GHG inventory in LULUCF Sector of Myanmar

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Introduction

- Myanmar ratified UNFCCC on 25 November, 1994 as a non-Annex I Party.

- Article 12.5 of the UNFCCC requires non-Annex I Parties to prepare their initial national communications.

- Myanmar has yet to submit INC report to UNFCCC.

- In Myanmar, the preliminary GHG inventory and mitigation options assessment were undertaken during the ALGAS study in 1997.

- NCEA of Myanmar launched an INC-project since 2008 with the financial assistance from GEF/UNEP.

INC Project in Myanmar

- GHG Inventory and Mitigation Options Analysis

- Vulnerability and Adaptation Assessment

- Development and transfer of Environmentally Sound Technologies (ESTs)

- Research and Systematic Observation

- Education, Training and Public Awareness

- Compilation of National Communication

GHG Study Team

- **Energy: Fuel combustion, Fugitive emissions from fuels, CO_2 transport and storage**
- **Industrial Processes and Product Use: Mineral, chemical & metal industries, Non-energy products from fuels and solvent use, Electronics industry, Product uses as substitutes for O_3 depleting substances, Other product manufacture and use, Other**
- **Agriculture: Agriculture and Livestock, Aggregate sources and non-CO_2 emissions sources in land**
- **LUCF: CO_2 emissions/absorption by land, Identify the activities of emission sources in different land use categories**
- **Waste: Solid waste disposal, Biological treatment of solid waste, Incineration and open burning waste, Waste water treatment and discharge**

Inventoried GHGs

- Carbon Dioxide
- Methane
- Nitrous Oxide
- NOx
- Carbon Monoxide

Summary of emissions in Myanmar for the year 2000

Source/ Sink	CO_2 Emission	CO Emission	CH_4 Emission	N_2O Emission	NO_x Emission	CO_2 Equivalent Total Emission	CO_2 Removal	CO_2 Equivalent Total Net Emission
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
Energy (Traditional Biomass burned)	7,658.65 (27,833.09)	- -	5.62 (7.4553)	0.28 (0.9941)	- -	7,863.47 (28,297.82)	- -	7,863.47 (28,297.82)
Industrial Processes	248.59	-		-	-	463.29 *	-	463.29
Agriculture		0.81	963.58	8.2706	0.022	22,800.46		22,800.46
A. Agri.	-	0.81	507.23	8.2706	0.022	13,217.11	-	13,217.11
B.Livestock	-	-	456.35	-	-	9,583.35	-	9,583.35
Forestry	33,656.51	2,215.37	144.85	4.26	34.08	40,404.86	142,221.19	101,816.33
Waste	-	-	134.57	-	-	2,825.97	-	2,825.97
TOTAL	41,563.75	2,216.18	1,248.62	12.8106	34.102	74,358.05	142,221.19	- 67,863.14

Methodology for LUCF Sector

- **Annual change in carbon stocks in biomass for a land use category** was calculated by Gain-Loss Method (Equation 2.7 in IPCC guidelines, 2006):

$$\Delta C_B = \Delta C_G - \Delta C_L$$

ΔC_B = sum of aboveground biomass and belowground biomass

ΔC_G = biomass growth for each land sub category

ΔC_L = biomass loss for each land sub category

Methodology (Contd.)

- **Annual increase in biomass carbon stocks** due to biomass increment was calculated as follow: (Equation 2.9 in IPCC guidelines, 2006)

$$\Delta C_G = \sum (A_{i,j} \cdot G_{TOTALi,j} \cdot CF_{i,j})$$

A = area of land remaining in the same land use category

G_{TOTAL} = mean annual biomass growth

CF = carbon fraction of dry matter

Methodology (Contd.)

- **Annual decrease in biomass carbon stocks** due to biomass losses was calculated as follows: (Equation 2.11 in IPCC guidelines, 2006)

$$\Delta C_L = L_{\text{wood removals}} + L_{\text{fuelwood}} + L_{\text{disturbance}}$$

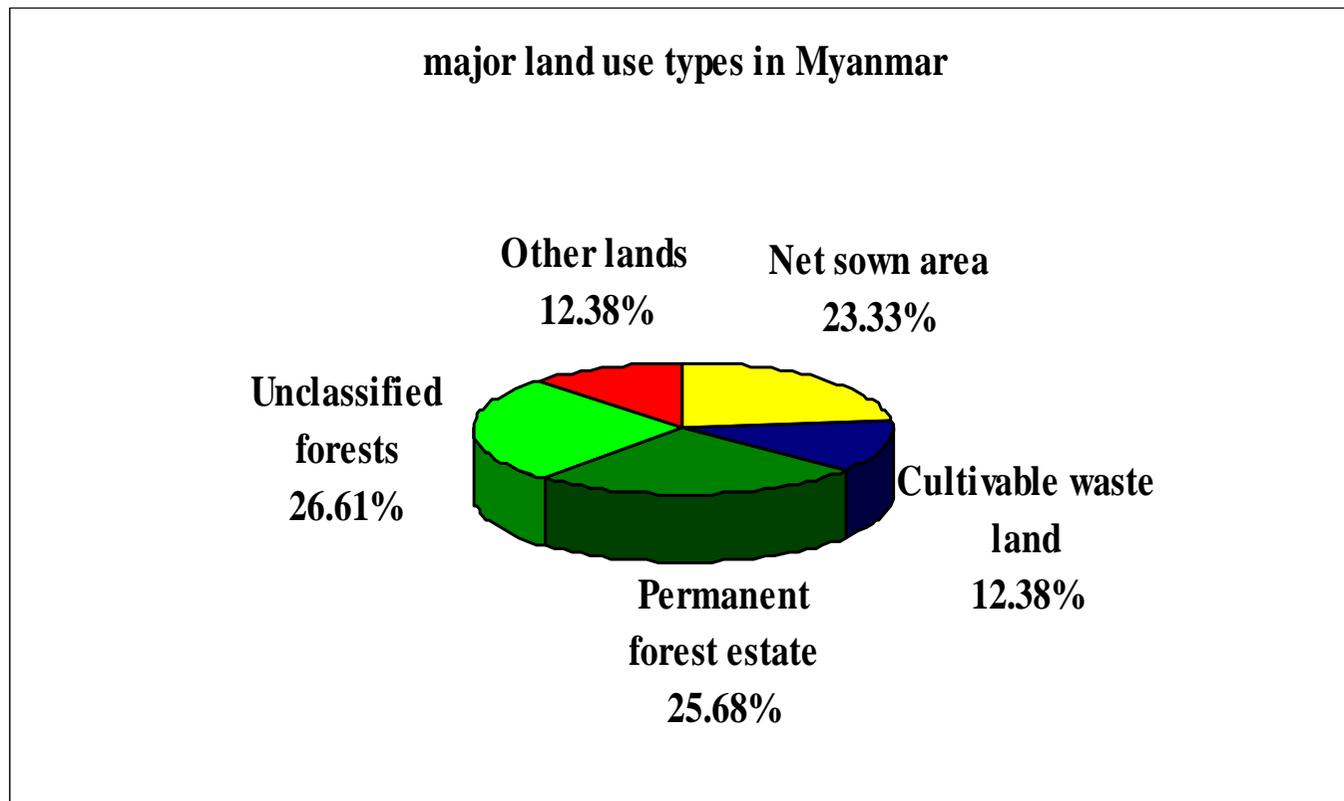$L_{\text{wood removals}}$ = annual carbon loss due to wood removals

L_{fuelwood} = annual carbon loss due to fuelwood removals

$L_{\text{disturbance}}$ = annual carbon losses due to disturbances

Identification of Sinks

- Natural forests
- Forest Plantations
- Home Garden Trees
- Road side Trees

Major land use types in Myanmar

major land use types in Myanmar

Other lands 12.38%

Net sown area 23.33%

Unclassified forests 26.61%

Cultivable waste land 12.38%

Permanent forest estate 25.68%

Natural forest Resources of Myanmar for the year 2000

Forest type (Myanmar)	Forest Type (IPCC)	Area (ha)	Percent of total forest area
Tropical ever green forest	Tropical rain forest	5528640	16
Mixed deciduous forest	Tropical moist deciduous forest	13476060	39
Dry forest	Tropical dry forest	3455400	10
Dipterocarps forest	Tropical dry forest	1727700	5
Hill and temperate evergreen forest	Subtropical mountain system	8984040	26
Beach and dune forest	Tropical rain forest	1382160	4
TOTAL		34554000	100

Carbon sinks in 2000

142,221.19 Gg CO_2
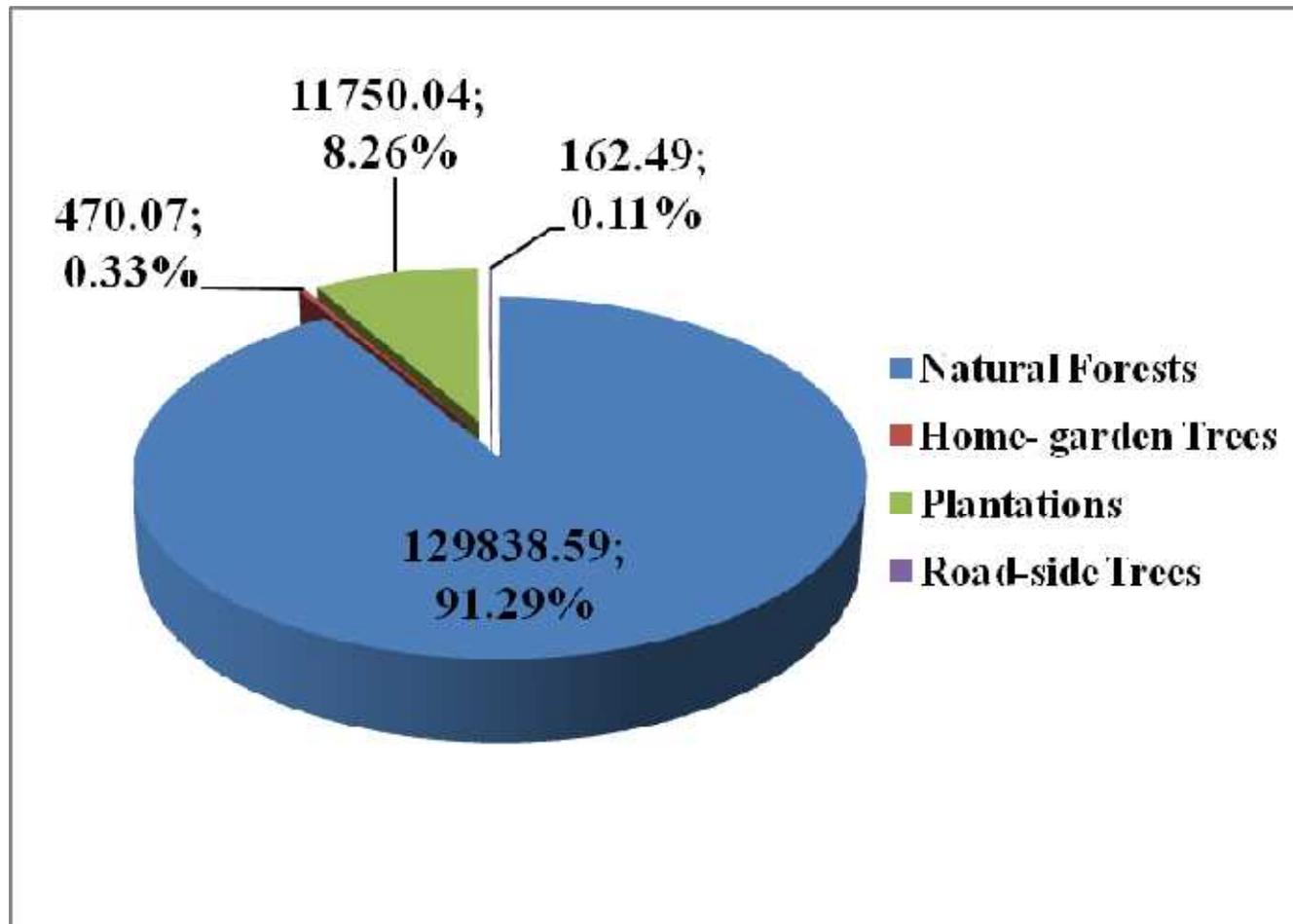
Identification of GHG Sources

- Wood Removal
- Fuelwood removal
- Harvested wood products
- Biomass burning
 - Site preparation for forest plantations
  - Shifting cultivation
  - Deforestation

Loss of carbon and GHG emissions by activities

Activity	Loss of carbon	GHG emission
Wood removal	2 176 888 tC	Not accounted
Fuelwood removal	26 936 418 tC	Accounted (Energy sector)
Harvested wood products	Not estimated	Not accounted
Site preparation for forest plantations	-	1 863 207 tCO_2e
Shifting cultivation	-	1 200 674 tCO_2e
Deforestation	-	37 340 974 tCO_2e

GHG Emissions in 2000

40,404.86 Gg CO$_2$ e
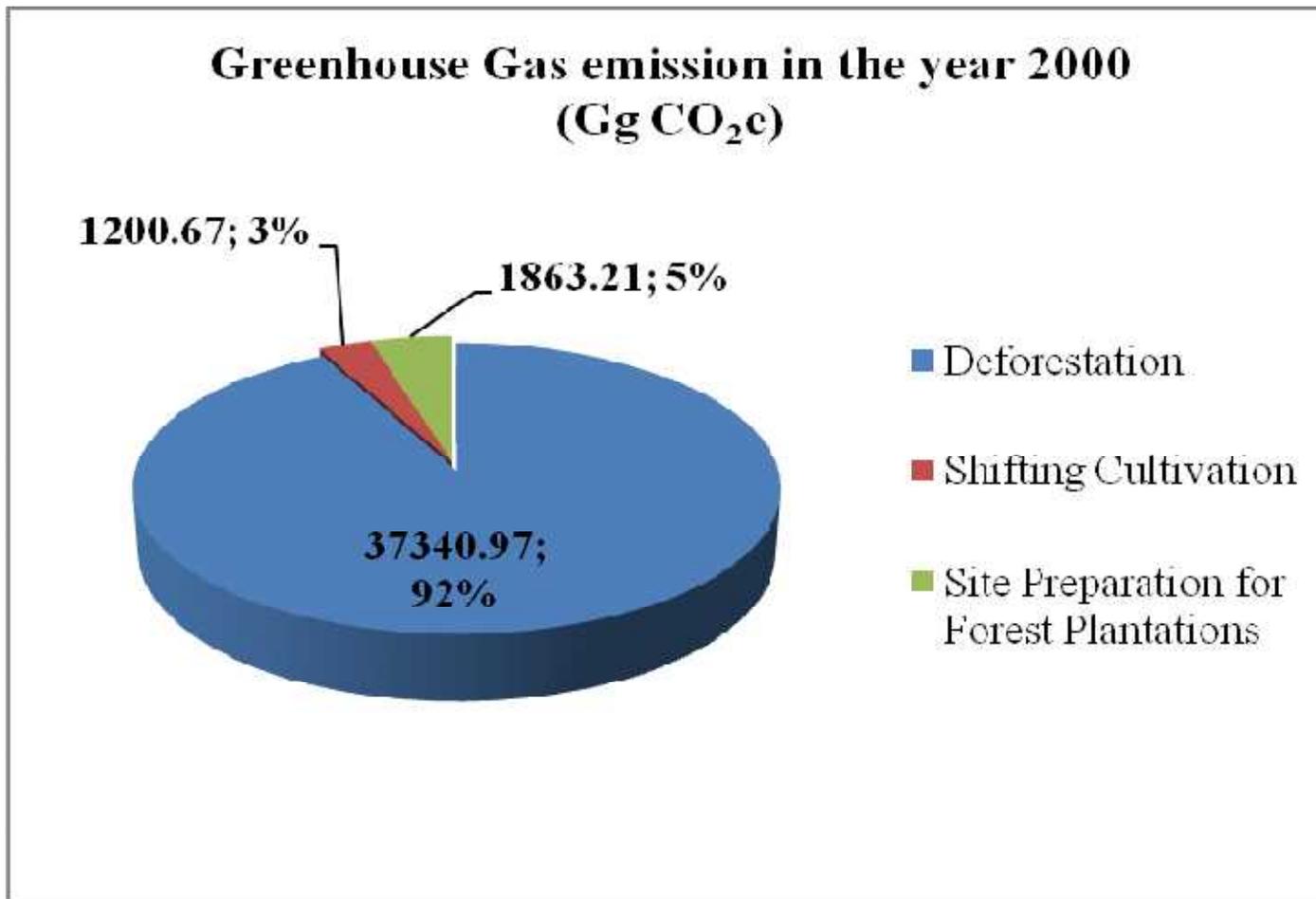
# Net emission/removal in LUCF sector of Myanmar for the year 2000

Activity	CO_2 emissions (Gg)	CO_2 removals (Gg)	Net CO_2 emissions/ removals (Gg)
Natural forests	-	129 838.59	(-) 129 838.59
Forest plantations	1 863.207	11 750.04	(-) 9 886.833
Home garden trees	-	470.07	(-) 470.07
Roadside trees	-	162.49	(-) 162.49
Wood removal	-	-	-
Fuelwood removal	(Energy sector)	-	-
HWP	-	-	-
Shifting cultivation	1 200.674	-	(+) 1 200.674
Deforestation	37 340.974	-	(+) 37 340.974
TOTAL	**40 404.855**	**142 221.19**	**(-) 101 816.38**

Trend of GHG emissions/removal in Myanmar

- Net GHG removal in LUCF sector shows it is still a major carbon sink until 2030.
- CO_2 removal by LUCF sector can compensate the total emission by different sectors.
- However the projection of net GHG removal in 2030 pointed out the constant decline because of decrease in natural forest area.
- Net CO_2 removal in 2000 was estimated to be 101816.38 Gg which would reduce to 78589.07 Gg in 2020 and 67085.05 Gg in 2030.
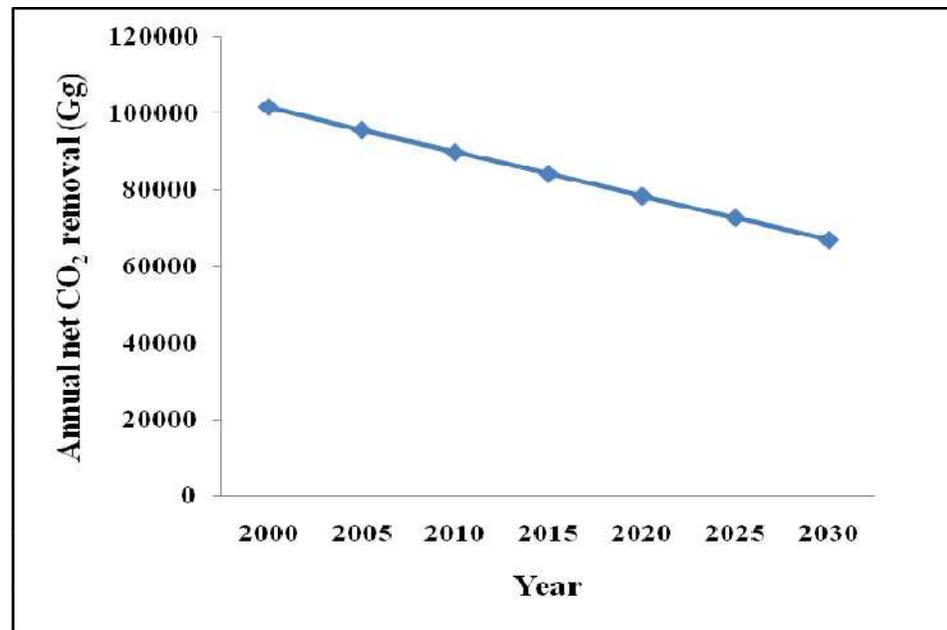
Trend of forests and other wooded lands in Myanmar
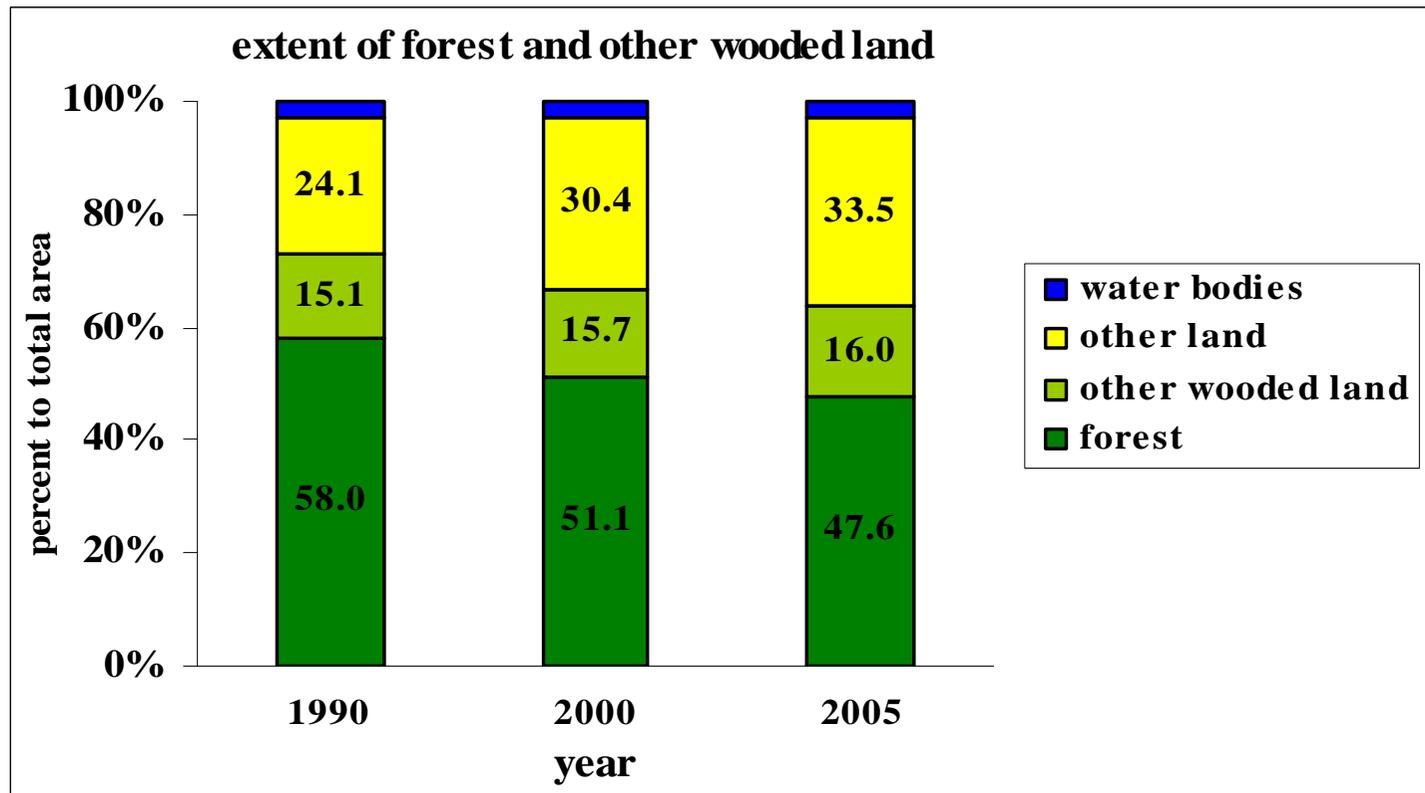
Data Gaps and constraints

- Country specific data (emission factors, biomass growth, soil emission/absorption)
- Lack of data for soil erosion
- Land use change national data
- Use of RS/GIS limitations
- Institutional set up (CC- focal institution to be established)
- Trainings/Capacity building
- Expertise / human resources
- Research needs

Thank You Very Much for Your Kind Attention!!