan	NAD	6.300,00
2.	Bukit Barisan Selatan	Sumatera Utara	51.600,00
3.	Dr. Mohammad Hatta	Sumatera Barat	12.100,00
4.	Sultan Syarif Kasim	Riau	6.172,00
5.	Sultan Thoha Saifudin	Jambi	15.830,00
6.	Rajo Lelo	Bengkulu	1.1222.,00
7.	Wan Abdul Rachman	Lampung	22.245,50
8.	Ir. H. Juanda	Jawa Barat	590,00
9.	Pancoran Mas Depok	Jawa Barat	6,00
10.	Gunung Palasari	Jawa Barat	35,81
11.	Ngargoyoso	Jawa Tengah	231,30
12.	Gunung Bunder	DI. Yogyakarta	4.567,93
13.	R.Suryo	Jawa Timur	27.868,30
14.	Ngurah Rai	Bali	1.373,50
15.	Nuraksa	NTB	3.155,00
16.	Prof. Herman Yohanes	NTT	1.900,00
17.	Sultan Adam	Kalimantan Selatan	112.000,00
18.	Bukit Soeharto	Kalimantan Timur	61.850,00
19.	Paboya-Paneki	Sulawesi Tengah	7.128,00
20	Bontohari	Sulawesi Selatan	3.475,00
21.	Murhum	Sulawesi Tenggara	7.877,00
22.	Sinjai	Sulawesi Selatan	724,00



THANK YOU