



Summary of the Mutual Learning Sessions

5 August 2026, Bandar Seri Begawan, Brunei
The 23rd Workshop on GHG Inventories in Asia

Greenhouse Gas Inventory Office of Japan (GIO)
National Institute for Environmental Studies (NIES)



Mutual Learning in WGIA23

- Participants had exchanged the Q&A sheets with the partner countries through the WGIA secretariat in advance.
- In the sessions, participants discussed the sector-specific issues based on the Q&A sheets and additional comments.
- The sessions were held as a closed sessions.

Participants in the ML sessions

Sector	Country	Number of Participants (remote)
IPPU	Brunei	4
	Singapore	1
Agriculture	Indonesia	3 (1)
	Malaysia	3 (3)



Report on each session

Overview of each country's inventory

■ Overview of each country's inventory

Sector	Country	Inventory	Guidelines Applied	Estimation Methodology	Emission Factors	Activity Data
IPPU	Brunei	BTR1 (2024)	2006 IPCC GLs	Tier 1, 3	D, PS	Data from a methanol manufacturer
	Singapore	BTR1/NID (2024)	2006 IPCC GLs	Tier 1, 2, 3	D, PS, CS	Data from facilities under the regulations (CPA ¹ , ECA ² , EPMA ⁹), national statistics, data from voluntary survey
Agriculture	Indonesia	BTR1 (2024)	2006 IPCC GLs	Tier 1, Tier 2	D, CS (rice cultivation, enteric fermentation)	BPS ³ , Agricultural Statistics, APPI ⁴ , PKHL ⁵ , and KLHK ⁶
	Malaysia	BTR1 (2024)	2006 IPCC GLs	Tier 1	D, CS (Non- dairy cattle, rice)	DVS ⁷ , NAPA ⁸ , and PETRONAS

Note:

1) CPA: Carbon Pricing Act

2) ECA: Energy Conservation Act

3) BPS: *Badan Pusat Statistik*

4) APPI: *Asosiasi Produsen Pupuk Indonesia*

5) PKHL: *Pengendalian Kebakaran Hutan dan Lahan*

6) KLHK: Ministry of Environment and Forestry

7) DVS: Department of Veterinary Services

8) NAPA: Number of Animals Produced Annually

9) EPMA: Environmental Protection and Management Act



1. IPPU sector (1)

(Brunei and Singapore)

■ Issues and solutions / Outstanding issues

- While HFC import data are available, more detailed information on application/sub-application categories and domestic distribution patterns would further support the application of the mass-balance approach. As a potential interim approach, application/sub-application shares from a comparable country with similar climatic conditions and market characteristics could be used as a proxy to allocate HFC imports and estimate emissions. (Brunei)
- During the 1st BTR's reporting period, the mandatory GHG reporting system had just been introduced and reporting utilities were only just building up their reporting capabilities. (Brunei)
- Industry coverage for sectors outside of Oil and Gas Petrochemical remains limited as Brunei is still in the process of identifying utilities and activity data of potential sources of emissions. The recent establishment of Ministry of Economy, Trade and Industry may provide opportunities to strengthen coordination to further expand the IPPU inventory. (Brunei)



1. IPPU sector (2)

(Brunei and Singapore)

■ Good practices

Brunei

- The GHG Inventory Report was submitted to a third-party verifier for quality assurance, which contributed to the identification of information gaps required for the development of emission estimate.

Singapore

- As historical data were unavailable, UN Comtrade statistics were used as surrogate data to estimate HFC emissions. To validate the use of Comtrade trade data as an indicator of market trends, a comparison was conducted using the mobile air-conditioning (MAC) sub-application, for which robust data were available from the Land Transport Authority's (LTA) vehicle registration records.
- Singapore implements a facility-level Measurement, Reporting and Verification (MRV) framework under the CPA, requiring facilities to quantify emissions in accordance with NEA's GHG Measurement and Reporting Guidelines and submit emissions reports that are annually verified by NEA-accredited third-party verifiers (for emissions of 25,000 t-CO₂ eq. or above) or NEA officers (for emissions below 25,000 t-CO₂ eq.). Verified facility-level emissions data are subsequently incorporated into the national GHG inventory.



2. Agriculture sector (1) (Indonesia and Malaysia)

■ Issues and solutions / Outstanding issues

- QC checks are lacking on the CRT output from the ETF tool, following import from the IPCC software (Both)
- Not enough disaggregated activity data for livestock and manure management (Malaysia)
- Not enough transparent explanation provided in the BTR1, especially for country-specific EFs (Malaysia)
- Not enough understanding on application of notation keys (Malaysia)
- Not enough QC checks at the category level for the BTR 1, but more detailed QA/QC guidelines have already been developed for the upcoming BTR 2 (Indonesia)



2. Agriculture sector (2) (Indonesia and Malaysia)

■ Good practices

Indonesia

- Using disaggregated scaling factors for rice variety
- Activity data of Residue/Biomass Burning is separated between the Agriculture and LULUCF sectors from BTR1
- All emissions from fertilizer are covered in the Agriculture sector
- Many sources of Satellite data were combined for more accurate estimation of area burnt for residue/biomass burning

Malaysia

- CSEF for rice cultivation has been developed based on published research results
- Conducted recalculation for full timeseries
- QC was conducted step-by-step, such as at the category level expert, main compiler level, NRES level

