

UNFCCC reporting requirements

UN-REDD
PROGRAMME

The United Nations Collaborative Programme
on Reducing Emissions from Deforestation
and Forest Degradation in Developing Countries



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Reporting Requirements

The ultimate objective of the UNFCCC is to achieve "... stabilization of GHGs concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

To report GHGs data under the UNFCCC a country will have to compile:

- Common reporting format (CRF): a series of standardized data tables containing mainly numerical information and submitted electronically
- National Inventory Report (NIR): a comprehensive description of the methodologies used in compiling the inventory, the data sources, the institutional structures and quality assurance and control procedures
- Countries have to report only on human induced emissions and removals (managed land as proxy to identify human interventions)
- The last update on the reporting requirements was done in Nairobi COP12 (http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/2759.php)



UNFCCC reporting principles

- **Transparency** means that the assumptions and methodologies used for a GHGs inventory should be clearly explained to facilitate replication and assessment of the inventory by users of the reported information.
- **Accuracy** is the degree of closeness of a measured or calculated quantity to its actual (true) value
 - practicability
 - for some pools demonstration may be enough if that pool is not a source
- **Consistency** means that an inventory should be internally consistent in all its elements with inventories of other years. An inventory is consistent if the same methodologies are used for the base and all subsequent years and if consistent data sets are used to estimate emissions or removals from sources or sinks
- **Completeness** means that an inventory covers all sources and sinks, as well as all gases, in existing relevant source/sink categories.
- **Comparability** means that estimates of emissions and removals reported by Parties in the GHGs inventories should be comparable among them

In order to respond to all the UNFCCC reporting principles, IPCC has provided several guidelines on how to prepare and compile a GHGs Inventory (<http://www.ipcc-nggip.iges.or.jp/public/index.html>)

The methodological context:

The *IPCC* basic equation to estimate GHGs emission from land use related activities is:



$$Emissions = AD \cdot EF$$

AD = Activity Data
EF = Emission Factors



A monitoring system under UNFCCC will have to provide data on forest area and forest area changes and also on carbon stock and carbon stock changes

Forest definitions

- Under UNFCCC no forest definition, but recommendation to be consistent with data reported to FAO
- Under Kyoto Protocol a framework forest definition
- Under REDD ????

IPCC Land use definition system

LAND USE CATEGORY

1 Forest land: this category includes all land with woody vegetation consistent with thresholds used to define forest land in the national GHG inventory, sub-divided into managed and unmanaged, and also by ecosystem type as specified in the *IPCC Guidelines*. It also includes systems with vegetation that currently fall below, but are expected to exceed, the threshold of the forest land category.

2 Cropland

3 Grassland

4 Wetlands

5 Settlements

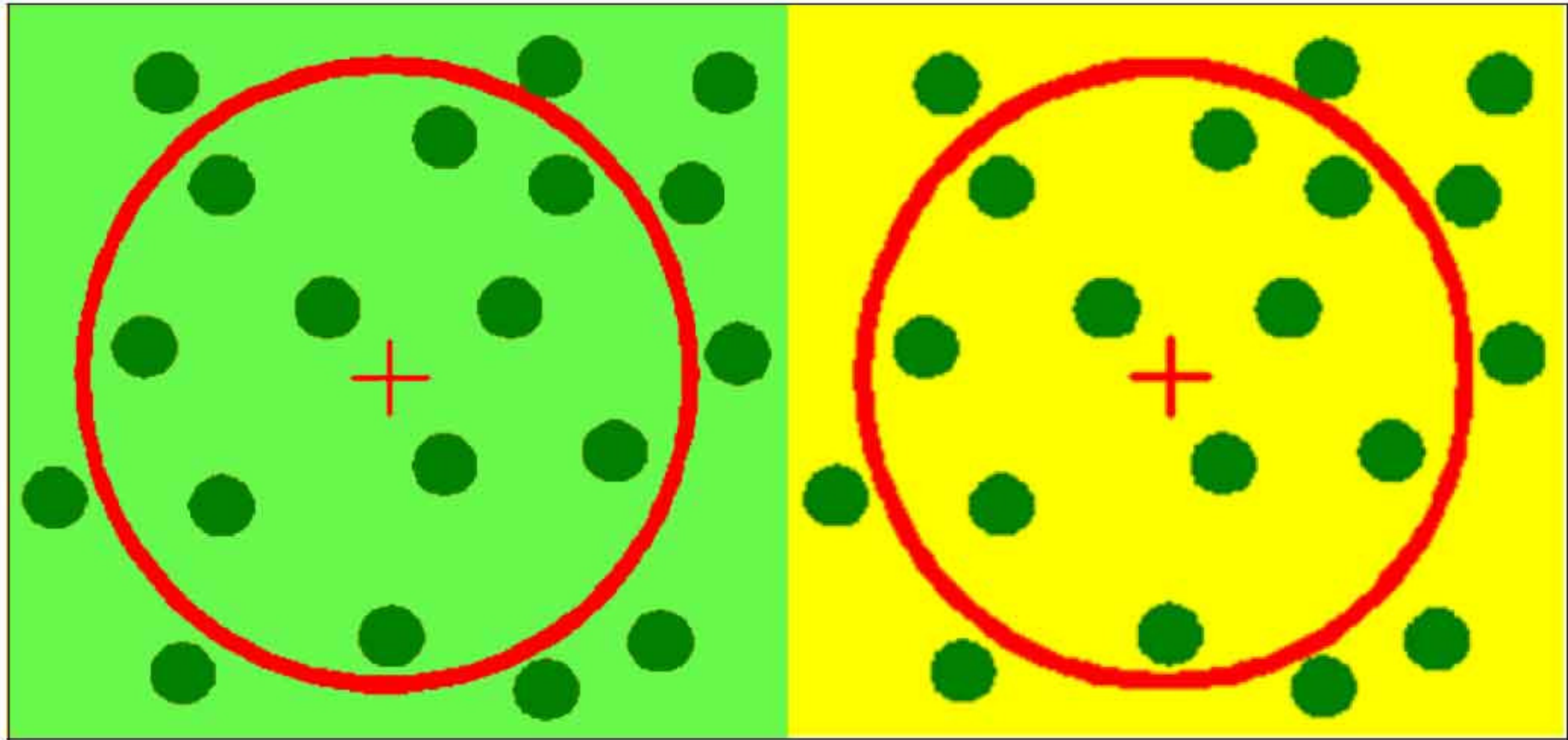
6 Other land

LAND COVER

is the observed physical cover of the earth's surface

Forest

Forest



Forest land

Crop Land

LAND USE

is the description of the land in terms of its socio-economic function

Activity Data:

IPCC indication: *Countries should characterize and account for all relevant land areas in a country consistently and as transparently as possible. Data should reflect the historical trends in land-use area.*

IPCC 2003 LULUCF Guidance suggests three Approaches*:

Approach 1: Basic land-use data

Approach 2: Survey of land use and land-use change

Approach 3: Geographically explicit land use data

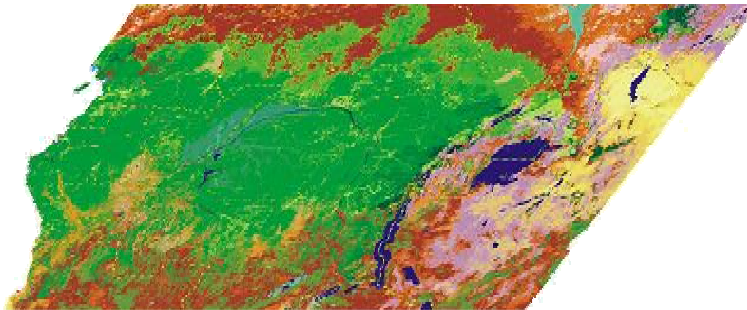
In almost all the developing countries the only way to represent land in a consistently and transparently approach with a time frame of 20 years backward is the use of satellite remote sensing data which allows to follow the Approach 3

* The Approaches are not presented as hierarchical tiers and do not imply any increase or decrease in accuracy but reflect collection methods and attributes and, therefore, appropriate ways to use the data.

Activity Data: geographically explicit data

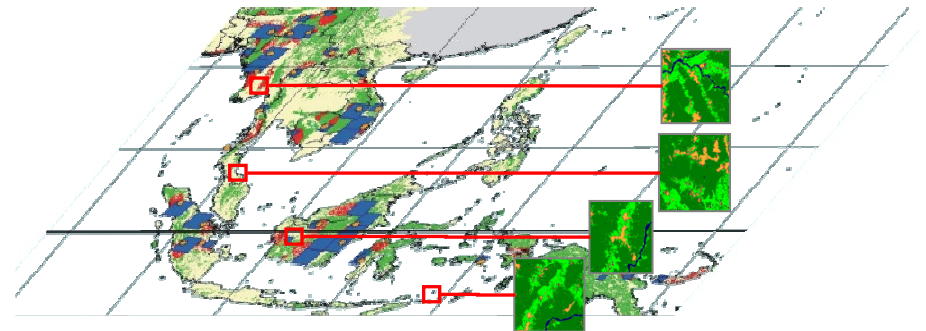
Remote sensing approaches

Wall-to-wall



- Mapping
- Change detection

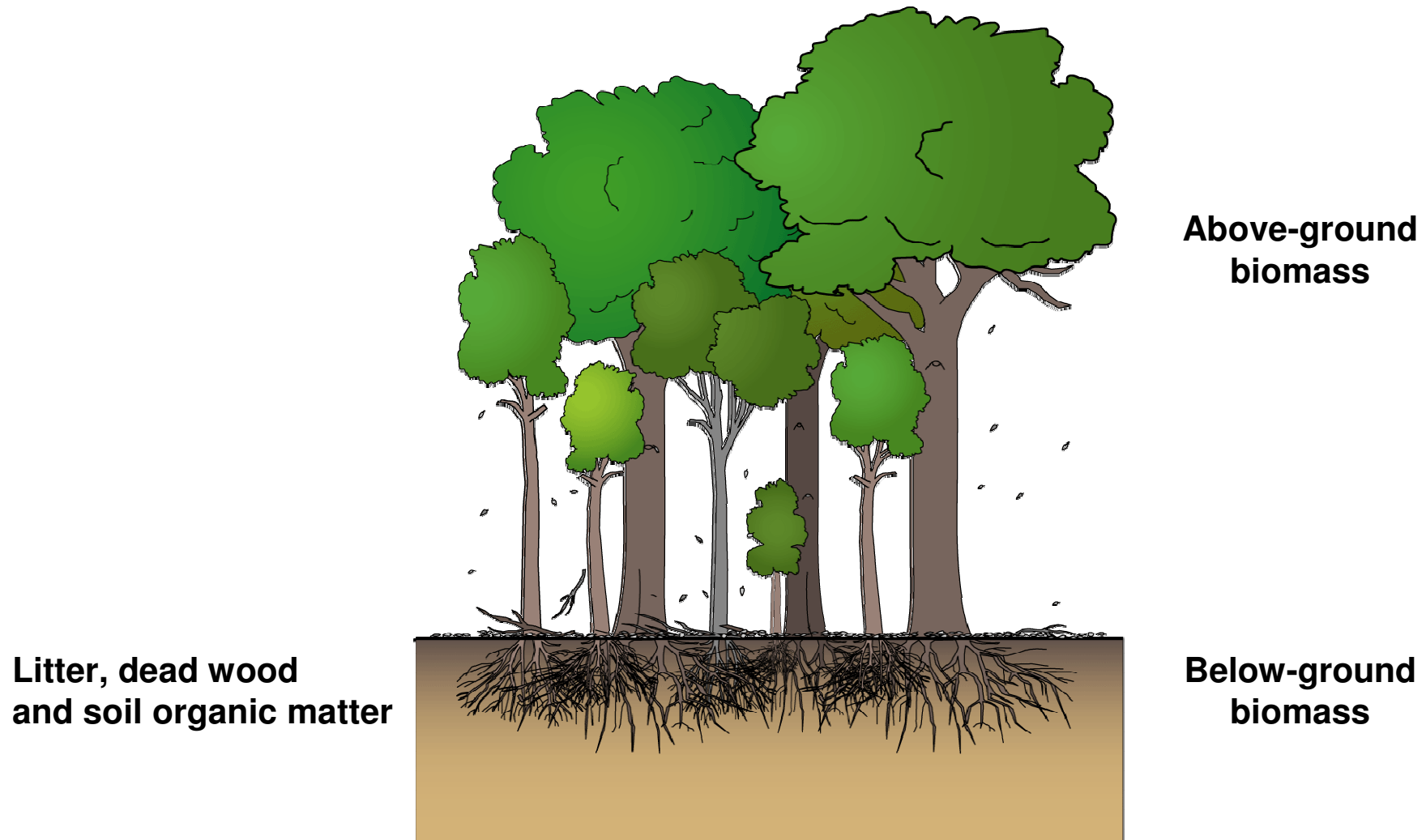
Sampling



- Change detection

Emission factors

IPCC has identified five carbon pools



Estimating C stock changes



Carbon stock changes: five pools

- Above-ground biomass
 - Below-ground biomass
 - Deadwood
 - Litter
 - Soil
- } biomass
- } dead organic matter
- { mineral
organic

$$\Delta C = \Delta C_{AB} + \Delta C_{BB} + \Delta C_{DW} + \Delta C_{LI} + \Delta C_{SO}$$

Carbon stock changes: three methods

1. Gain-Loss (default) – TIER 1,2,3
2. Stock Difference – TIER 3
3. Country specific model – TIER 3

„Stock Difference” method

$$\Delta C = C_2 - C_1$$

ΔC = change of carbon stock

C_2 = carbon stock at time 2

C_1 = carbon stock at time 1

„Stock Difference” method

$$\Delta C = C_2 - C_1$$

ΔC = change of carbon stock

C_2 = carbon stock at time 2

C_1 = carbon stock at time 1

for one year: $\Delta C = (C_2 - C_1)/(t_2 - t_1)$

REPORTING METHODOLOGIES

Changes = Gains - Losses (by pool)

AB

LI

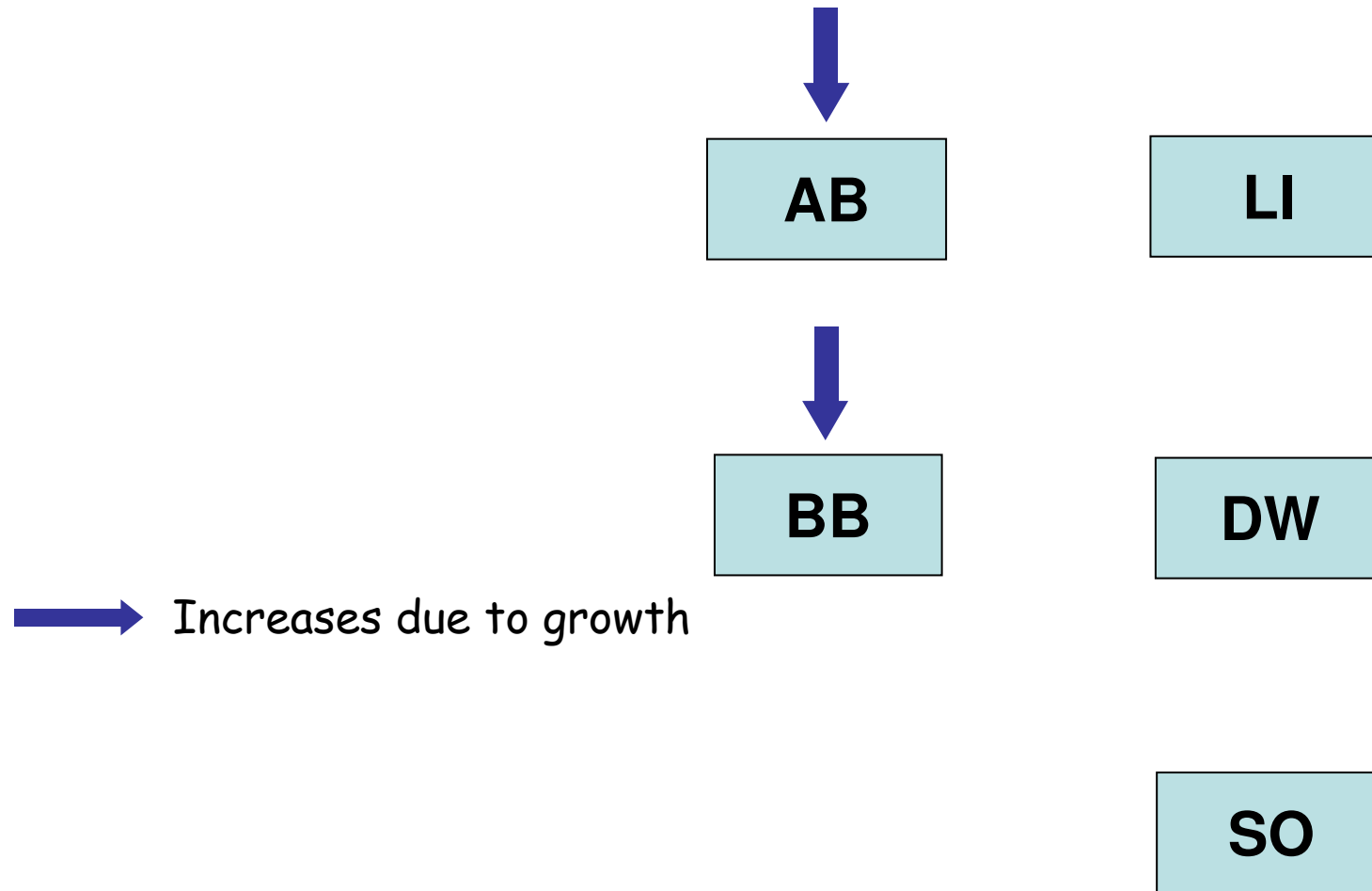
BB

DW

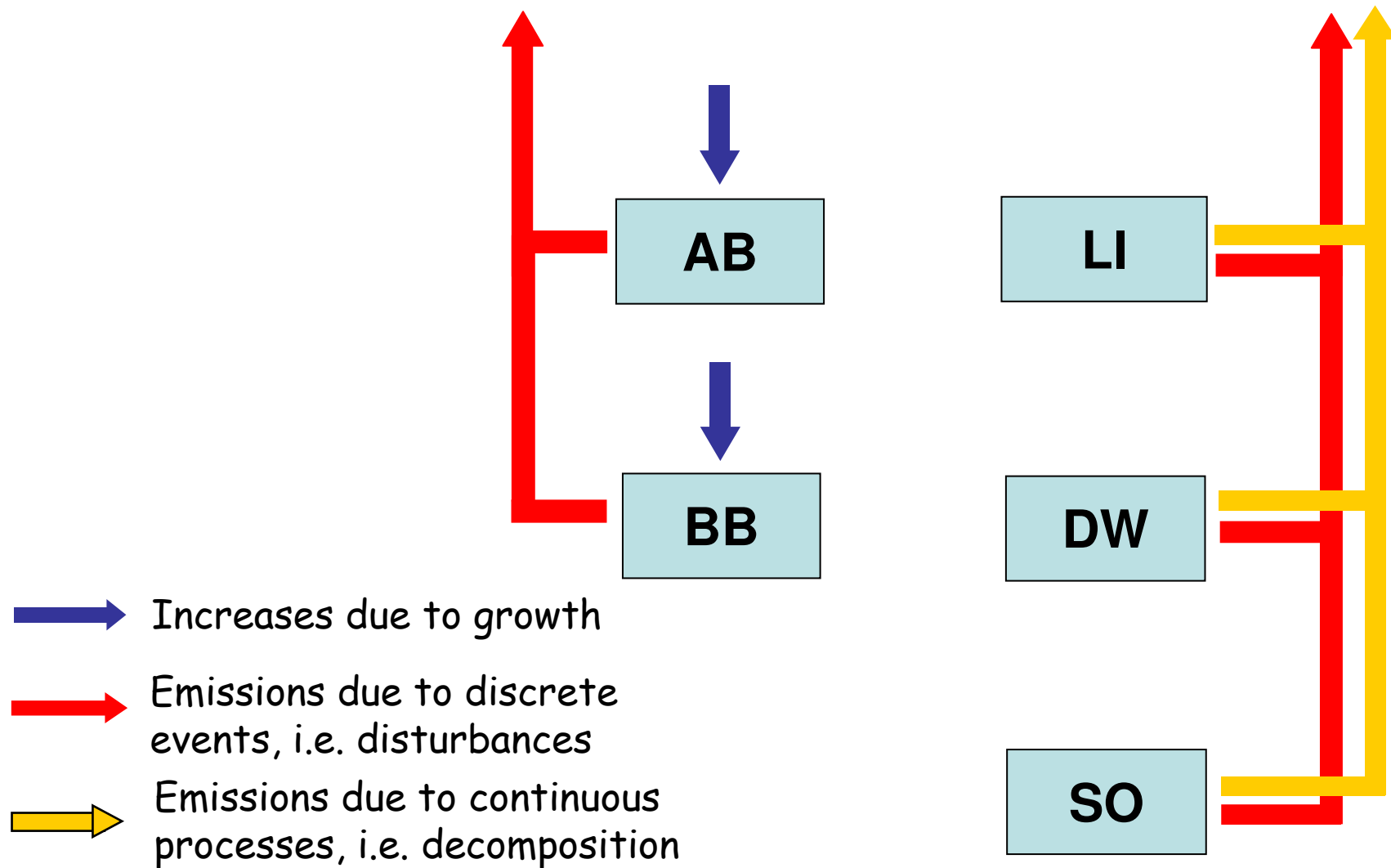
SO

REPORTING METHODOLOGIES

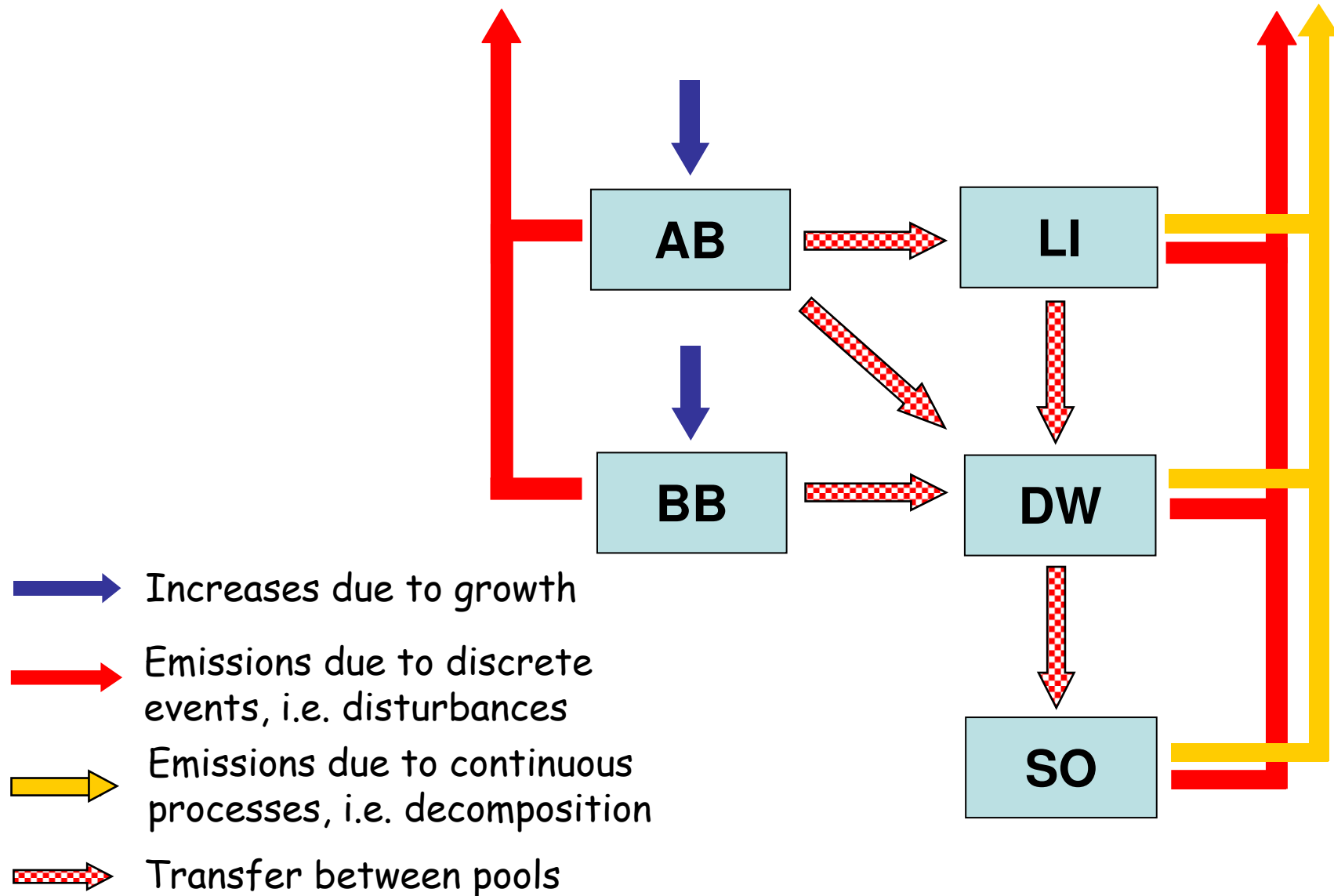
$$\text{Changes} = \text{Gains} - \text{Losses (by pool)}$$



Changes = Gains – Losses (by pool)



Changes = Gains – Losses (by pool)



Reporting Requirements

TIER 1

TABLE 1.2
LAND-USE CATEGORIES, CARBON POOLS AND NON-CO₂ GASES TO BE ESTIMATED UNDER TIER 1, THEIR RELEVANCE TO AFOLU SECTIONS, AND THE REFERENCE TO 1996 IPCC GUIDELINES

Land-use category/ Chapter	Subcategory	C pool & non-CO₂ gases	Methods Section	Chapter 2 Method	Linkage to 1996 IPCC Guidelines	Tier 1 Method
Forest Land (Chapter 4)	Forest Land Remaining Forest Land (FF)	Above-ground biomass	4.2.1	2.3.1.1	5A	⊕
		Below-ground biomass	4.2.1	2.3.1.1	NE	⊕
		Dead organic matter	4.2.2	2.3.2.1	NE	0
		Soil carbon	4.2.3	2.3.3.1	5D	⊕ ¹
		Non-CO ₂ from biomass burning	4.2.4	2.4.1	NE	⊕
	Land Converted to Forest Land (LF)	Above-ground biomass	4.3.1	2.3.1.2	5A, 5C	⊕
		Below-ground biomass	4.3.1	2.3.1.2	NE	⊕
		Dead organic matter	4.3.2	2.3.2.2	NE	⊕
		Soil carbon	4.3.3	2.3.3.1	5D	⊕
		Non-CO ₂ from biomass burning	4.3.4	2.4.1	4E, 4F	⊕

TABLE 5.A SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY									
Forest Land						Inventory 2007	Submission 2009	ITALY	
GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED CARBON-STOCK-CHANGE FACTORS						Net CO ₂ emissions/removals ^{(8) (9)}
Land-Use Category	Sub-division ⁽¹⁾	Area ⁽²⁾ (kha)	Carbon stock change in living biomass per area ^{(3) (4)}			Net carbon stock change in dead organic matter per area ⁽⁴⁾	Net carbon stock change in soils per area ⁽⁴⁾		
			Gains	Losses	Net change		Mineral soils ⁽⁵⁾	Organic soils	
			(Mg C/ha)						
A. Total Forest Land		10,879.12	2.50	-1.92	0.58	0.13	0.68	NO	-55,588.35
1. Forest Land remaining Forest Land		10,782.32	2.50	-1.92	0.58	0.13	0.64	NO	-53,384.43
	stands - norway spruce	533.27	1.63	-1.44	0.19	0.05	0.49	NO	-1,441.27
	stands - silver fir	90.11	2.13	-1.73	0.39	0.10	0.56	NO	-348.98
	stands - larches	343.74	1.76	-1.26	0.49	0.12	0.62	NO	-1,552.55
	stands - mountain pines	375.52	3.92	-2.69	1.23	0.27	0.76	NO	-3,109.93
	stands - mediterranean pine	151.80	4.69	-3.54	1.15	0.26	0.77	NO	-1,216.15
	stands - other conifers	33.87	2.69	-1.61	1.08	0.25	0.80	NO	-263.76
	stands - european beech	423.28	3.31	-3.30	0.01	0.09	0.05	NO	-233.33
	stands - turkey oak	141.28	3.09	-2.86	0.22	0.11	0.22	NO	-285.10
	stands - other oaks	261.20	2.39	-2.33	0.06	0.09	0.09	NO	-227.92
	stands - other broadleaves	402.71	2.41	-2.10	0.31	0.11	0.29	NO	-1,051.22
	coppices - european beech	578.02	2.30	-1.77	0.53	0.14	0.77	NO	-3,071.58
	coppices - sweet chestnut	645.00	6.01	-3.29	2.72	0.32	1.30	NO	-10,274.61
	coppices - hornbeams	541.89	1.09	-0.92	0.17	0.10	0.63	NO	-1,797.17
	coppices - other oaks	973.53	1.52	-1.20	0.32	0.12	0.66	NO	-3,913.42
	coppices - turkey oak	473.54	1.45	-1.38	0.07	0.09	0.56	NO	-1,247.41
	coppices - evergreen oaks	259.13	2.72	-2.60	0.12	0.10	0.57	NO	-746.87
	coppices - other broadleaves	1,100.75	3.11	-1.77	1.34	0.21	0.97	NO	-10,165.40
	coppices - conifers	143.69	2.72	-1.60	1.12	0.26	0.82	NO	-1,154.59
	plantations - eucalyptuses c	1.10	4.37	-4.52	-0.15	0.08	0.46	NO	-1.60
	plantations - other broadleaves	3.40	3.48	-3.09	0.39	0.08	0.71	NO	-14.78
	plantations - poplar stands	140.73	3.58	-1.81	1.77	0.05	1.44	NO	-1,679.13
	plantations - other broadleaves	14.97	2.22	-1.77	0.45	0.08	0.40	NO	-51.26
	plantations - conifers stands	10.29	6.84	-4.08	2.76	0.17	1.39	NO	-163.15
	plantations - others	195.13	6.31	-5.02	1.29	0.05	1.08	NO	-1,734.32
	protective forests - rupicol	715.09	2.51	-2.08	0.43	0.12	0.52	NO	-2,795.64
	protective forests - riparian	143.57	2.62	-2.25	0.37	0.15	0.34	NO	-456.02
	protective forests - shrublan	1,851.04	1.65	-1.66	0.00	0.09	0.56	NO	-4,385.25
	unstocked forest area	234.67	NA	NA	NA	NA	NO	NO	NA,NO

TABLE 5.A SECTORAL BACKGROUND DATA FOR LULUCF

Forest Land					Inventory 2007	Submission 2009	CANADA		
GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED CARBON-STOCK-CHANGE FACTORS					Net CO ₂ emissions/removals ⁽⁸⁾ (9)	
Land-Use Category	Sub-division ⁽¹⁾	Area ⁽²⁾ (kha)	Carbon stock change in living biomass per area ^{(3) (4)}			Net carbon stock change in dead organic matter per area ⁽⁴⁾	Net carbon stock change in soils per area ⁽⁴⁾		
			Gains	Losses	Net change		Mineral soils ⁽⁵⁾		Organic soils
			(Mg C/ha)						(Gg)
A. Total Forest Land		229,565.74	3.46	-3.64	-0.19	0.21	0.03	IE,NO	-48,217.87
1. Forest Land remaining Forest Land		229,402.27	3.46	-3.64	-0.19	0.21	0.03	IE	-47,255.51
	RZ4 Taiga Shield East	1,102.86	2.66	-3.21	-0.54	0.15	0.03	IE	1,454.62
	RZ5 Boreal Shield East	55,613.87	3.22	-3.24	-0.02	0.11	0.03	IE	-22,926.91
	RZ6 Atlantic Maritime	15,407.16	3.62	-3.65	-0.03	-0.09	0.01	IE	5,804.97
	RZ7 Mixedwood Plains	2,688.12	4.41	-3.63	0.78	-0.02	0.03	IE	-7,764.03
	RZ8 Hudson Plains	302.26	2.99	-2.55	0.44	0.00	0.05	IE	-544.50
	RZ9 Boreal Shield West	28,767.65	2.41	-2.23	0.18	0.04	0.03	IE	-26,214.20
	RZ10 Boreal Plains	36,155.69	3.53	-3.37	0.15	-0.04	0.02	IE	-17,752.72
	RZ11 Subhumid prairies	1,819.33	3.40	-3.18	0.22	0.03	0.04	IE	-1,925.00
	RZ12 Semiarid prairies	16.06	2.72	-2.63	0.08	0.05	0.03	IE	-9.92
	RZ13 Taiga Plain	20,042.86	2.65	-2.26	0.39	0.08	0.03	IE	-36,535.82
	RZ14 Mountane Cordillera	35,411.61	3.75	-5.54	-1.78	1.22	0.06	IE	65,756.72
	RZ15 Pacific Maritime	13,215.19	6.85	-7.17	-0.32	-0.26	0.02	IE	27,439.41
	RZ16 Boreal Cordillera	16,617.98	3.51	-3.25	0.26	0.19	0.03	IE	-29,641.35
	RZ17 Taiga Cordillera	412.08	2.37	-1.96	0.41	-0.21	0.02	IE	-336.03
	RZ18 Taiga Shield West	1,829.55	2.10	-1.40	0.69	-0.09	0.00	IE	-4,060.75

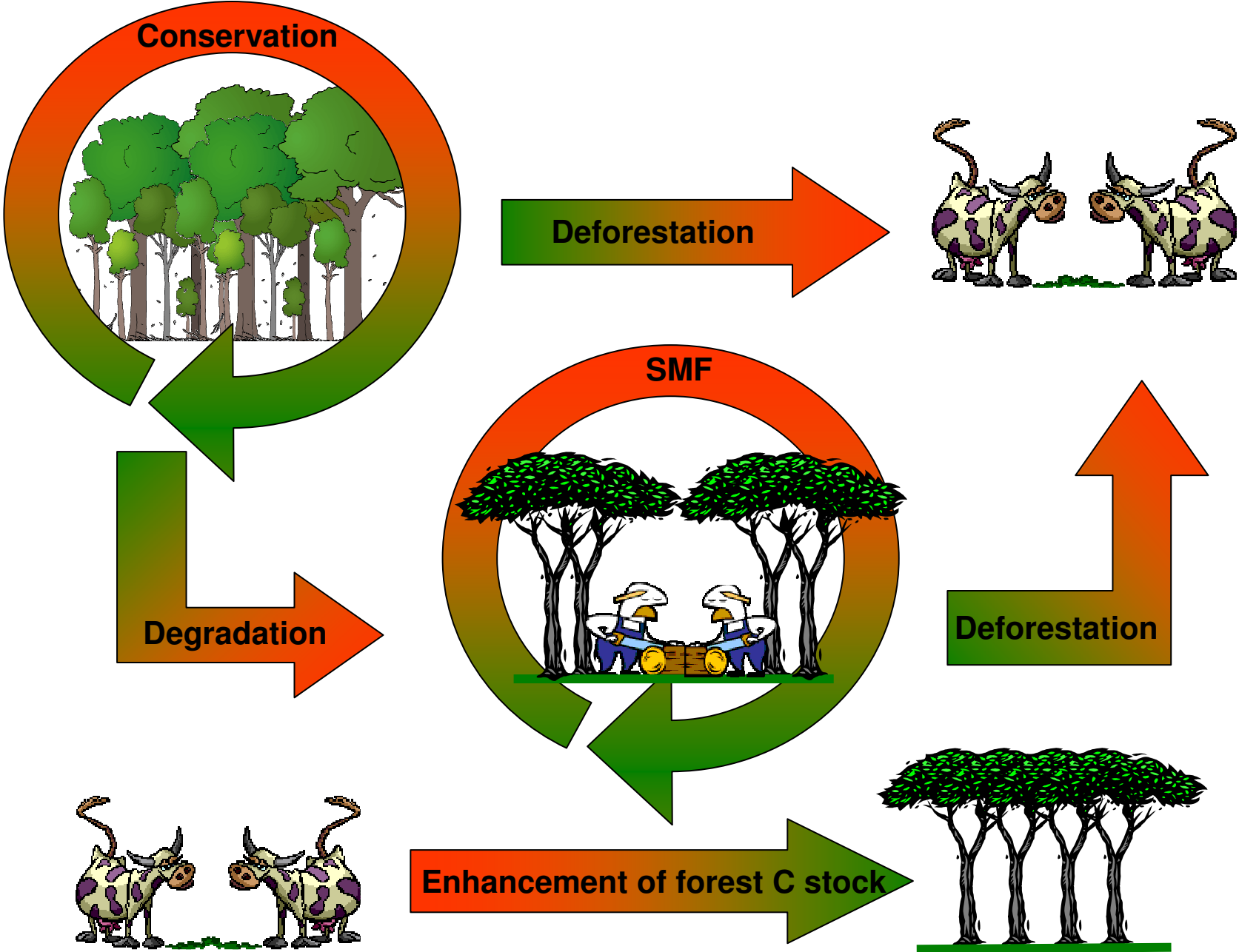
REDD negotiation history

- 2003 COP9 IPAM – side event on the concept of reduced emission
- 2005 COP11 Coalition for Rainforest Nations – new SBSTA agenda item
 - one UNFCCC workshop
 - four SBSTA
- 2007 COP13 Bali REDD decision and Action Plan
 - two UNFCCC workshops
 - two expert meetings
 - three SBSTA

REDD+ negotiation text for COP15 decision available at:
<http://unfccc.int/meetings/sb30/items/4842.php>



REDD+ forest related activities



IPCC methodology for REDD+

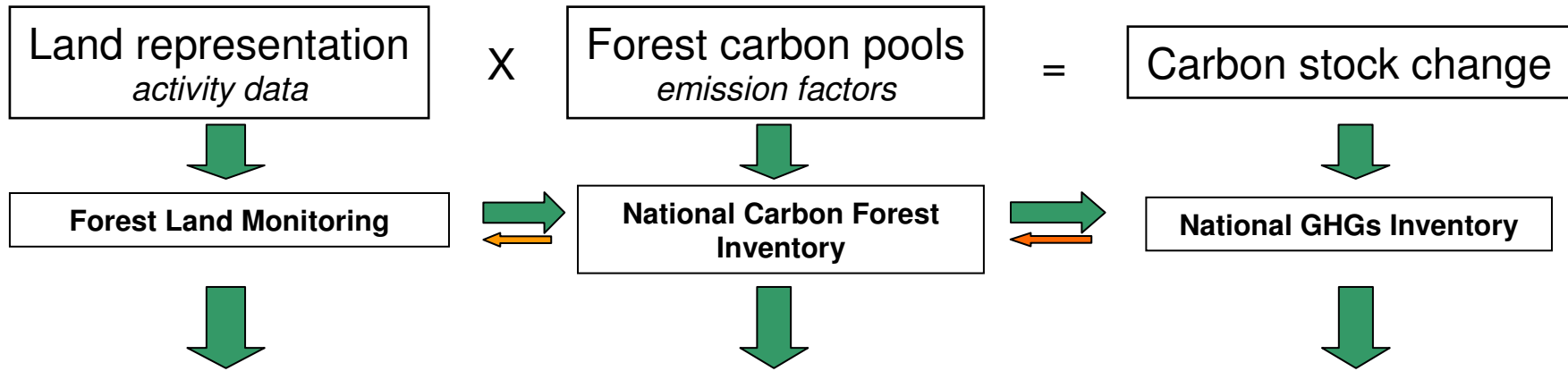
REDD+ potential activities = Forest sector (AFOLU / IPCC)

Deforestation = Forest land converted to other land

Degradation
SMF
Conservation
Enhancement F C S } = Forest land remaining forest land

Enhancement F C S = Other land converted to forest land

Measurement strategy



System Spec.

Operational wall-to-wall system based on satellite remote sensing data, with a sampling approach to assess historical deforestation and degradation rate. Changes in forest area to be assessed in order to fulfill the IPCC Approach3 reporting requirements.

The system will also have to support the development of the NFI sampling design.

First national carbon forest inventory to be completed by end 2011.

Future inventory based on continuous inventory sampling system, e.g. Indian forest inventory.

Data on carbon stock for all forest carbon pools for the main forest types at IPCC Tier2 and Tier3 reporting requirements.

Adoption of a stratified sampling approach that support the IPCC stratification requirements.

All the statistical analysis of the forest population need to be based on a point measurement approach.

Biomass measured through basic wood density of tree species

National inventory for the AFOLU sector developed following the reporting requirements of the Annex-I Parties under UNFCCC.



Measurement strategy

FAO MR approach for REDD

