# Session II-2
# Discussion on AFOLU

*Rapporteur: Khin Lay Swe*

**The 10th Workshop on GHG Inventory in Asia,**
**Hanoi, Vietnam**
**July 11-12, 2012**

# *Outline*

*WGIA10 Day 1 (11th July), 13:30～17 :00*

- Introductory Presentation by . Kohei Sakai
- Presentation by Dr. Khin Lay Swe (Myanmar)
- Presentation by Dr. Idat Galih Permana (Indonesia)
- Presentation by Mr. Worapong Waramit (Thailand)
- Presentation by Dr. Shenghui Han (China)
- Presentation by Dr. Damasa Magcale Macandog (Philippines)
- Presentation by Dr. Elizabeth M.P. Philip (Malaysia)
- Presentation by Dr. Kyeong-hak Lee (Korea)
- Group discussion

***Chair: Damasa Magcale Macandog***

***Rapporteur: Khin Lay Swe***

Participants: over 20 persons

# 1. National GHG Inventory Status of Myanmar

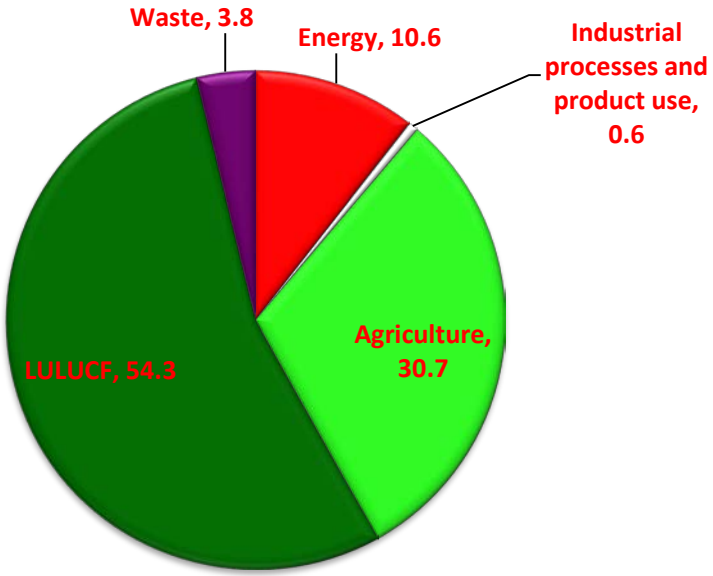
Khin Lay Swe, Team Leader, National Inventory Team

- ✓ Myanmar ratified UNFCCC in 1994 , GEF in 2006, for its INC
- ✓ NCEA (National Communication for Environmental Affairs) under the Ministry of Foreign Affairs, relocated under the Ministry of Forestry in 2004, launched an INC project in 2008
- ✓The NCEA was abolished and the National Environmental Conservation Committee (NECC) was formed on 20th April 2011
- ✓It issued the notification that Ministry of Forestry was renamed into the Ministry of Environmental Conservation and Forestry (MOECAF) in September, 2011.
- ✓Environmental affairs will be taken into action more promptly and effectively.
- ✓The establishment of new Department of Environmental Conservation was approved by the Government and at the moment it is under the recruiting process.

## INC of Myanmar

- Base year 2000 , 2006 IPCC guide lines
- Total emission was estimated to be 74,358 Gg $CO_2$- e of which the GHG emissions LULUCF was the largest portion (54 %).
- However, carbon removal by this sector accounted for 142,221 Gg$CO_2$- e so that the country's net emissions turned out to be a negative value of 67,863 Gg$CO_2$- e

**Share of emission by sector (%)**



# GHG Inventory in Myanmar

**With decreasing forest cover and increasing forest degradation, if this trend is left unchecked, the only carbon reservoir in the country will shrink gradually**

- **GHG emissions from other economic sectors will increase as a result of mechanized agriculture, industrialization and national economic development**
- **The draft report now under the process of seeking the approval by the MoECAF (Ministry of Environmental Conservation and Forestry)**

# GHG Inventory in Myanmar

- Myanmar is at an historic stage in its development
- The new Constitution provides for the basic principles of democracy; rule of law and human rights, has set out a reform agenda focusing on good governance and ensuring fundamental rights,
- A number of reforms have already been undertaken these developments represent a unique opportunity for Myanmar to place itself on a path of sustainable, inclusive development
- Moving forward to International Relations
- Hope for NC 2

# 2. Inventory and Mitigation for Methane Emissions from Livestock in Indonesia

Idat G. Permana, Suryahadi & Rizaldi Boer

Estimation of Enteric Fermentation and Manure Management: IPCC 2006 GL

In the NC2, the1996 Revised IPCC Guidelines while for the NC3, use the 2006 IPCC Guidelines.

- ✓ Challenges - multiple land use especially in croplands
- ✓ the land use in private owned farm in the some states
- ✓ the soil classification especially the wetlands. Would a 30 year old drained peatland continue to be a peatland currently?
- ✓ Mitigation Technologies in Livestock Sector: Supplementation, Improved feeding practices, manure management/ biogas, pasture management

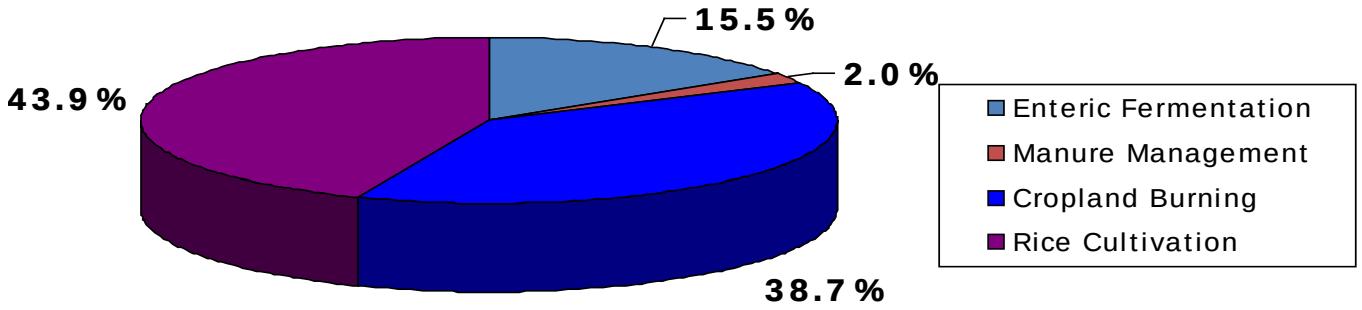
## 3. Greenhouse Gases Inventory in Agricultural Sector of Thailand: GHG Inventory for SNC

Worapong Waramit, Land Development Department Bangkok, Thailand

- ✓ **Revised 1996 IPCC Guidelines for National GHG Inventory,**
- ✓ **2000 IPCC Good Practice Guidance and Uncertainty Management.**
- ✓ **2003 Good Practice Guidance for Land-Use Change and Forestry**

- Tier 2: Enteric Fermentation , Manure Management , Rice Cultivation , Field Burning of Agricultural Residues
- Tier 1 : Agricultural Soils
- In 2000, GHG emission from agricultural sector in form of carbon equivalent accounts for 51.88 million ton/ 22.6 percent of the total emission of the country which is the second shares after the energy sector.

# Distribution of Methane Emission by Sources in Indonesia




- ✓ **The most significant GHG is methane from rice cultivation, enteric fermentation, manure management and field burning of agricultural residues.**
- ✓ **Nitrous oxide is from agricultural soils, manure management, and field burning of agricultural residues**
- ✓ **Considering experience gained from the inventory, recommendation for improvement: to make available more detailed data as well as to improve knowledge and to develop standardized fraction burning values for calculation purposes**

# 4. GHG emission from China croplands

HAN Shenghui, ZHANG Wen,

ZHENG Xunhua, HUANG Yao, WANG Mingxing

- ✓ $CH_4$ emission from paddy fields
- ✓ $N_2O$ emission from croplands
- ✓ Difficulties
- ✓ China has submitted its Initial National Communication
- ✓ In 2012, China will submit its Second National Communication
- ✓ Agriculture is a major source of $CH_4$ and $N_2O$ emissions in China in 1994:

- **CH4 from Rice fields - Tier 3, IPCC, 2006**

  **The $CH_4$ emission factor is simulated by CH4MOD model for early rice, late rice and single rice with spatial resolution 10km×10km**

- **N2O from Crop land: Tier 2:**

  **China is divided into six regions according to climate belt and crop planting regime, Nitrogen input of each type of cropland is calculated with a regional nitrogen cycling model IAP-N**

# 5. Philippine SNC: Gaps, Challenges and Improvements for the GHG Inventory of the Agriculture and LUCF Sectors

**Damasa B. Magcale-Macandog,Professor,**

**University of the Philippines Los Baños**

**Institutionalizing the GHG Inventory: Proposed Institutional Structure**

- **SNC: Documentation: 1996 IPCC GL, The 2000 Philippine GHG inventory**
- **Tier 2 approach - methane emission from rice based on the country-specific emission factors for rice cultivation in the Philippines as derived from the research findings of IRRI**
- **Tier 1: LUCF**
- **Comparison between the INC and the SNC,**
- **Gaps, needs and constraints**

## Recommendations for Agriculture Sector

- Further disaggregation and improvement of activity data in the agriculture sector to fit the GHG inventory requirements

For higher tier, enhanced characterization of livestock data is needed

For future inventories, these assumptions have to be supported with published data (based on survey) to improve transparency and estimates

Compilers could attempt to undertake uncertainty analysis of GHG estimates by generating uncertainty values for activity data and emission factors

# 6. Monte Carlo Uncertainty Analysis Program

Lam Tzeng Yih, Kyeong-hak Lee*, and
Raehyun Kim
Korea Forest Research Institute

- **An analysis software is needed to:**
  - **Assist in the uncertainty calculation,**
  - **Automate the calculation process,**
  - **Standardize/harmonize the estimation process,**
  - **Making the calculation process transparent.**

- **Motivation**
- **The package, Statistical software, The structure of the program**
- **Way to operate the program**
- **The concept of Monte Carlo Uncertainty Analysis**
- **Advantages, disadvantages, etc**
- **Example:**

**Estimating uncertainty for 2010 emission level of**

**Above- and belowground biomass in Republic of Korea using Gain-Loss Method for Conifer and Non-conifer forests**

- **The GUI of the program:**
  - **Is built from `tcltk`, `rpanel` and `tkrplot` packages,**
  - **They provide a convenient way to operate the program,**
  - **80% of the codes in the program.**

# 7.Developing a Sustainable AFOLU GHG System

Elizabeth Philip, Yen Mee Chong and Abdul Rahim Nik, Malaysia

- ✓Lessons learnt from INC & NC2
- ✓Moving on from NC2 to NC3
- ✓Addressing AFOLU at the national level
- ✓Challenges

# Comparison of NC1 and NC2, Improvements in NC2

- **Expansion on activity data**
- **Local emission factors**
- **Uncertainty assessment**
- **QA/QC, etc.**
- **Transition from NC2 to NC3**
  - **Weakness in NC2 being addressed**
- **NC3**
  - **Improved emission factors**
  - **Land based accounting**
  - **Development of national templates**
  - **Capacity building**

## Challenges

- Updated land use data/maps
- Tracking changes within private properties
- Agricultural crops
- Matching soils with land use
- Emission factors – esp soil

## Conclusion

- Sustainable GHG inventory is in place for the AFOLU sector
- Capacity building amongst new inventory compilers on-going
- Improvement in the agriculture sector is being planned – 2012-2013
- Challenges--

# GHG inventories of Indian Agriculture and Livestock sector

## Indian Grassland and Fodder Research Institute, Jhansi India

## Agriculture Sector

- Enteric fermentation (cattle, buffalo, sheep, goats, yak, mithun, horses, ponny, donkeys, pigs)
- Manure Management
- Rice Cultivation (Irrigated, Rain-fed, Deep water and Upland)
- Field burning of crop residues (9 crops: rice, wheat, mustard, cotton stalk, sugarcane, jute, millet, maize and groundnut.
- Agriculture soils

**Procedure – T2, T3, T1 = $CH_4$ and $N_2O$**
**Livestock category**
**Manure management for various livestock/animal species – $CH_4$, $N_2O$**
**GHG emission by ruminants – large, small ruminants**
**Feed and fodder availability**
**Mitigation approaches**

# Discussion on AFOLU, Comparison among WGIA Countries

| | Livestock | Agriculture | LUCF |
|---|---|---|---|
| Indonesia | NC 2: 1996 IPCC<br>NC 3: 2006 | | |
| Thailand | 2003 GPG<br>Tier 2 | 1996 IPCC<br>2000 GPG: Uncertainty<br>Tier 2: Rice<br>Tier 1: Agric. soil | 2003 GPG |
| China | NC2: 2012 | Rice : Tier 3, 2006 IPCC<br>Crop land, N2O: Tier 2 | |

# Discussion on AFOLU, Comparison among WGIA Countries

| | Livestock | Agriculture | LUCF | |
|---|---|---|---|---|
| Philippines | | NC 2: 1996 IPCC<br>Rice: Tier 2 | Tier 1 | |
| Republic of Korea | Monte Carlo Uncertainty Analysis Program | | | |
| Malaysia | | | NC 2 to NC3 | |
| Myanmar | NC 1: Institutional Structure | 2006 IPCC<br>Tier 1: All sectors | | |

# Group Discussion

➢What do you want to discuss in WGIA11 or in future WGIA ?
(for Agriculture/LULUCF sector)

- ✓ Exchange institutional arrangements
- ✓ Check the progress of each country
- ✓ IPCC-EFDB
- ✓ Wetlands supplementary guidelines
- ✓ Uncertainty
- ✓ REDD+

**Thank You**