

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

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

**Professor**

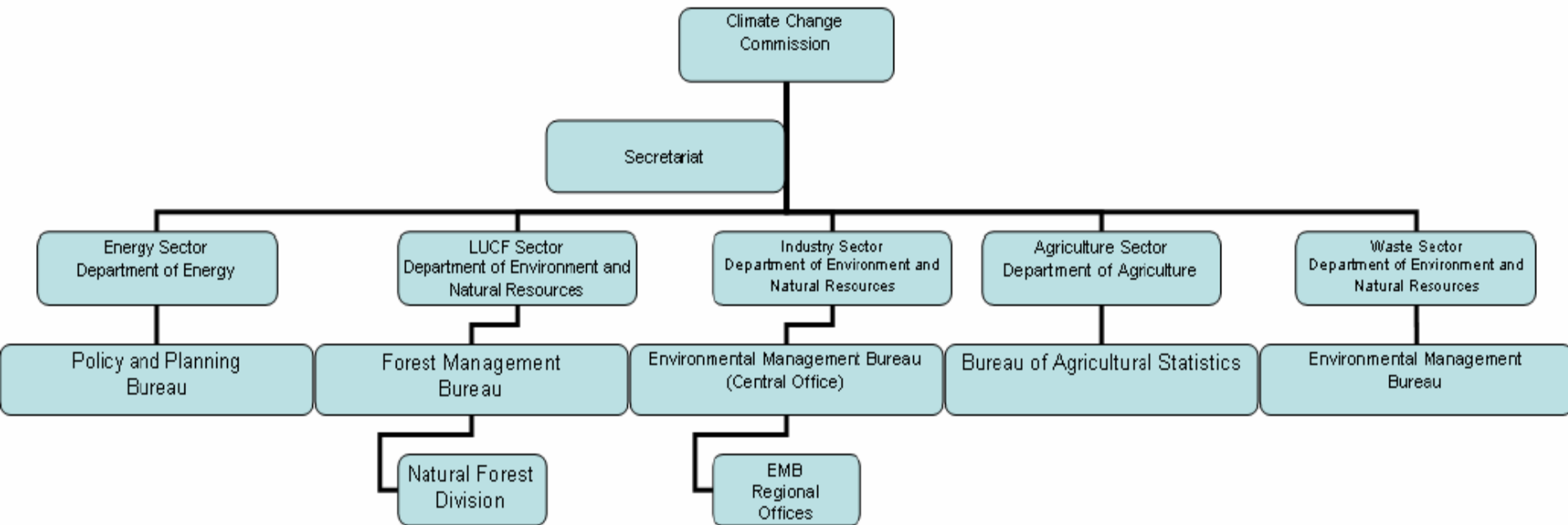
**Institute of Biological Sciences**

**University of the Philippines Los Baños**



# Institutionalizing the GHG Inventory Process

## Proposed Institutional Structure for the National GHG Inventory



# Institutionalizing the GHG Inventory Process: Agriculture

## Department of Agriculture

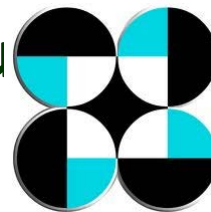
- Bureau of Agricultural Statistics
- Bureau of Agricultural Research
- Bureau of Animal Industry
- Bureau of Soils and Water Management
- Philippine Rice Research Institute (PhilRice)

## Department of Science and Technology

- Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD)

## University of the Philippines at Los Banos (UPLB)

## International Rice Research



# Institutionalizing the GHG Inventory Process : LUCF

- ❑ **Forest Management Bureau (FMB) is the agency responsible for collecting and publishing forestry data, and it should regularly undertake the GHG inventory for the LUCF sector**
- ❑ **GHG inventory must become part of FMB's regular activities through undertaking regular forest inventory**



# The National GHG Inventory for the SNC

## **SNC: Documentation**

- ☐ 1996 IPCC Guidelines**
- ☐ The process of 2000 GHG inventory were manually documented and written that will facilitate a step-by-step guide for each sector**
- ☐ The recipe manual per sector as provided on this report include instructions on utilizing the IPCC inventory software as well as the appropriate data for input**

# The National GHG Inventory for the SNC

- The recipe manual was used in the training workshops for government agencies and other relevant stakeholders conducted per sector
- It provided greater transparency in the compilation of the national GHG inventory, as well as an effective strategy to broaden expertise in this field in the Philippines

# The National GHG Inventory for the SNC

## Database

- The 2000 Philippine GHG inventory, worksheets and documentation is hosted online for the use of inventory team members
- Eventually, a link is to be established to the EMB website with varying levels of security for access by different types of clients interested in the GHG inventory process

# The National GHG Inventory for the SNC

- Developed database will be the central repository of all the files that the sector teams produced and submitted to the Manila Observatory**
- The files collated and produced by Manila Observatory also archived in the database**
- With all the files in place, the website was launched online in order for the files to be accessed remotely by the assigned users with access privileges**



# The National GHG Inventory for the SNC

## Agriculture Sector

- Tier 1 approach using the IPCC default values for emission factors
- 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

# The National GHG Inventory for the SNC

- ❑ Grasslands in the Philippines are dominated by cogon grass (*Imperata cylindrica*); vicious grass-fire-grass cycle
- ❑ lack of data on the extent of burned cogon areas
- ❑ 5% of the total cogon areas in the country were burned based on expert judgment



# The National GHG Inventory for the SNC

- ❑ In order to improve the future inventory emission for agriculture sector is to estimate the burned grassland area in the country
- ❑ The grassland area has to be consistent with the area reported in the LUCF sector and has to be checked for double counting emissions of non-CO<sub>2</sub> gases



# The National GHG Inventory for the SNC

- ❑ Need for estimates of direct N<sub>2</sub>O emissions from soils due to the application of synthetic fertilizers
- ❑ assumed that most of the nitrogen fertilizers were applied in rice areas
- ❑ However, nitrogen fertilizers are also applied to corn, sugarcane, fruit trees, etc.



# The National GHG Inventory for the SNC

- ❑ lack of data on the estimates of the area of organic soils (histosols) drained for agricultural production
- ❑ assumed (by expert judgment) that 10% of the total area (8,530 ha) were cleared and drained for agriculture in the Philippines



# The National GHG Inventory for the SNC

## LUCF Sector



- Tier 1 approach
- Key sinks of carbon are those land uses that contain trees such as the dipterocarp forests, pine forests, mossy forest, mangrove areas and tree plantations
- Key sources of carbon include biomass harvests or deforestation and conversion of forested areas into brushlands or other land uses that contain less trees

# The National GHG Inventory for the SNC

## LUCF Sector

- ❑ LUCF sector a huge net sink of carbon
- ❑ attributed to the lower deforestation rate from 1990 to 2000
- ❑ In the 1990s, DENR issued total log ban policy to hold the massive deforestation in the country
- ❑ carbon emission/sequestration in the soil and abandoned lands not included



# The National GHG Inventory for the SNC

## Issues on LUCF Inventory

1. Areas of forest land use in the FMB statistics were extrapolations from the inventory conducted in 1987
  - estimates of the area of each land use reported in the FMB statistics were used thus not very accurate
  - Forest Resource Assessments (FRAs) should be conducted on a regular basis to improve the data for GHG inventory



# The National GHG Inventory for the SNC

## Issues on LUCF Inventory

- 2. Revision of the definition of forest (from area with > 10% cover to area with 20 – 30% cover) will likely reduce the area of forests in the Philippines**
  - As a consequence, this will reduce the contribution of the LUCF sector as a net sink of carbon**

# The National GHG Inventory for the SNC

## Issues on LUCF Inventory

- 3. New classification of the Philippine forests might make it more difficult to compile the GHG inventory for the LUCF sector**
  - Difficult to determine extent of land use change between the two time periods (e.g. 2000 and 2010)**
  - Biomass density data generated from the previous studies in the Philippines were based on the old classification**
  - Using the new classification might mean the generation of new biomass and carbon density data**

# The National GHG Inventory for the SNC

## Issues on LUCF Inventory

- 4. The original biomass density value used after land use conversion for second growth forests is low**
  - second growth forest was assumed to be converted to brushland**
  - an average of the biomass densities of second growth forest and brushland**
  - The 2000 GHG inventory for LUCF was revised based on this comment, thus leading to higher net sequestration in the LUCF sector**

# The National GHG Inventory for the SNC

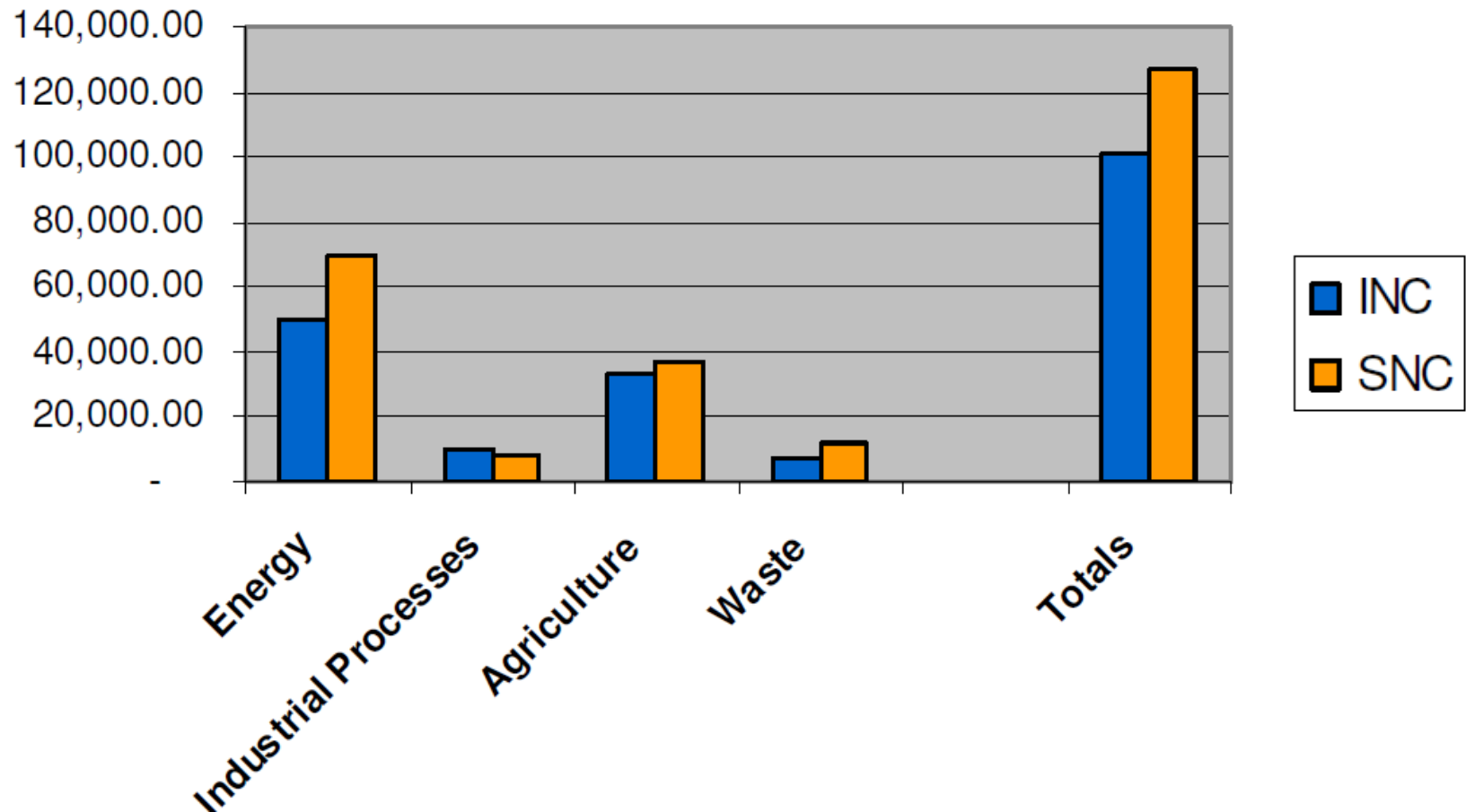
## Issue on LUCF Sector

**Comparing the figures for the INC and the SNC, there is a huge difference in the figures**

- Although both inventories used the 1996 IPCC Guidelines for the GHG Inventory, the sources of data are different for the following:**
  - Roundwood and fuelwood harvests**
  - Amount of charcoal produced**
  - Percent carbon content of the various land uses**

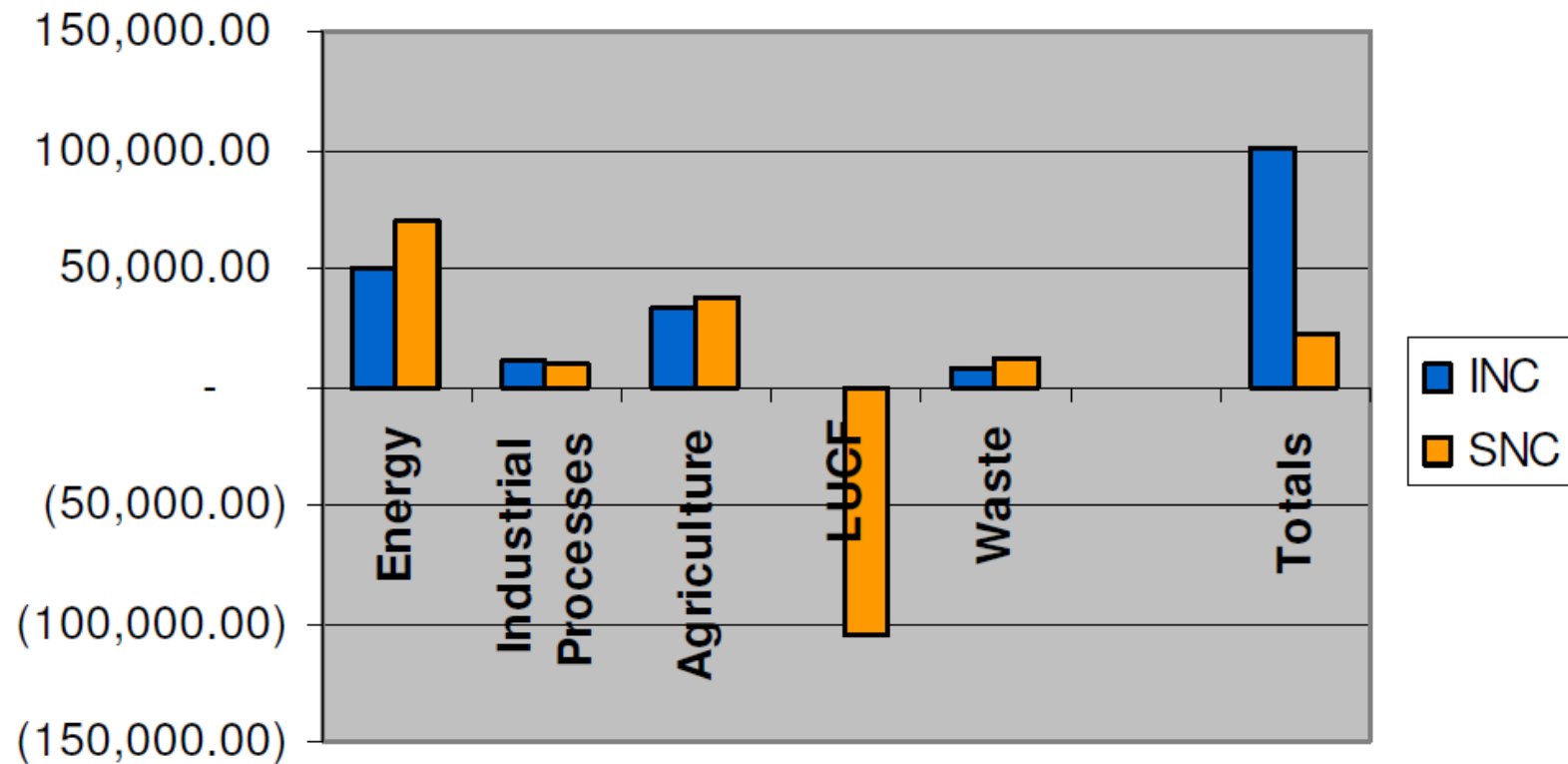
# The National GHG Inventory for the SNC

## Comparison between INC and SNC without LULUCF



# The National GHG Inventory for the SNC

## Comparison between INC and SNC with LULUCF



# Gaps, Needs, and Constraints

## Issues on Agriculture Sector

- 1. The agriculture sector, apart from rice cultivation, used the IPCC Tier 1 method to estimate GHG emissions for most of its sub-sectors**
  - Lack of more disaggregated activity data and country-specific emission factors makes it difficult to be able to move to a higher tier
  - For future inventory, attempt must be done to use higher tier for key categories which include:
    - CH<sub>4</sub> emission from enteric fermentation,
    - CH<sub>4</sub> and N<sub>2</sub>O emission from manure management,
    - CH<sub>4</sub> emission from cultivation
    - N<sub>2</sub>O emission from agricultural soils

# Gaps, Needs, and Constraints

- 2. Most available activity data are not so disaggregated to allow the use of higher tier**
  - For instance, in livestock, animal populations are only categorized according to type (e.g. cattle, buffalo, goat, swine, etc.)
  
- 3. Rice is well studied in the Philippines. Hence, more disaggregated activity data are available.**
  - Data on harvested area are available on regional and provincial bases that could be used for higher tier like the ALU software



# Gaps, Needs, and Constraints

4. **In estimating GHG emissions from burning of agricultural residues, activity data on how residues are managed are important**
  - However, data on residue management (e.g. rice straw) are inadequate**
  - The current estimate was based on some assumptions on regional or provincial practices**
5. **Estimate of GHG emissions from grassland burning was confronted with inadequate data on the area of grassland in the Philippines and the management practices applied**

# Gaps, Needs, and Constraints

- 6. Most of the emission factors used for the inventory apart from the country specific emission factors for rice cultivation, are IPCC default values**
  - Clearly there is a gap in having country-specific emission factors for livestock, residue burning and agricultural soils**
- 7. Uncertainty assessment has not been possible due to unavailability of the associated uncertainty values for activity data and emission factors**

## Recommendations for Agriculture Sector

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

- ❑ The DA and its different bureaus particularly the BAS should institutionalize GHG inventory in this sector
- ❑ Agricultural research institutions and universities can be consulted as to the availability of data and expert assumptions or expert judgment
- ❑ Future inventories can explore the use of Agriculture and LUCF Software (ALU Software), a tool for consistent representation of land for agriculture and LUCF sectors as well as to compile, archive, update and manage GHG inventories in agriculture and LUCF sector

## Recommendations for Agriculture Sector

- 2. For higher tier, enhanced characterization of livestock data is needed (e.g. for cattle, buffalo and goat: dairy and non-dairy, male and female, and age).**
- 3. For future inventories, these assumptions have to be supported with published data (based on survey) to improve transparency and estimates.**

## Recommendations for Agriculture Sector

- 4. Major agricultural research agencies and universities can be consulted to assist future inventory compilers in developing country-specific emission factors**
- 5. Future inventory compilers could attempt to undertake uncertainty analysis of GHG estimates by generating uncertainty values for activity data and emission factors in consultation with local experts**

## **Recommendation for LUCF Sector**

**There is a need to conduct a separate study for the recalculation of the LUCF INC figures using the same data as that of the 2000 Inventory**



**Thank you**