Enhancing Capacity for Methane Emission Reduction and MRV in FSM

Review of the Methane Reduction Roadmap, Pohnpei, FSM June 5-6, 2025

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Objectives

1. **Enhance the understanding of methane emissions** among national and state-level government officials, focusing on the sources, impacts, and current emission status in the key sectors of waste, agriculture, and energy. It will also highlight **the significance of ground data collection** and management in line with IPCC estimation methods. (DAY 1)
2. Facilitate in-depth **discussions on proposed methane reduction targets** and **sector-specific mitigation measures** at the state level. (DAY 1)
3. Introduce participants to **digital tools and methodologies** for building a robust MRV system tailored to FSM's context. (DAY 1)
4. Suggest the feasible and effective MRV system for FSM (DAY 2)

Contents

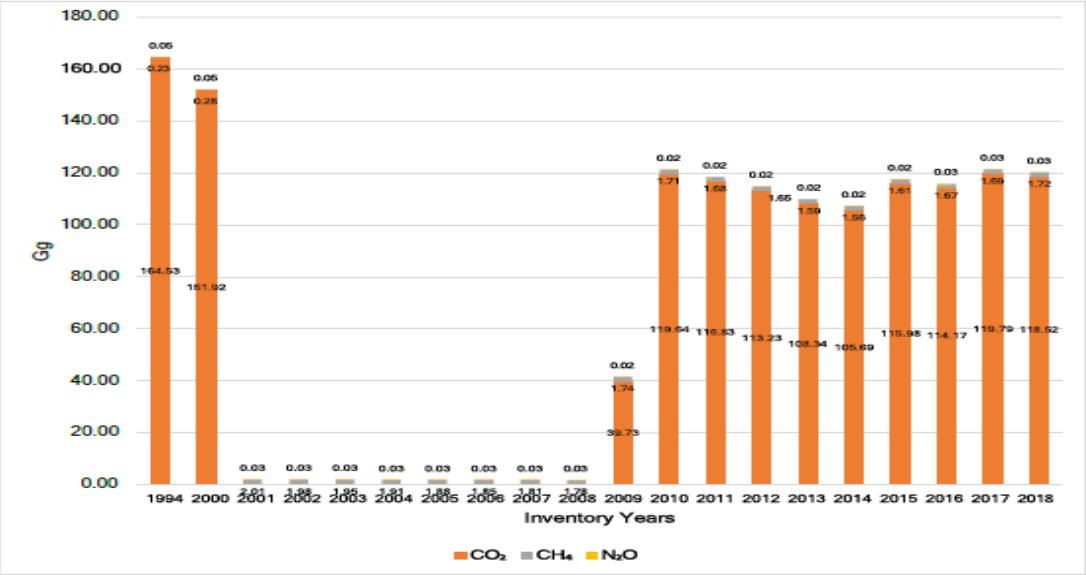
Day 1 (June 4)

- Session 1: Current Methane Emissions and Proposed Reduction Targets and Measures by Sector
- Session 2: IPCC Guidelines and Importance of Ground Data Collection for adequate estimation of methane emission
- Session 3: Useful Digital Tools for data management and emission calculation

Day 2 (June 5)

- Session 4: Introduction of MRV Systems

Session 1: Current CO2 Emissions

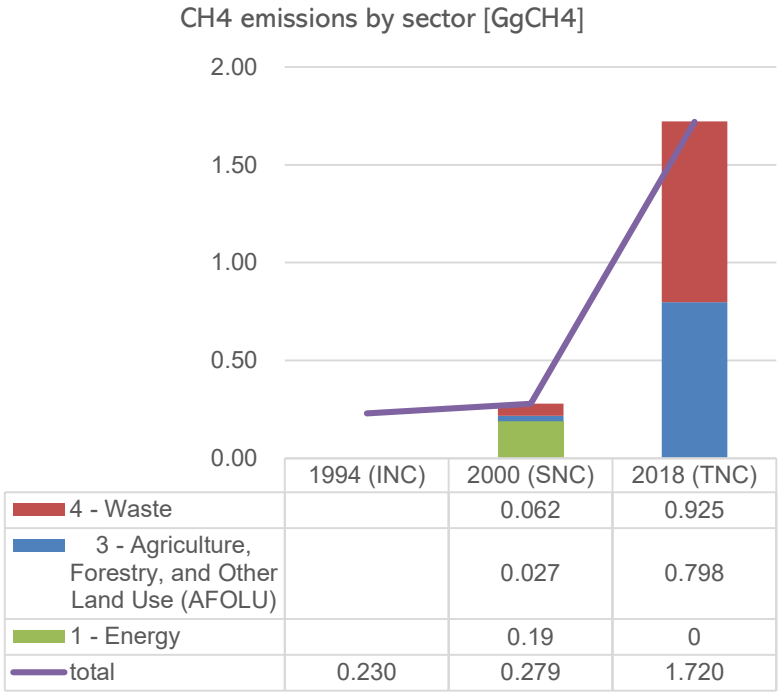


- In 2018, the FSM's total GHG emissions (excluding removals) was 174.19 Gg CO_2eq
- FSM's total GHG (CO_2eq) emissions was around 0.0000031% of the total Global GHG emissions for year 2018

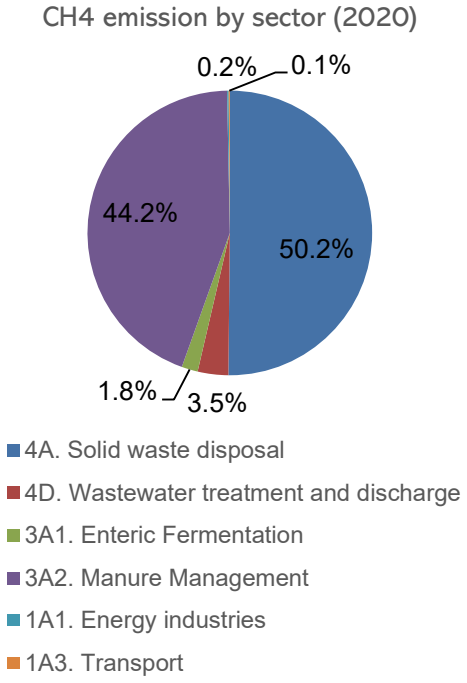
FSM's GHGs emission in Gg by type of gas (1994-2018)

Third National Communication and First Biennial Update Report to the UNFCCC

Session 1: Current Methane Emissions by Sector

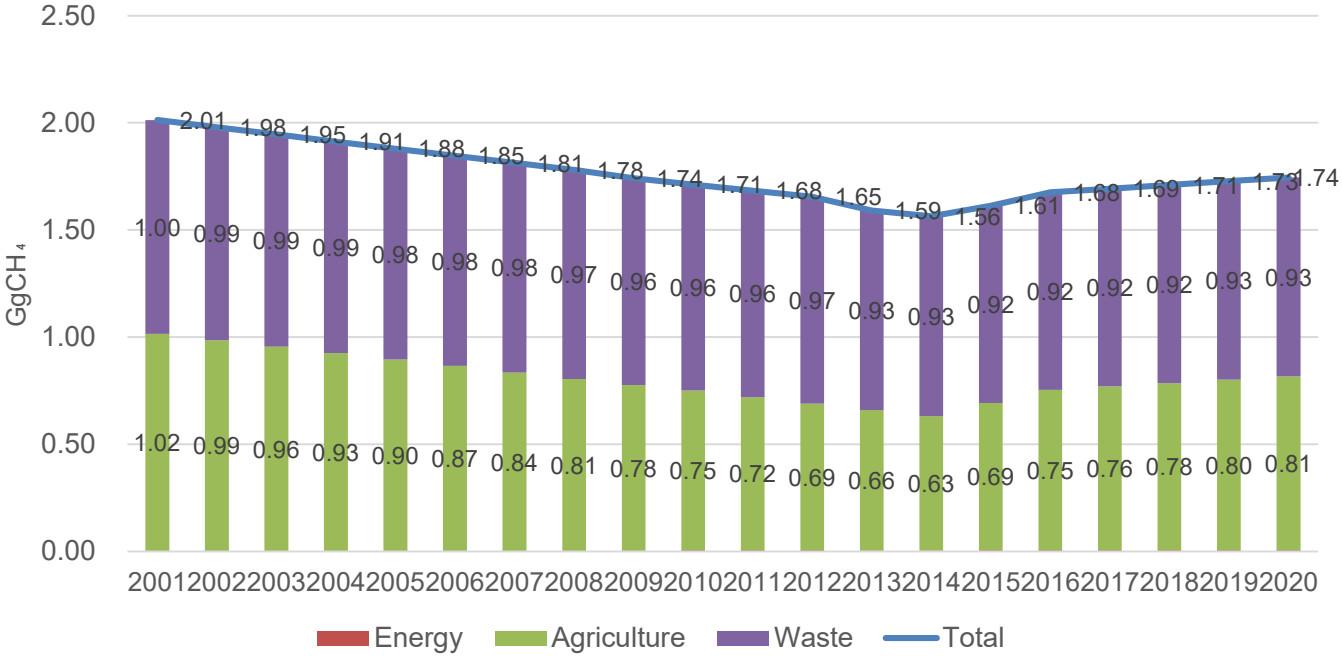


	1994 (INC)	2000 (SNC)	2018 (TNC)
4 - Waste		0.062	0.925
3 - Agriculture, Forestry, and Other Land Use (AFOLU)		0.027	0.798
1 - Energy		0.19	0
total	0.230	0.279	1.720



Methane emission estimates reported in INC, SNC, and TNC (Left) and Source of methane emissions according to TNC (Right)

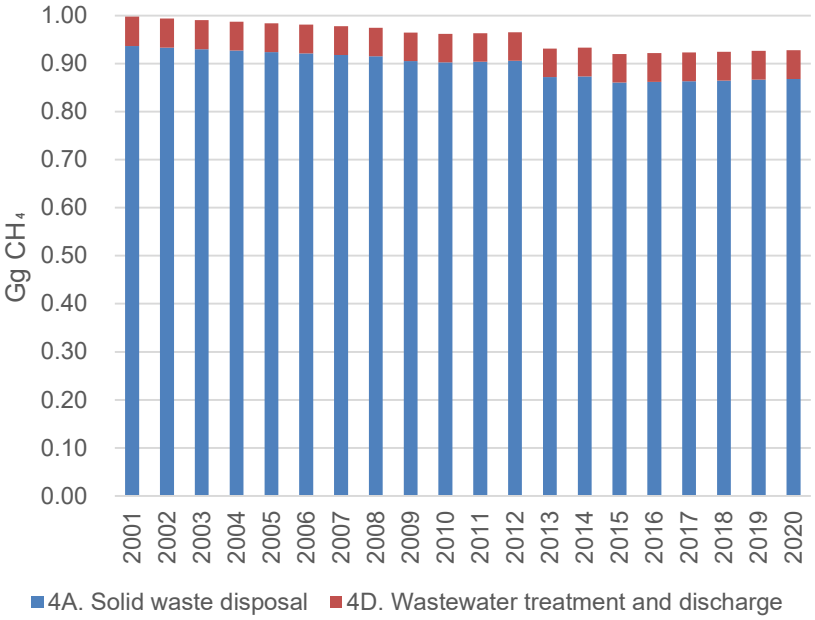
Session 1: Current Methane Emissions by Sector



Historical trend of methane emissions (national total)

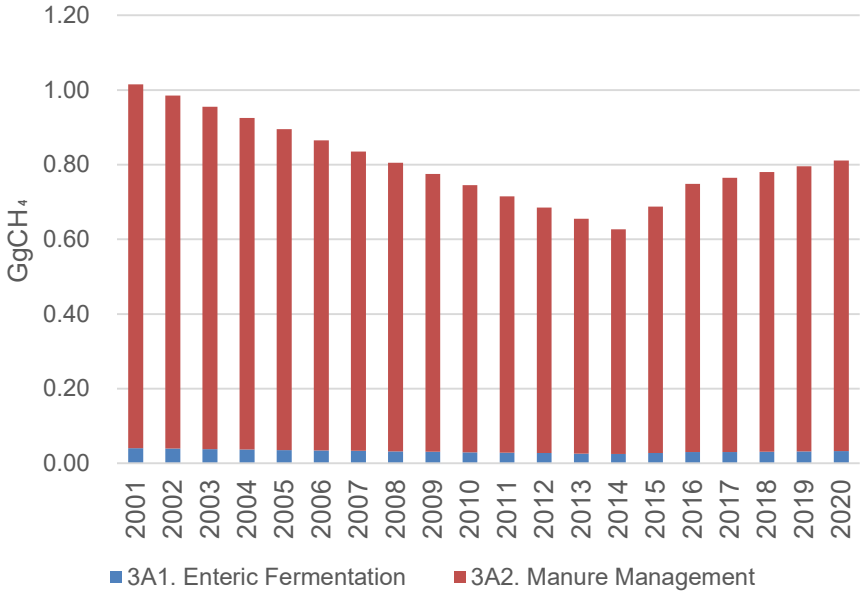
Developed by the author based on the TNC, further estimating the methane emissions up to 2020

Session 1: Current Methane Emissions in Waste Sector



Emission of 0.93 GgCH_4 was estimated to generate from the waste sector in 2020, which represents approximately 53% of national CH_4 emissions, of which 93.5% from **4.A solid waste disposal** and 6.5% from 4.D wastewater treatment and discharge

Session 1: Current Methane Emissions in Agri. Sector



The emissions from **manure management** was 0.78 $GgCH_4$, accounting for 96% of total CH2 emission from Agri. sector, while only 4% comes from enteric fermentation.

Session 1: Current Methane Emissions in Energy Sector

1. Primarily arise from the incomplete combustion of diesel.
2. Additional small fraction may be produced through the incomplete combustion of biomass or organic waste, such as firewood and coconuts,
3. Very small fraction from anaerobic decomposition in biomass storage for renewable energy source

FSM's Updated Nationally Determined Contributions (NDC) for 2030

- *"By 2030, increase electricity generation from renewable energy to more than 70% of total generation."*
- *"By 2030, reduce black carbon and methane emissions related to diesel electric generation by more than 65% below 2000 levels."*

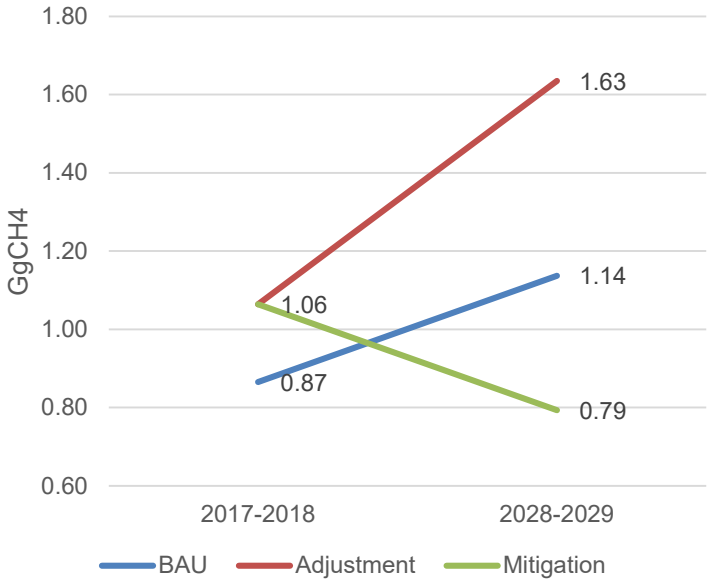
↳ It is ok to have this NDC but methane reduction will be very minimal.

Session 1: Key Categories of Methane Emissions in FSM

1. Solid Waste Disposal
2. Wastewater Treatment and Discharge
3. Manure Management (from livestock)

These top sources are called *key categories* because they have the greatest impact on the country's total emissions and are therefore the most important to track and manage.

Session 1: Scenario Analysis (Solid Waste Disposal Sub-Sector)



Projection of CH4 emissions from Solid Waste Disposal by Scenario

BAU Scenario: the Scenario assuming that the baseline data and estimation methods are sufficiently accurate and no additional mitigation efforts are implemented

Adjustment Scenario: the Scenario assuming that the original TNC do not reflect on-the-ground realities and no mitigation measures are implemented

Mitigation Scenario: the Scenario assuming that the waste management strategies outlined at the state level are fully implemented. 25.4% reduction (or 0.271 GgCH4) will be estimated compare to the Adjustment Scenario by 2029

Session 1: Scenario Analysis (Manure Management and Wastewater treatment Sub-Sectors)

It is challenging to accurately project the future methane emissions from these sub-sectors in FSM due to lack of current and reliable data.

→ no scenario analysis, no target setting

Data Requirement for emission calculation (critical one)

Manure management	Wastewater treatment
• Updated livestock population figures, • Details on manure management practices • the proportion of waste treated under anaerobic versus aerobic conditions	• The operation of centralized sewage systems and treatment of sludge; • The prevalence and condition of septic tanks, pit latrines and other on-site systems; • Regional variations in wastewater treatment practices

Session 1: Mitigation Target

Methane Reduction Target for 2030:

Achieve a reduction of 0.271 $GgCH_4$ by 2030 compared to the revised 2017 baseline

This target is attributed to the contribution from the solid waste disposal sector only.

This target will be achieved with full implementation of the actions outlined in the State-level Solid Waste Management Strategies (SWMS)

Session 1: Mitigation Target (waste target)

Solid waste management indicator and its target per state (unit: [tonne/day] except for organic waste fraction [%])

	Pohnpei		Chuuk (Weno)		Yap		Kosrae	
	2017	2029 →2030	2017	2028 →2030	2017	2027 →2030	2017	2027 →2030
Amount generated	46.0	53.7	12.8	14.1	9.5	9.7	7.3	7.7
Amount discharged	30.4	35.4	9.7	10.2	6.6	6.8	4.8	5.4
Amount collected	6.1	17.2[9]	3.6	7.9	1.3	5.4	1.2	4.5
Amount recycled and reduced	11.9	14.0	2.6	3.4	2.2	2.2	1.8	2.0
Amount disposed	22.9	35.4	7.5	8.8	5.7	6.4	4.2	5.2
Organic waste fraction (%)	34.9	19.9	34.9	19.9	20.9 (adjusted)	20.9	23.2	23.2

Session 1: Mitigation Measurements (options)

Sub- Sector	Actions	CH4 reduction impact	Co-Benefit
Solid waste disposal	Improvement of Disposal site management	◎Reduction	Co-benefit for Public Health, prevention of nuisance and air and water pollution caused by burning and proper management
	Organic waste management + waste collection	◎Reduction & Avoidance	Diversion of organic waste will help reduce burden to landfill site, reduce methane emissions and pollutants in leachate. The compost as output can be used to improve the soil and for agriculture activity.
	Conversion of Coconut to Syngas and Biochar	△Future avoidance	- Energy or product generation from organic waste - Reducing air pollution cause by open burning of coconut shells - Contribute to reduction of CO_2 emission
Manure management	Anaerobic digesters and generate methane for biogas	○Generation & conversion	Co-benefit for Prevention of water pollution, Health, biogas generation for cooking and lighting Risk: without proper maintenance, methane gas may leak from tanks
	Dry litter piggery system	△	- Utilisation of wood chipper from green waste (waste as resource) - reduction of pollution - production of pig manure for agri. use
Domestic Wastewater treatment	Anaerobic digesters and generate methane as biogas	○Generation & conversion	Co-benefit for Prevention of water pollution, Health, and replace fossil fuels Risk: without proper maintenance, methane gas may leak from tanks
	Decentralized Wastewater treatment system	△Reduction?	Co-benefit for Prevention of groundwater pollution, and water-borne disease

Session 2: IPCC Guidelines and Importance of Ground Data Collection for adequate estimation of methane emission

Session 3: Useful Digital Tools for data management and emission calculation

KoBoToolBox (KoBoTool):

Emission Quantification Tool (EQT):

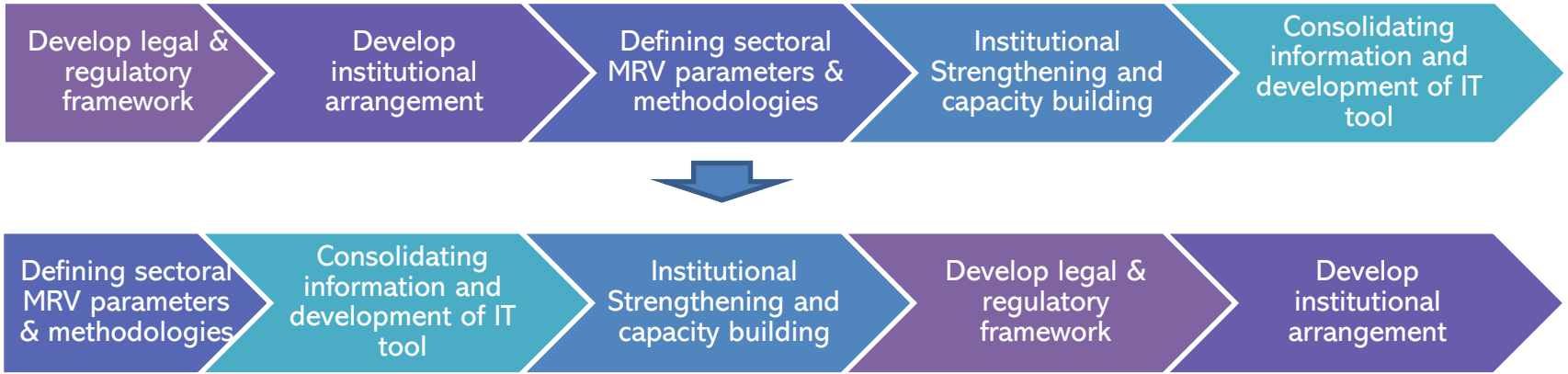
Session 4: Introduction of MRV Systems

MRV

To track GHG emissions and entail measuring and monitoring the GHG emissions and removal associated with activities within the country, states, organizations, or facilities, reporting the collected data in a GHG inventory or other forms, and undertaking review and verification.

Currently, MRV system for electricity and transportation is under development as they are relevant to achieving the NDC goals (FSM MRV FRAMEWORK)
→ Integration of MRV for CH4 reduction in NDC

Session 4: Steps to develop and implement MRV



1. Select the mitigation measurements
2. Identify data to be collected (GHG indicators for NDC reported to UNFCCC)
3. Identify data to be collected (non-GHG indicators for sector development/ improvement (co-benefit)
4. Capacity building
5. Regulatory framework & Institutional arrangement

Each State Select Mitigation Measurements

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	Conversion of Coconut to Syngas and Biochar	△Future avoidance	- Energy or product generation from organic waste - Reducing air pollution cause by open burning of coconut shells - Contribute to reduction of CO_2 emission
Manure management (no reliable baseline)	Anaerobic digesters and generate methane for biogas	○Generation & conversion	Co-benefit for Prevention of water pollution, Health, biogas generation for cooking and lighting Risk: without proper maintenance, methane gas may leak from tanks
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	Decentralized Wastewater treatment system (from latrine system)	△Reduction?	Co-benefit for Prevention of groundwater pollution, and water-borne disease

How to select?→ Mitigation impact, feasibility, adaptability, scalability, sustainability, co-benefit, measurable?