Agricultural Sector

9 July 2009, Seoul, Korea
7th Workshop on GHG Inventories in Asia

Batimaa Punsalmaa

Agriculture WG in WGIA 7

- Understanding of Country-Specific EFs development

- Availability to the other country of CS-EFs, and possibility of joint research

- Exchange agriculture information (including mitigation potential)

Chair: Kazuyuki Yagi

Rapporteur: Batimaa Punsalmaa

Time Schedule *(WGIA7 Day 3, 9:30~12:20)*

Discussed

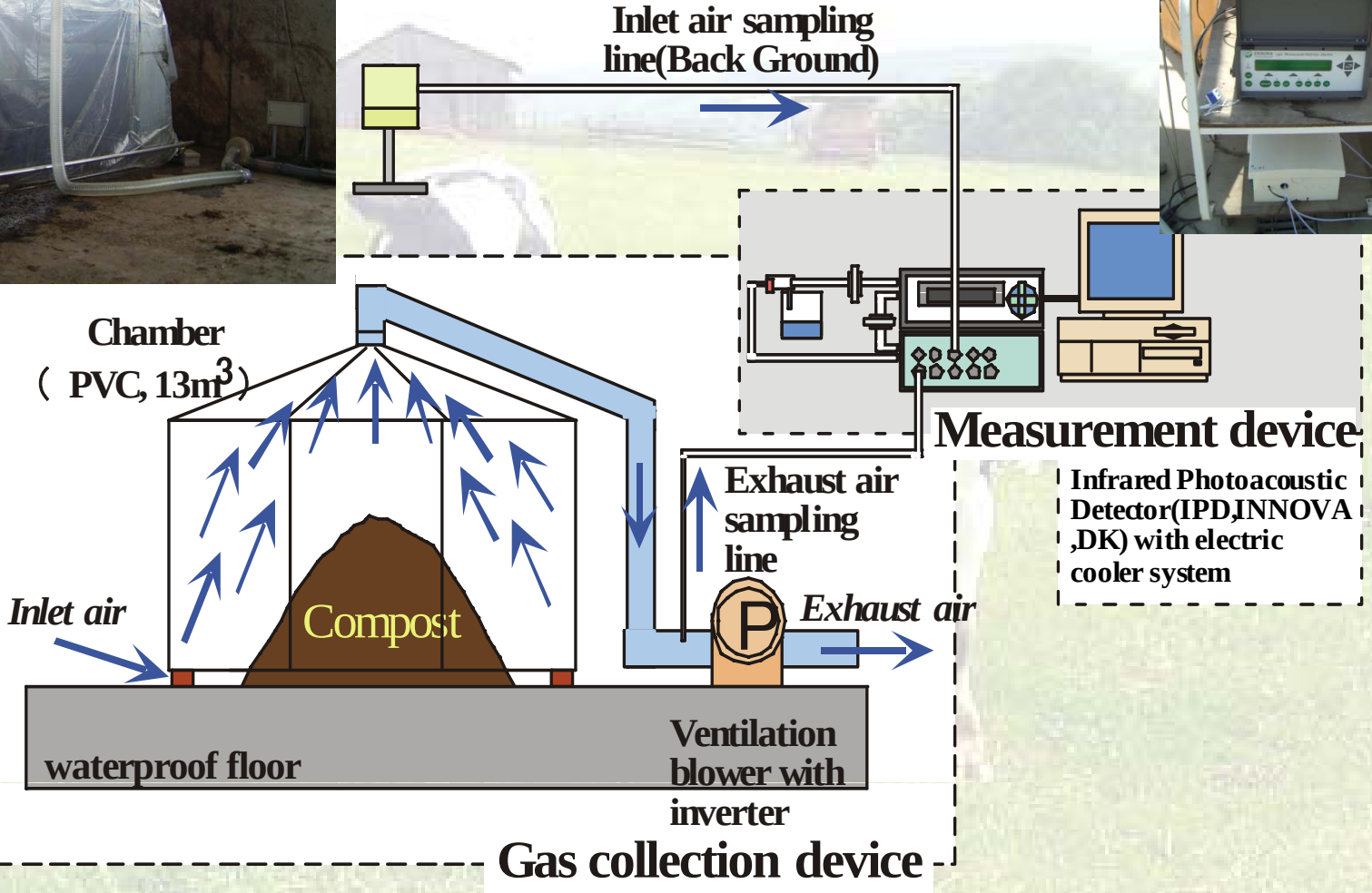
- CS-EFs for Livestock Manure Management
  Koki Maeda (NARO)
- CS-EFs for Soils and Rice Cultivation
  Kazuyuki Yagi (NIAES)
- CS-EFs for Rice Cultivation in Philippine
  Leandro Buendia
- CS-EFs in Indonesia
  Prihasto Setyanto (Indonesia)
- Agricultural Mitigation Potential
  Kohei Sakai (GIO)
- Short information by Vietnam, Mongolia, Myanmar

GHG Emission from Livestock waste management

Koki Maeda

National Agricultural and Food Research Organization (NARO)
National Agricultural Research Center for Hokkaido Region

Measurement of GHG emission from cattle manure composting process



Maeda et al., Journal of Environmental Quality 38:598-606 (2009)

Emission Factor

		Dairy Cattle	Non-dairy Cattle	Swine	Hen Broiler
CH_4	Pit Storage	3.9	3.0	8.7	
	Sunlight Drying	0.2	0.2	0.2	0.2
	Composting (feces)	0.044	0.034	0.097	0.14
	Composting (feces and urine mixed)	3.8	0.13	0.16	0.14
	Deposition	0.4	0.4	0.4	0.4
	Incineration	0.044	0.034	0.097	
	Wastewater management	0.0087	0.0067	0.019	
N_2O	Pit Storage	0.1			
	Sunlight Drying	2.0			
	Composting (feces)	0.25			
	Composting (feces and urine mixed)	2.4	1.6	2.5	2.0
	Deposition	0.1			
	Incineration	2.0			
	Wastewater management	5.0			

(%)

Established by data of Japan

Default value of IPCC Guideline

The 7th Workshop on GHG Inventories in Asia (WGIA7)
7-10 July 2009, Seoul, Republic of Korea

Country-specific Emission Factors for Agricultural Soils and Rice Cultivation in Japan

Kazuyuki Yagi

National Institute for Agro-Environmental Sciences, Tsukuba, Japan

NIAES

National Inventory for Japan
N_2O from agricultural soils

Adopted EFs

Direct N_2O: Mineral fertilizer/Animal manure

- Paddy rice: 0.31 (±0.31) % (IPCC default values)
- Tea: 2.90 (±1.82) % (from national data analysis)
- Other crops: 0.62 (±0.48) % (from national data analysis)

Direct N_2O: Crop residues/Legumes

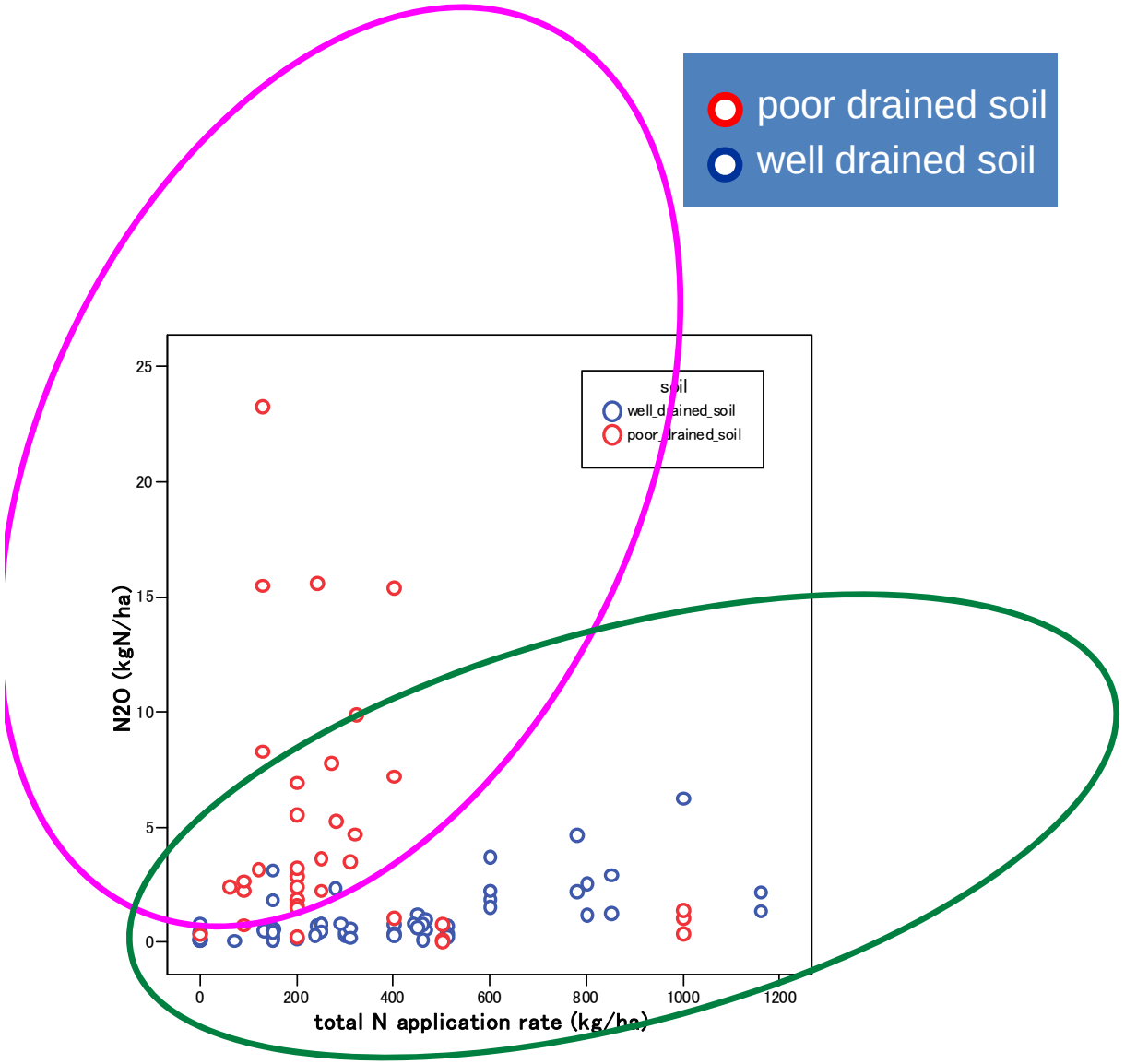
- IPCC default values

Direct N_2O: Organic soils

- Paddy: 0.30 kg N_2O-N/ha/year (from national data)
- Upland: IPCC default values (similar to national data)

Indirect N_2O

- Atmospheric deposition (IPCC default values)
- Leaching and run-off: 1.24 % (IPCC default values)



Further analysis for other upland crops

- Soil drainage classes were categorized from soil types
- Poorly drained soil > well-drained soil
- No clear relationship for poorly drained soil
- Well-drained soil: $r^2 = 0.38$

Relationship between N inputs and N_2O emissions from upland fields with different soil drainage type (measurement period more than 90 days)

Country-specific Emission Factors for Rice Cultivation in the Philippines

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Leandro Buendia

Team Leader, Agriculture Sector of the Philippine SNC GHG Inventory

The IRRI International Research Program on Methane Emissions from rice fields in Asia

- Automated closed chambers measuring system: 24 hours/day for the whole growing season; 2-3 cropping seasons.
- Five countries (8 stations):
  - China (2)
  - India (2)
  - Indonesia (1)
  - Philippines (2)
  - Thailand (1)

All findings were published in a book "**Methane Emissions from Major Rice Ecosystems in Asia**", Development in Plant and Soil Sciences, Kluwer Academic Publishers

EFs for rice cultivation in the Philippines

Variety	Water Management	Organic amendment	Cropping Season	Emission Factor, kg/ha/day
IR72	Continuous flooding	none	dry season	1.46 (0.64 - 2.27)
IR72	Continuous flooding	none	wet season	2.95 (1.39 -5.16)

Source: Corton et al. 2000; Wassmann et al. 2000

TABLE 5.11
DEFAULT CH_4 BASELINE EMISSION FACTOR ASSUMING NO FLOODING FOR LESS THAN 180 DAYS PRIOR TO RICE CULTIVATION, AND CONTINUOUSLY FLOODED DURING RICE CULTIVATION WITHOUT ORGANIC AMENDMENTS

CH_4 emission (kg CH_4 ha^{-1} d^{-1})	Emission factor	Error range
	1.30	0.80 - 2.20

Source: Yan et al., 2005

INDONESIA EXPERIENCE IN DETERMINING COUNTRY SPESIFIC EMISSION FACTOR IN AGRICULTURE SECTOR

Dr. Prihasto Setyanto
Prof. Dr. AK Makarim
Prof. Hidayat Pawitan
Prof. Iswandi Anas
Dr. Le Istiqlal Amien
Elza Sumaini

Rice cultivation scaling factors

1. Water regimes
2. Soil Types
3. Rice varieties
4. Organic matter
5. Establishment of herbicides
6. Crop establishment

Adjusted scaling factor for water regimes and soil correction factors

Category	Sub-category			SF (adapted from IPCC Guidelines 1996)	Adjusted SF (based on current studies in Indonesia)	Adjusted CF from different soil types of Indonesia
Upland	None			0		
Lowland	Irrigated	Continuously Flooded		1.0	1.00	
		Intermittently Flooded	Single Aeration	0.5 (0.2-0.7)	0.46 (0.38-0.53)	
			Multiple Aeration	0.2 (0.1-0.3)		
	Rainfed	Flood Prone		0.8 (0.5-1.0)	0.49 (0.19-0.75)	
		Drought Prone		0.4 (0-0.5)		
	Deep Water	Water Depth 50-100 cm		0.8 (0.6-1.0)		
		Water Depth < 50 cm		0.6 (0.5-0.8)		

Summary

- CS-EFs development in agricultural sector
  - enteric fermentation
    Mongolia, India and Japan
  - manure management
    Japan
  - rice cultivation
    Cambodia, India, Japan, Philippines, Thailand and Vietnam
  - N_2O emission from soils
    Japan

Participants mentioned that CS EFs is not always the best case.

Summary

➢Technical paper for "*Challenges and opportunities for mitigation in the agricultural sector"* was released in 21 Nov. 2008. ("FCCC/TP/2008/8") –Kohei Sakai

- Mitigation potential

  Many research have done: *management rice cultivation management of fertilizer application, soil carbon sequestration*

- Availability to the other country of CS-EFs

Summary

- **About WGIA-EFDB**

  There is considerable amount of information

- **What could be discussed in WGIA8 and in future WGIA ?**

  To share experiences (software, tools) how to move from simple tier 1 to tier 2 beyond SNC

  To combine LULUCF and Agriculture sector

  To focus on agricultural soil and livestock

  To discuss about mitigation options in sub-sectors of AS

  To discuss on a possibility to separate rice cultivation from other crops

Thank you for your attention


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IMPOSSIBLE IS NOTHING