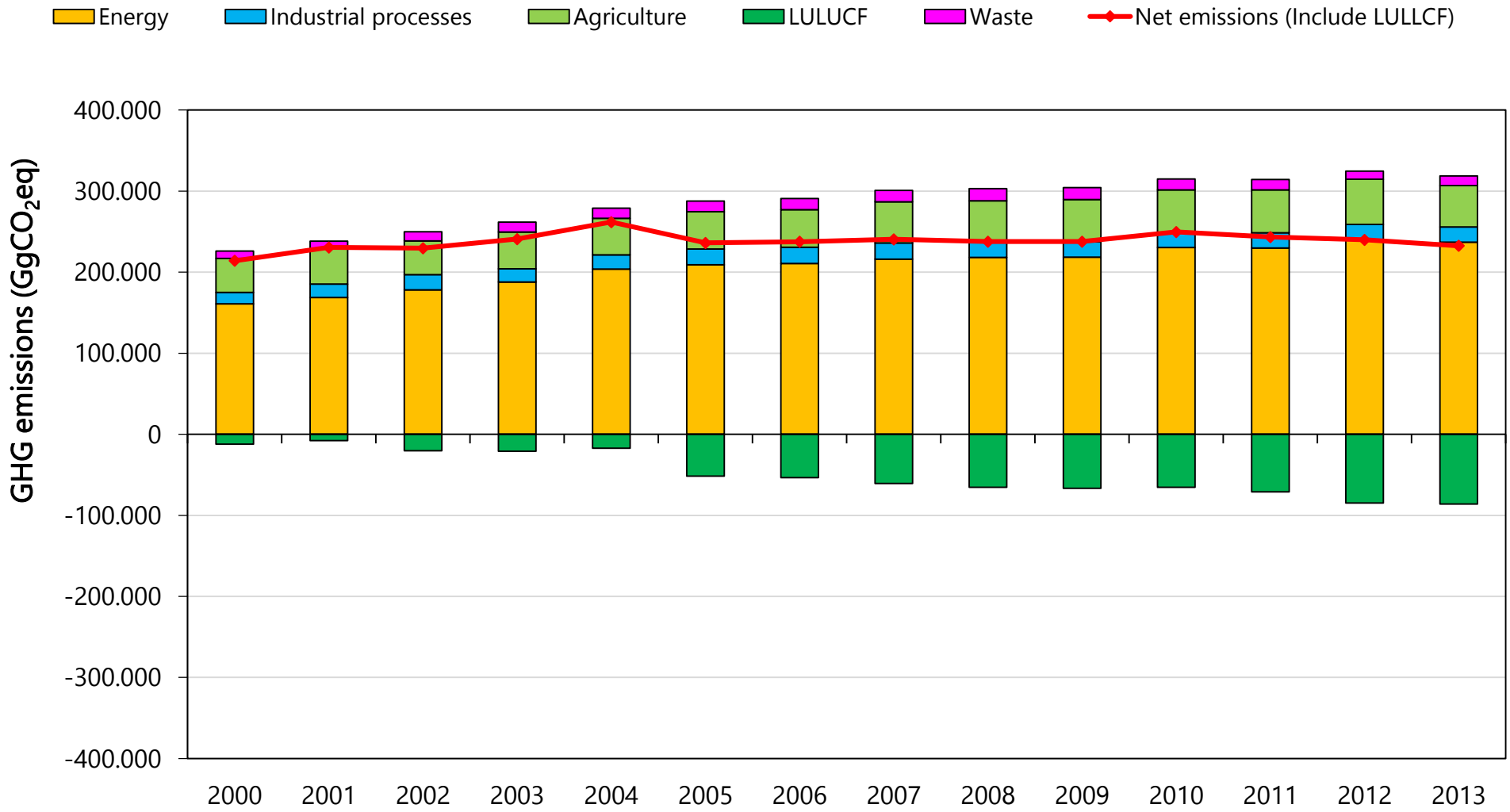


Thailand experience on MRV for the AFOLU sector

- Ms.Ratana Lukanawarakul
Department of National Parks, Wildlife and Plant Conservation
- THAILAND
- Workshop of the ASEAN-Pacific Regional Group “Tracking progress on NDCs and Reporting under the Enhanced Transparency Framework”



Current figures/emissions, time series and





National GHG emissions/removals by sector 2000-2013

Year	Source Category		Net emissions	Remarks
	Agriculture	LULUCF		
2000	41,906	-11,995	214,091	In 5 sector, emission increase from 2000 to 2013 = 18,469 GgCO ₂ eq. (8.63%) from 2000
2001	43,208	-7,718	230,585	
2002	41,845	-20,183	229,615	
2003	45,350	-20,987	240,899	
2004	44,931	-17,254	261,879	Exclude LULUCF, emission increase from 2000 to 2013 = 92,576 GgCO ₂ eq (40.95%)
2005	46,294	-51,551	236,177	
2006	46,398	-53,467	237,517	
2007	50,979	-60,521	240,535	Main sector of emission = Energy, increase from 2000 to 2013= 47.16%
2008	50,997	-65,341	237,686	
2009	52,238	-66,690	237,769	
2010	52,316	-65,262	249,658	Agriculture is the second sector in emission.
2011	52,927	-70,938	243,334	
2012	55,682	-84,839	239,941	
2013	50,919	-86,102	232,560	

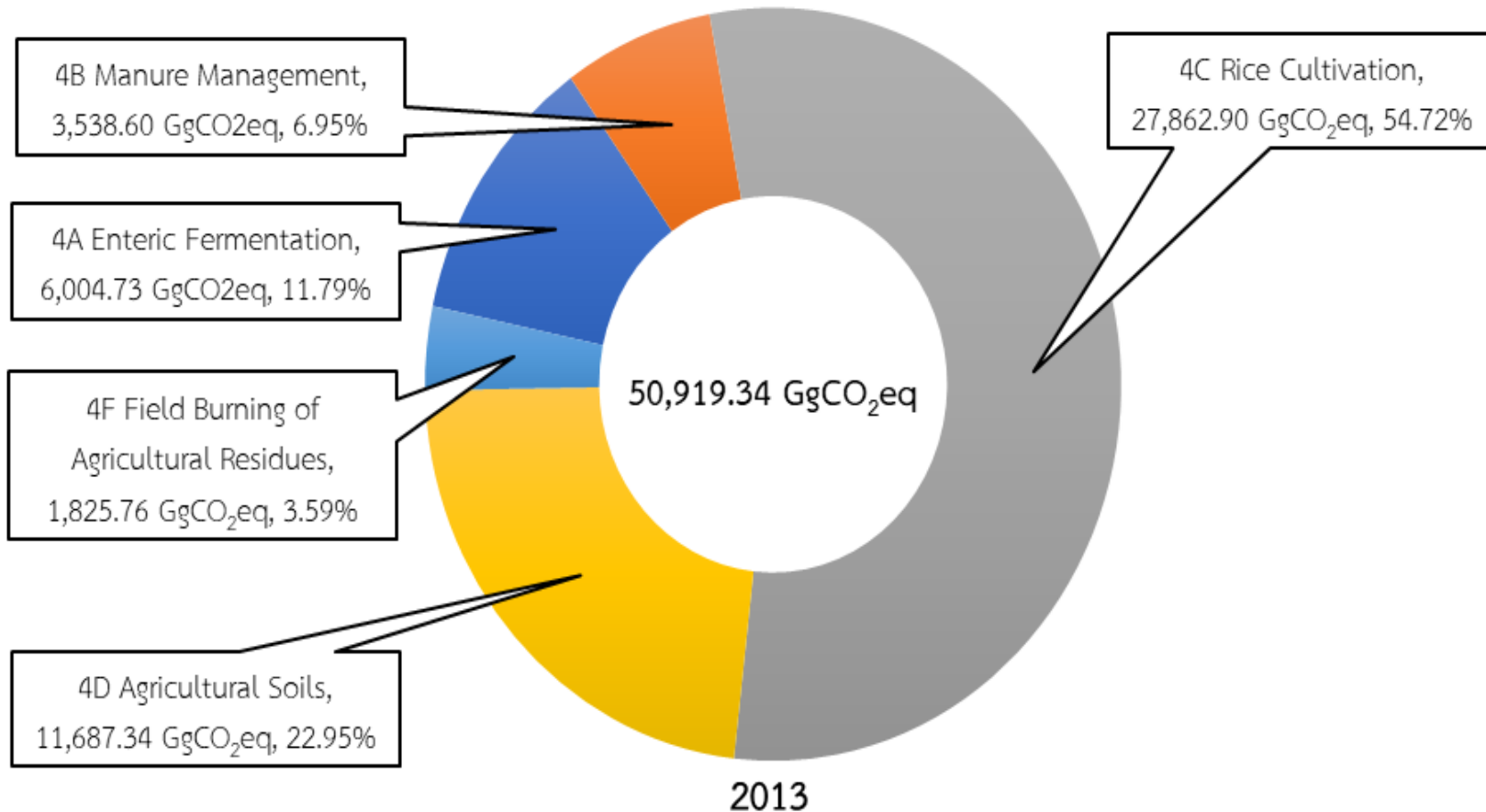


National GHG emissions/removals in Agriculture and LULUCF

GHG sources and sink	CO2 -E	CO2 -R	CH4	N2O	NOx	CO
Agriculture			1,730	47	56	1,345
1) Enteric Fermentation			286			
2) Manure Management			53	8		
3) Rice Cultivation			1,327			
4) Agricultural Soils			N/A	38		
5) Prescribed Burning of savannas			No	No	No	No
6) Field burning of Crop residues			64	2	56	1,345
LULUCF	44,147	-130,654	18	1	4	153
1) Change in forest and other woody biomass stocks	30,817	-114,202				
2) Forest and Grassland concersion	13,330		18	0.12	4	153
3) Abandonment of managed lands		-16,452				

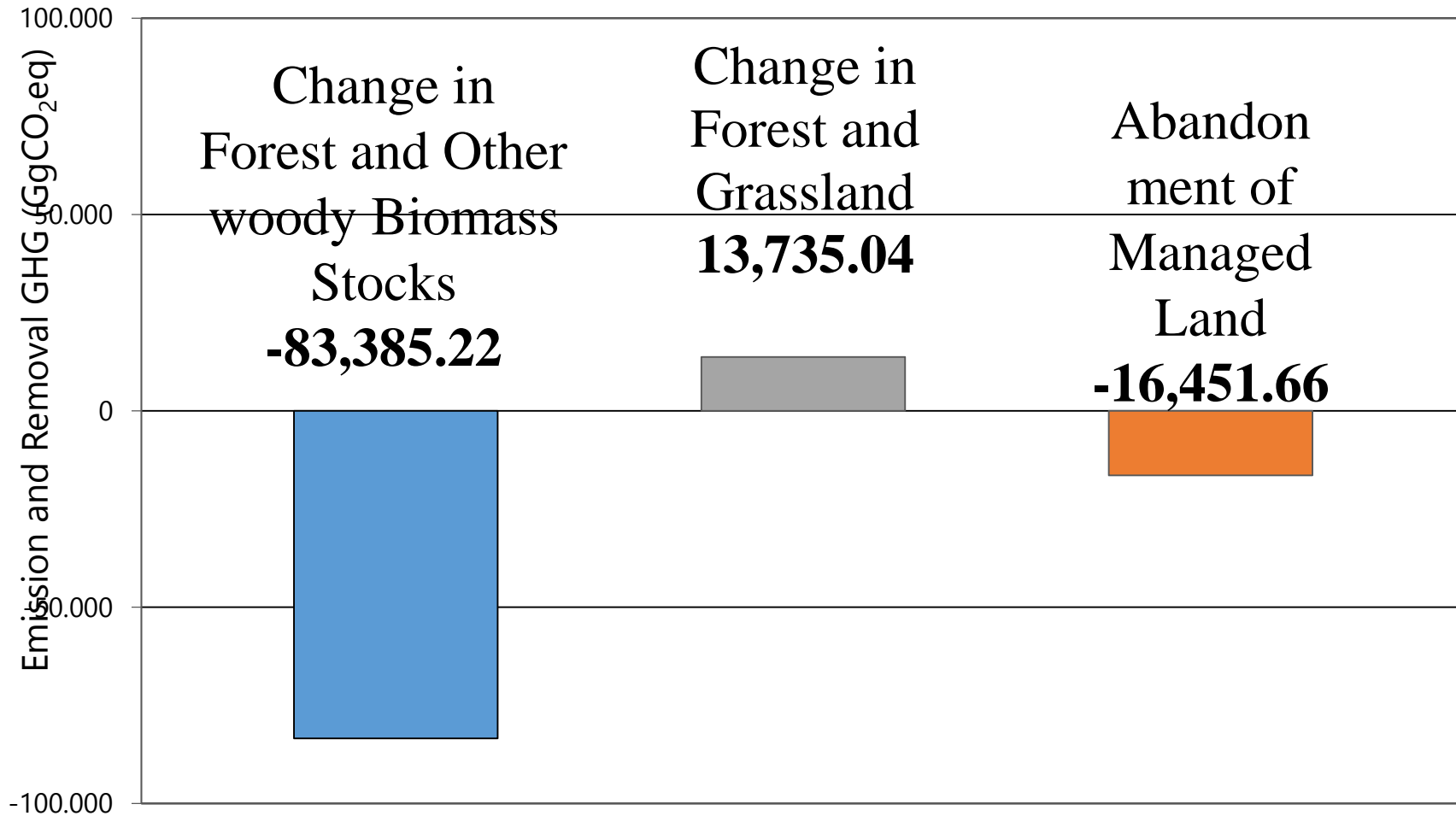


Agriculture Sector





LULUCF sector



Source : 2nd



GHG Emissions and Removals in LULUCF sector, 2013

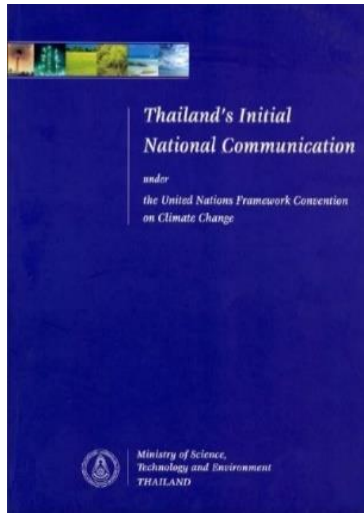
Greenhouse gas source and sink categories	CO ₂ emissions	CO ₂ removals	Net	CH ₄		N ₂ O		NO _x	CO	NMVOCs	SO ₂	Total
				Gg	GgCO ₂ e	Gg	GgCO ₂ eq					
Unit	GgCO ₂ eq	GgCO ₂ eq	GgCO ₂ eq	Gg	GgCO ₂ e	Gg	GgCO ₂ eq	Gg	Gg	Gg	Gg	GgCO ₂ e
Total national emissions and removals	44,147.17	-130,653.91	-86,506.74	17.51	367.61	0.12	37.29	4.35	153.17	NO	NO	-86,101.84
5. Land Use, Land-Use Change and Forestry												
5A Change in Forest and Other woody Biomass Stocks	30,817.03	-114,202.25	-83,385.22	NO	NO	NO	NO	NO	NO	NO	NO	-83,385.22
5B Change in Forest and Grassland	13,330.14		13,330.14	17.51	367.61	0.12	37.29	4.35	153.17	NO	NO	13,735.04
5C Abandonment of Managed Land	NO	-16,451.66	-16,451.66	NO	NO	NO	NO	NO	NO	NO	NO	-16,451.66
5D Change in Soil Carbon	NE	NE	NE	NO	NO	NO	NO	NO	NO	NO	NO	NE

Source : Thailand's Second Update Report
: NE = Not estimate

In 3rd BUR (2020) will use mix between IPCC 1996 and 2006



Thailand GHG report to UNFCCC



**1st NC
(2000)**



**2nd NC
(2011)**



**1st BUR
(2015)**



**2nd BUR
(2017)**

download from <http://climate.onep.go.th>



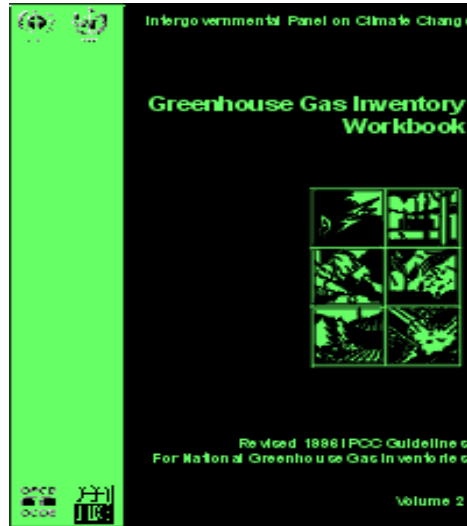
Trend for Thailand's Emission

- Estimate Emission in year 2030 will be 555 MtCO₂eq.
- Within 2030, Expect to reduce 20 – 25 %

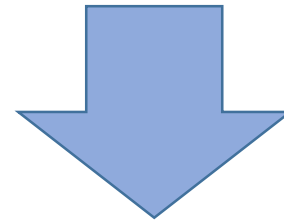
(111 – 139 MtCO₂eq) from the emission in year 2000

(not include LULUCF)

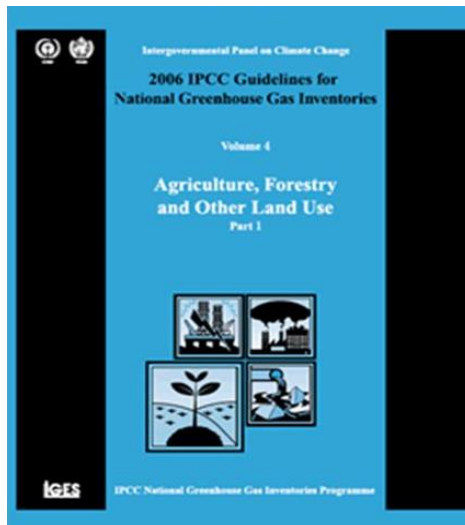
Trend to change from LULUCF GHG inventory to AFOLU GHG inventory



IPCC 1996 (LULUCF)



3rd NC
and
3rd
BUR



IPCC 2006 (AFOLU)



Institutional arrangements on AFOLU sector

National Committee on Climate Change Policy (Chair : Prime Minister)

Sub-Com. on Climate Change Policy and planning Integration

National GHG management plan Working group

Sub-committee on Climate Change Knowledge and Data Base

National GHG Inventory WG

Energy Working Group

Industrial Process Working Group

Waste Working Group

Agriculture Working Group

Sub-committee on Climate Change Negotiation and international coordinating

Sub-committee on Action for Climate Empowerment and Public Relations.

AFOLU /LULUCF Working Group

- Department of National Parks, Wildlife and Plant Conservation,
- Royal Forest Department,
- Department of Marine and Coastal Resources,
- Forest Industry Organization,
- Department of Land Development,
- Office of agricultural economics.

Office of Natural Resources and Environmental Policy and Plan (ONEP) is a National GHG inventory

Institution/organization	Main agency	Support agency
Ministry of Natural Resources and Environment		
Royal Forest Department	/	
Department of National Parks, Wildlife and Plant Conservation	/	
Department of Marine and Coastal Resources	/	
Forest Industry Organization	/	
Provincial office of Natural resources and environment		/
Ministry of Agriculture and Cooperation		
Department of Land Development	/	
Department of Agriculture Promotion	/	
Thailand Rubber Authority		/
Office of Agricultural Economics		/
Ministry of Science and Technology		
GISTDA		/



Data collection and Measurement

3 B1 a Forest remaining forest)

Activity Data	Main Agency	Support Agency
1. Forest Plantation area -collect in each species	-Forest Industrial Organization	-Department of Marines and Coastal Resources.
2. Number/Volume of logging in Forest Plantation in each species	-Royal Forest Department	-Natural Resources and Environment Provincial Office. -Geo-Informatics and Space Technology



Data collection and Measurement

3 B1 a Forest remaining forest

Activity Data	Main Agency	Support Agency
3. Forest Degradation area -Natural Recovery -Forest Restoration	-Department of National Parks, Wildlife and Plant Conservation	-Geo-Informatics and Space Technology Development Agency (Public organization)
4. Forest Fire area in each type of	, -Royal Forest	(CISTDA)



Data collection and

3 BMR Measurement remaining crop land

Activity Data	Main Agency	Support Agency
1. Perennial Crop Land -record in each species such as Rubber Oil Palm and Fruit Tree	-Thailand Rubber Authority -Forest Industrial Organization	-Department of Agriculture Promotion -Geo-Informatics and Space Technology
2. Logging of the perennial Crop in	-Office of Agriculture	Development



Data collection and

3 B6a Land converted to crop land 3 B6b Land

Activity Data	Main Agency	Support Agency
<ul style="list-style-type: none"> - Forest Area Change to Crop land and others - Forest type area change to Cropland and others 	<ul style="list-style-type: none"> -Department of National Parks, Wildlife and Plant Conservation, -Royal Forest Department -Department of 	<ul style="list-style-type: none"> -Geo-Informatics and Space Technology Development Agency (Public organization) (GISTDA)



Thailand Greenhouse Emissions

Inventory System (TGEIS)

- **Thailand Greenhouse Emissions Inventory System (TGEIS) (Support by Government of Australia)**
- **Develop for IPCC 2006**
- **Consist of**
 - **Data base management**
 - **GHH emission calculation**
 - **Quality control**
 - **Verification**
 - **Support to preparing the GHG report**
 - **Collect in Data Base system**
 - **Easy to access**



3B1a-1 Forest Plantation

Form LUUCF3 - Form for coordinating agency

Section	Forest and Land use.
Main gas emissions/removals	CO ₂
BE	2554
Coordinating agency	Department of National Parks, Wildlife and Plant Conservation
Data agency owner	The Forest Industry Organization
Subdivision/Activity	3B1a Forest land remaining Forest land/ Increasing biomass and loss of biomass from Forest Plantation.
Form 3B1a-1	For recording Forest Plantation area and logging from Forest Plantation.

Province	Species	Forest Plantation Area		logging		collector	Remark
		(rai)	(ha)	(m ³)	(Ton dry weight)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Kanchanaburi	Teak	7304	11.69	1,656.43		The Forest Industry Organization	
Kanchanaburi	Teak	531.00	84.96	1,063.96		The Forest Industry Organization	
Kanchanaburi	Teak	316.17	50.59	867.18		The Forest Industry Organization	
Phitsanulok	Teak	800.00	128.00	-		The Forest Industry Organization	
Phitsanulok	Teak	500.00	80.00	-		The Forest Industry Organization	
Sa Kaeo	Eucalyptus	25.00	4.00	558.00		The Forest Industry Organization	
Sa Kaeo	Eucalyptus	210.49	33.68	-		The Forest Industry Organization	
Sa Kaeo	Eucalyptus	94.65	15.14	-		The Forest Industry Organization	
Total		2,550.35	408.06	4,145.56			



3B1a-2

FormLUU03 - Form for coordinating agency

Section	Forest and Land use.
Main gas emissions/removals	CO ₂
BE	2554
Coordinating agency	Department of National Parks, Wildlife and Plant Conservation
Data agency owner	Department of National Parks, Wildlife and Plant Conservation
Subdivision/Activity	3B1a Forest land remaining Forest land/ Enhancement of biomass from Forest land/ Forest Degradation activity.

Form3B1a2 For recording Disturbed Forest Area/ Forest Degradation

Province	Legal Forest Type	Forest Type	Disturbed Forest Area		Restoration Type	collector	Remark
			(rai)	(ha)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chiang Rai	Conservation Forest		644.44	103.11	Reforestation	Protected Area Rehabilitation and Development Office	
Chiang Rai	Conservation Forest		303.51	48.56	Reforestation	Protected Area Rehabilitation and Development Office	
Chiang Rai	Conservation Forest		177.29	28.37	Reforestation	Protected Area Rehabilitation and Development Office	
Chiang Rai	Conservation Forest		97.66	15.63	Reforestation	Protected Area Rehabilitation and Development Office	
Chiang Rai	Conservation Forest		155.03	24.81	Reforestation	Protected Area Rehabilitation and Development Office	
Chiang Rai	Conservation Forest		104.45	16.71	Reforestation	Protected Area Rehabilitation and Development Office	
Chiang Rai	Conservation Forest		315.68	50.51	Reforestation	Protected Area Rehabilitation and Development Office	
Chiang Rai	Conservation Forest		209.68	33.55	Reforestation	Protected Area Rehabilitation and Development Office	
Ubon Ratchathani	Conservation Forest		78.74	12.60	Reforestation	Protected Area Rehabilitation and Development Office	
Ubon Ratchathani	Conservation Forest		95.70	15.31	Reforestation	Protected Area Rehabilitation and Development Office	
Total			2,007.74	321.24			



3B1a-3

Form LULUCF3 - Form for coordinating agency

Section	Forest and Land use.
Main gas emissions/removals	CO ₂
BE	2554
Coordinating agency	Department of National Parks, Wildlife and Plant Conservation
Data agency owner	Department of National Parks, Wildlife and Plant Conservation
Subdivisor/Activity	3B1a Forest land remaining Forest land/ Loss of biomass from Forest Fire activity.

Form 3B1a-3 For recording Forest Fire Area

Province	Legal Forest Type	Forest Type	Forest Fire Area		severity	collector	Remark
			(rai)	(ha)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chiang Mai	Conservation Forest		2,795.91	447.35	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Mae Hong Son	Conservation Forest		820.00	131.20	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Lampang	Conservation Forest		669.00	107.04	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Lamphun	Conservation Forest		943.00	150.88	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Chiang Rai	Conservation Forest		84.50	13.52	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Phayao	Conservation Forest		165.00	26.40	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Phrae	Conservation Forest		227.00	36.32	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Nan	Conservation Forest		8.00	1.28	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Phitsanulok	Conservation Forest		479.00	76.64	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Kemphaeng Phet	Conservation Forest		317.00	50.72	1	Forest Protection and Fire Control Office Director	Burn the farm, Collecting NIFFs, Hunting
Total			6,508.41	1,041.35			



3B2a-1

Form LUUCF3 - Form for coordinating agency

Section	Forest and Land use.
Main gas emissions/removals	CO ₂
BE	2554
Coordinating agency	Department of National Parks, Wildlife and Plant Conservation
Data agency owner	Rubber Authority of Thailand
Subdivision/Activity	3B2a Crop land remaining Crop land/ Enhancement of biomass from forest area activity and Loss of biomass from logging of Perennial crops

Form 3B2a-1 For recording Crop land and logging of Perennial crops

Province	Species	Agriculture land		logging		collector	Remark
		(rai)	(ha)	(m ³)	(Ton dry weight)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chiang Mai	Rubber	19,432.00	3,109.12			Office of the Rubber Replanting Aid Fund	
Phrae	Rubber	10,078.00	1,612.48			Office of the Rubber Replanting Aid Fund	
Pitsanulok	Rubber	18,509.00	2,961.44			Office of the Rubber Replanting Aid Fund	
Nong Bua Lamphu	Rubber	25,692.00	4,110.72			Office of the Rubber Replanting Aid Fund	
Kron Kien	Rubber	11,766.00	1,882.56			Office of the Rubber Replanting Aid Fund	
Udon Thani	Rubber	40,998.00	6,559.68			Office of the Rubber Replanting Aid Fund	
Loei	Rubber	318.45	50.95			Office of the Rubber Replanting Aid Fund	
Kalasin	Rubber	20,609.00	3,297.44			Office of the Rubber Replanting Aid Fund	
Total		147,402.45	23,584.39				



3B2b_3B6b-1

Form LUUCF3 - Form for coordinating agency

Section	Forest and Land use.
Main gas emissions/removals	CO ₂
BE	2554
Coordinating agency	Department of National Parks, Wildlife and Plant Conservation
Data agency owner	Royal Forest Department
Subdivision/Activity	3B2b Land convert to Crop land , 3B6b Land convert to other land/ Loss of biomass from Forest land activity convert to Crop land and other land.

Form 3B2b_3B6b-1 For recording Forest land convert to Crop land and other land.

Province	Forest area before invasion		Land used after invasion	Crops cultivated after invasion (if any)	Area		collector	Remark
	legally	Forest Type			(ra)	(ha)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	16.29	261	Forest Land Management Bureau	
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	5,269.90	843.18	Forest Land Management Bureau	
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	13.55	217	Forest Land Management Bureau	
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	5,131.79	821.09	Forest Land Management Bureau	
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	0.73	0.12	Forest Land Management Bureau	
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	5,131.79	821.09	Forest Land Management Bureau	
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	14.72	236	Forest Land Management Bureau	
Krabi	National Reserve Forest	Tropical Evergreen Forest	Agriculture land	Tree	7.16	1.14	Forest Land Management Bureau	
Total					15,585.93	2,493.75		



Measurable, Reporting and Verification (MRV)

Measurable (M)	<ul style="list-style-type: none">- Collect the quality and Quantity data in the designed and standard Form in the proper time
Reporting (R)	<ul style="list-style-type: none">- Submitting the data for process for approval from the GHG committee, Data Base Climate Change Committee and National Climate Change Committee- And Ministerial Approve
Verification (V)	<ul style="list-style-type: none">- QC and QA control and evaluate by the qualification Institutional and using the international standard.

Measurable Reporting and Verification (M



National level	National Committee on Climate Change Policy	Approval
Sub-committee	Sub-Committee on Climate Change Knowledge and Data base	Verification
Working Groups and QC	Energy s WG Industrial Process WG Agriculture WG LULUCF WG Waste WG	QC and Report
Estimate GHG emissions	Office of Natural Resources and Environment (National Focal Point) and Each Sector Focal Point	Measurement
Data owner from ministries will check and verify the input data(QC)	Related GHG Agency and report to sector focal Point	Measure/ Report following guideline
Data from local government and private sector (GIS/MIS/Statistic/etc) report to Central gov.		Collect data



Strengths and Gaps in data collection and management

Strengths

- Thailand Greenhouse Emissions Inventory System (TGEIS) design for support IPCC 2006 (AFOLU) and ONEP will be the National Focal Point to estimate the GHG.
- Thai Satellite Images (THAI CHOTE) by Geo-Informatics and Space Technology Development Agency (Public organization) (GISTDA) can provide real time data.
- Department of Land Development has long time experience for develop land use map



Strengths and Gaps

Constraints and Gaps

- Lack of one standard land use map for the country.
- Each institutional develop their own land use map and collect data for their own purpose with different scale, methodology, land classification, form and use different resolution and others.
- Good quality and quantity use more budget, time and staffs.
- The historic data was collected for other



Needs

- Improvement in national statistics and reporting of activity data by relevant agencies can improve the inventory quality.
- The preparation of future GHG inventories needs a series of well-planned improvements.
- Financial and Capacity Building should support at all level.
- National long term land use system.
- Need time and CB. to change form LULUCF GHG reporting to AFOLU GHG reporting.

THANK YOU