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draft REDD Methodology

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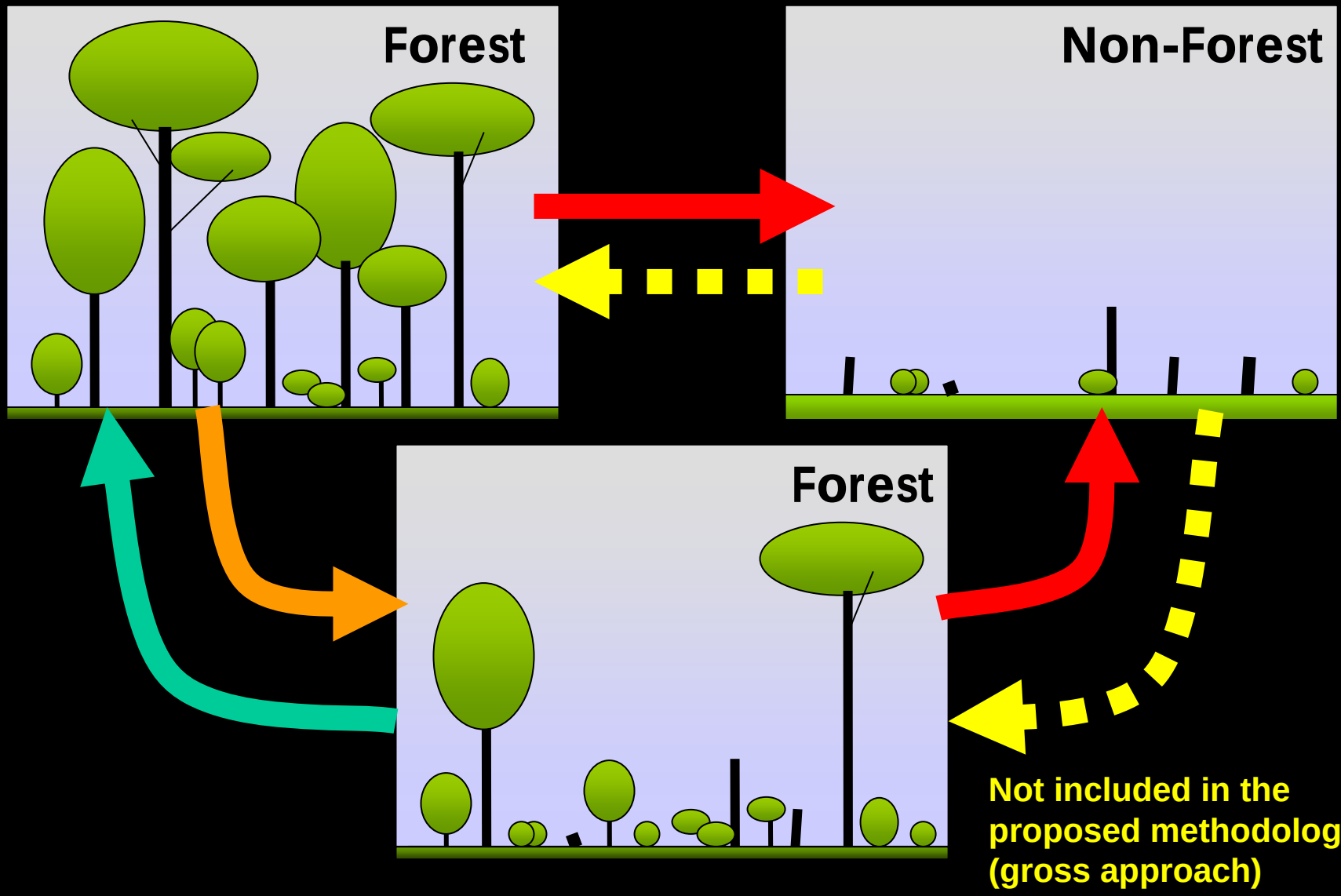
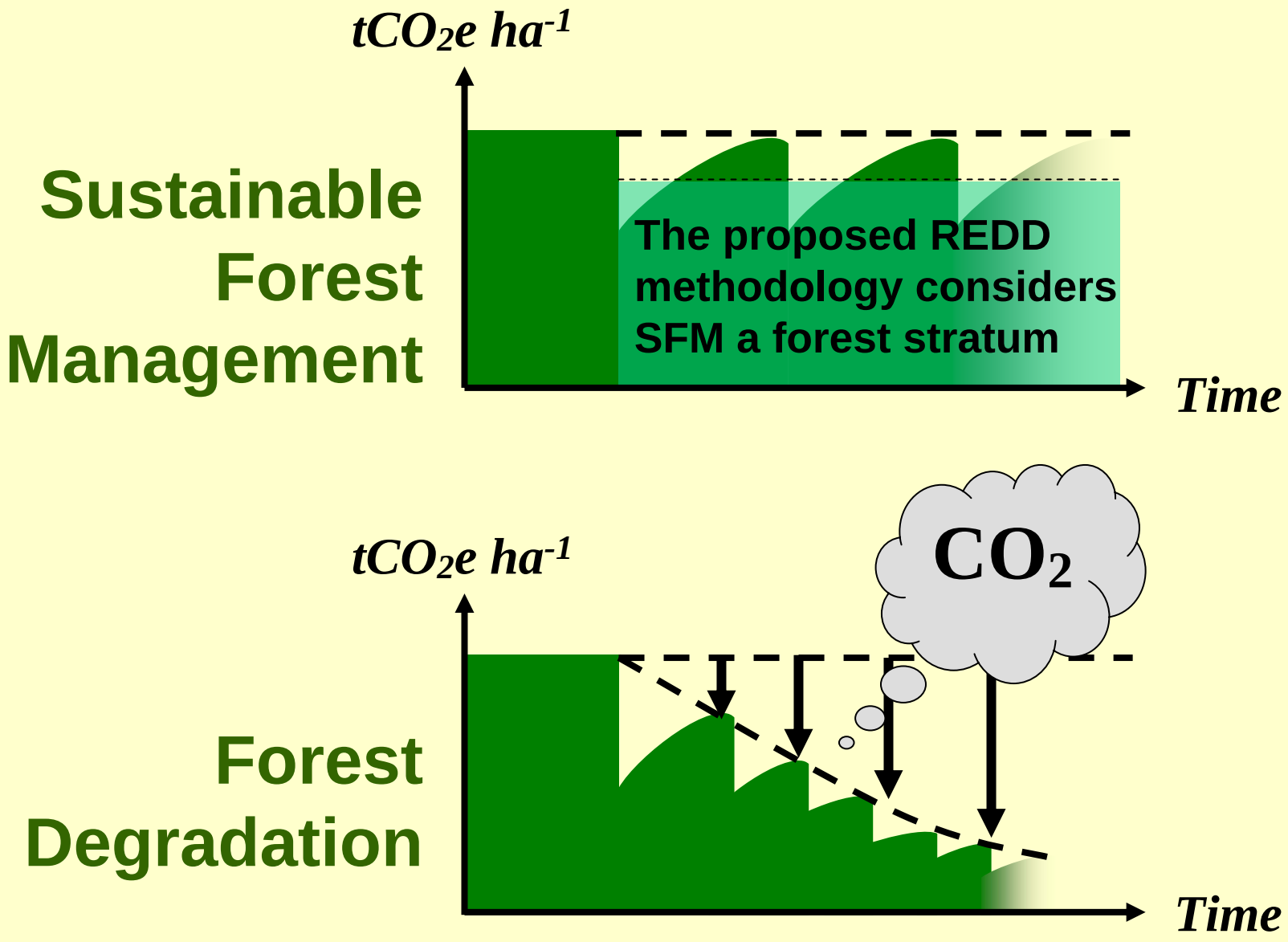
CATIE Global Change Group

Deforestation, Forest Degradation, Forest Regeneration, AR

DEFINITIONS




$tCO_2e\ ha^{-1}$
Sustainable Forest Management
The proposed REDD methodology considers SFM a forest stratum
Time
$tCO_2e\ ha^{-1}$
CO_2
Forest Degradation
Time

Ex ante
methodology steps

Step 1. Define the *boundaries* of the proposed REDD project activity.

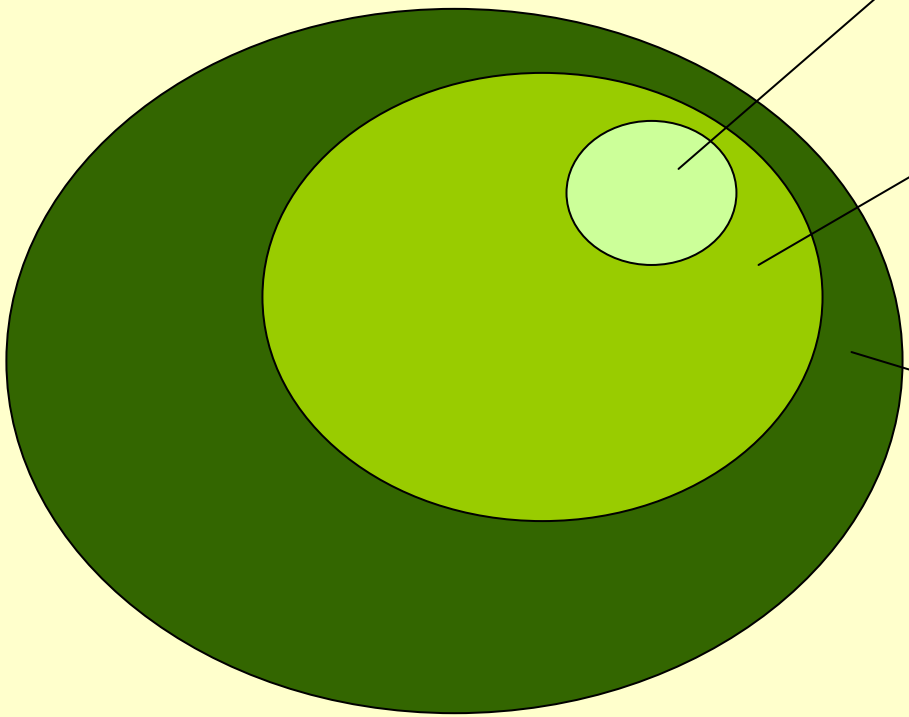
1.1 Spatial boundaries

1.2 Temporal boundaries

1.3 Carbon pools

1.4 Sources of emissions and GHG

1.1 Spatial boundaries

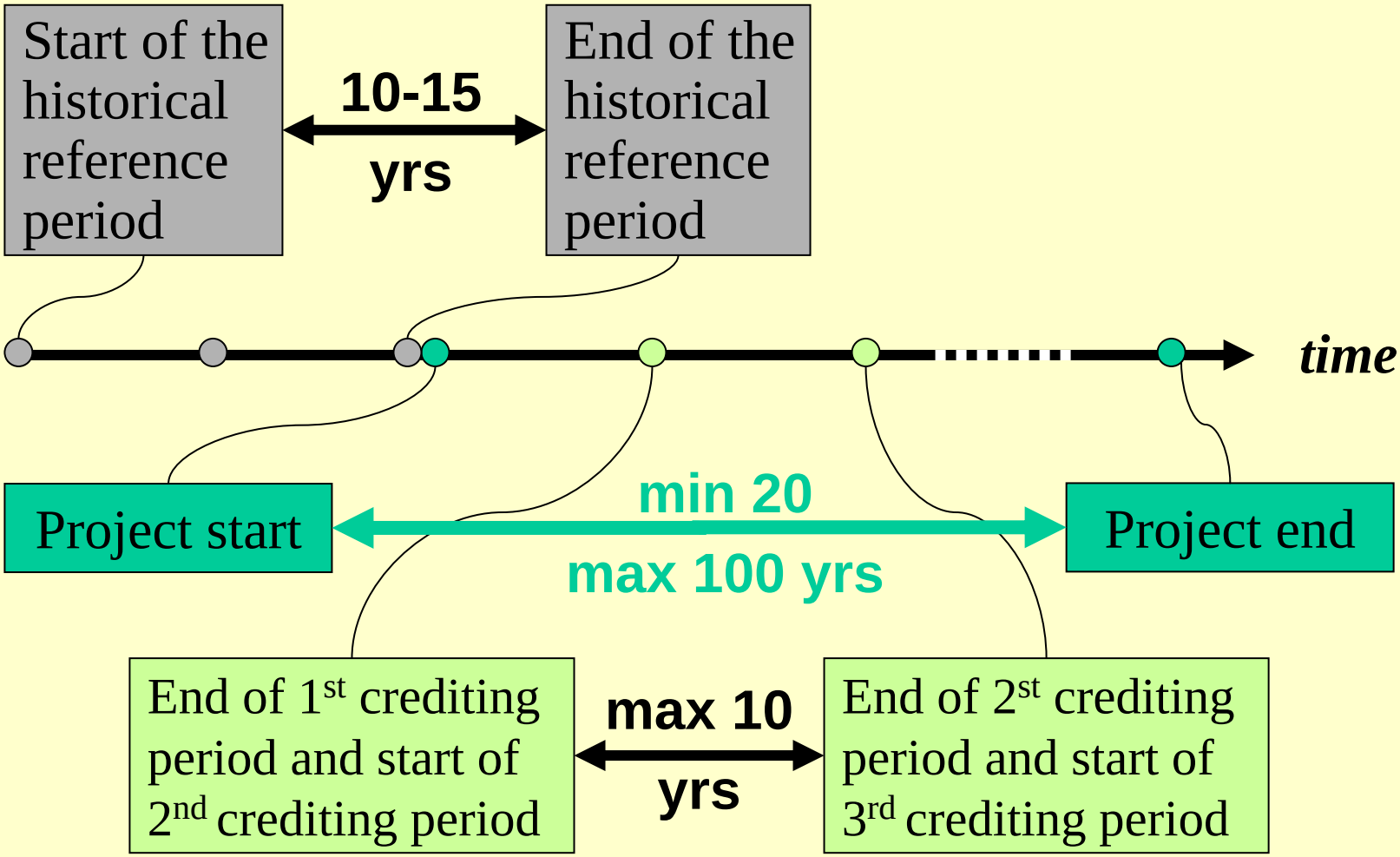


Project area = Forest to be protected / managed

Leakage belt = Area where pre-project activities could be displaced

Reference region = Domain from which information on DD agents, drivers and rates is extracted and projected.

1.2 Temporal boundaries



1.3 Carbon Pools

1. Above-ground biomass
   - Trees
   - Non-Trees
2. Below-ground biomass
3. Dead wood
   - Standing
   - Lying
   - Wood products
4. Litter
5. Soil organic carbon

Selection criteria:

- Principle of conservadurism.
- Expected magnitude of carbon stock change.
- Cost of measuring

→ Could be different carbon pools depending on the land-use/land-cover change category.

1.4 Sources of GHG emissions

Under the REDD activity scenario:

GHG emissions that would occur in the *baseline* are avoided.	• Conservatively ignore them. • Can count non-CO_2 emissions from forest fire.
GHG emissions due to *project activities* are likely to occur.	• Reasonably assume that project emissions are less than baseline emissions → ignore.
GHG emissions due to *leakage* are likely to increase.	• Leakage prevention measures and activity displacement may lead to significant GHG emissions → consider.

Step 2. Analysis of historical Land-Use and Land- Cover Change.

2.1 Select data sources

2.2 Define land-use/land-cover classes

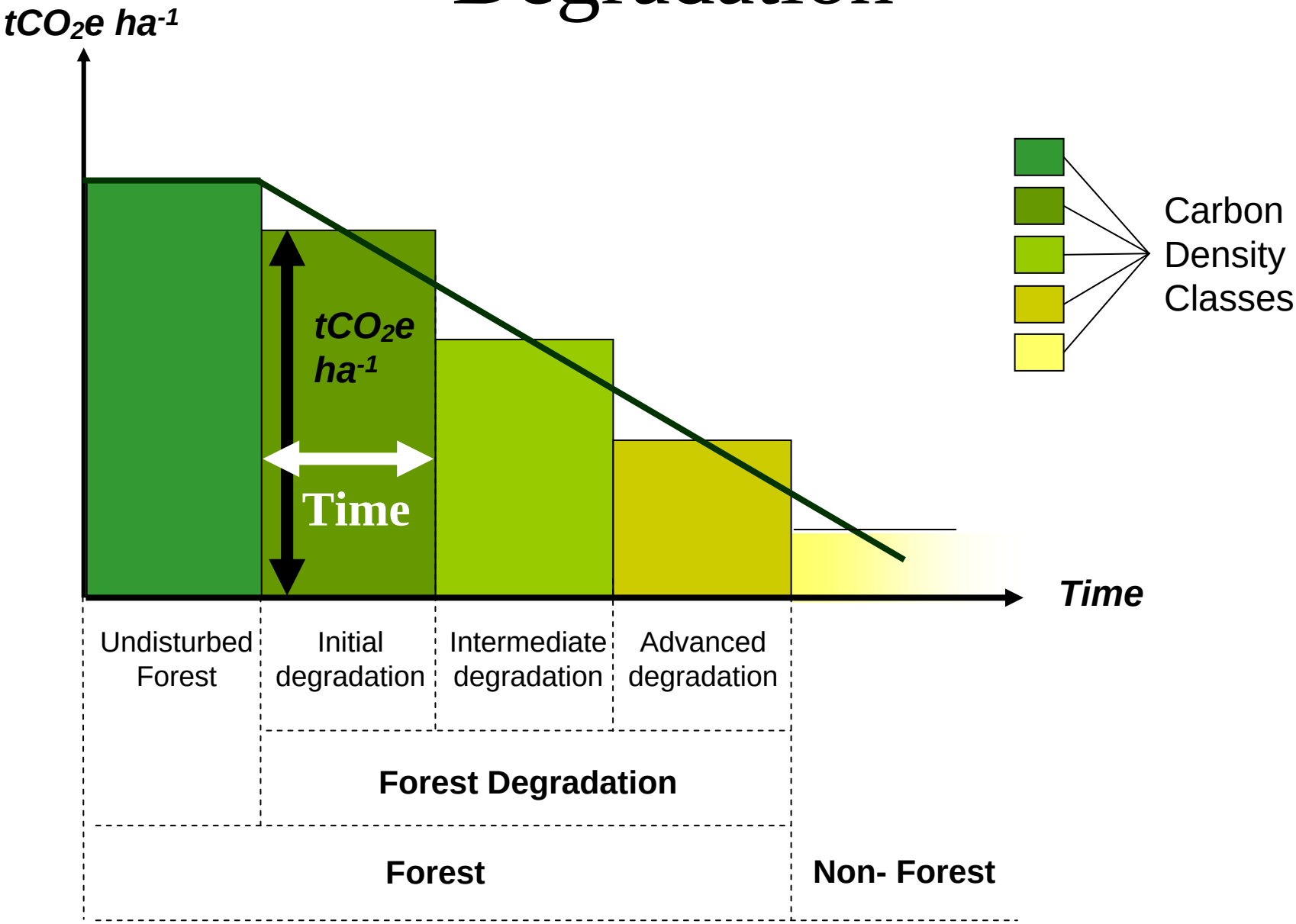
2.3 Define LU/LC-change categories

2.4 Prepare LU/LC and LU/LC-change maps and LU/LC-change matrices

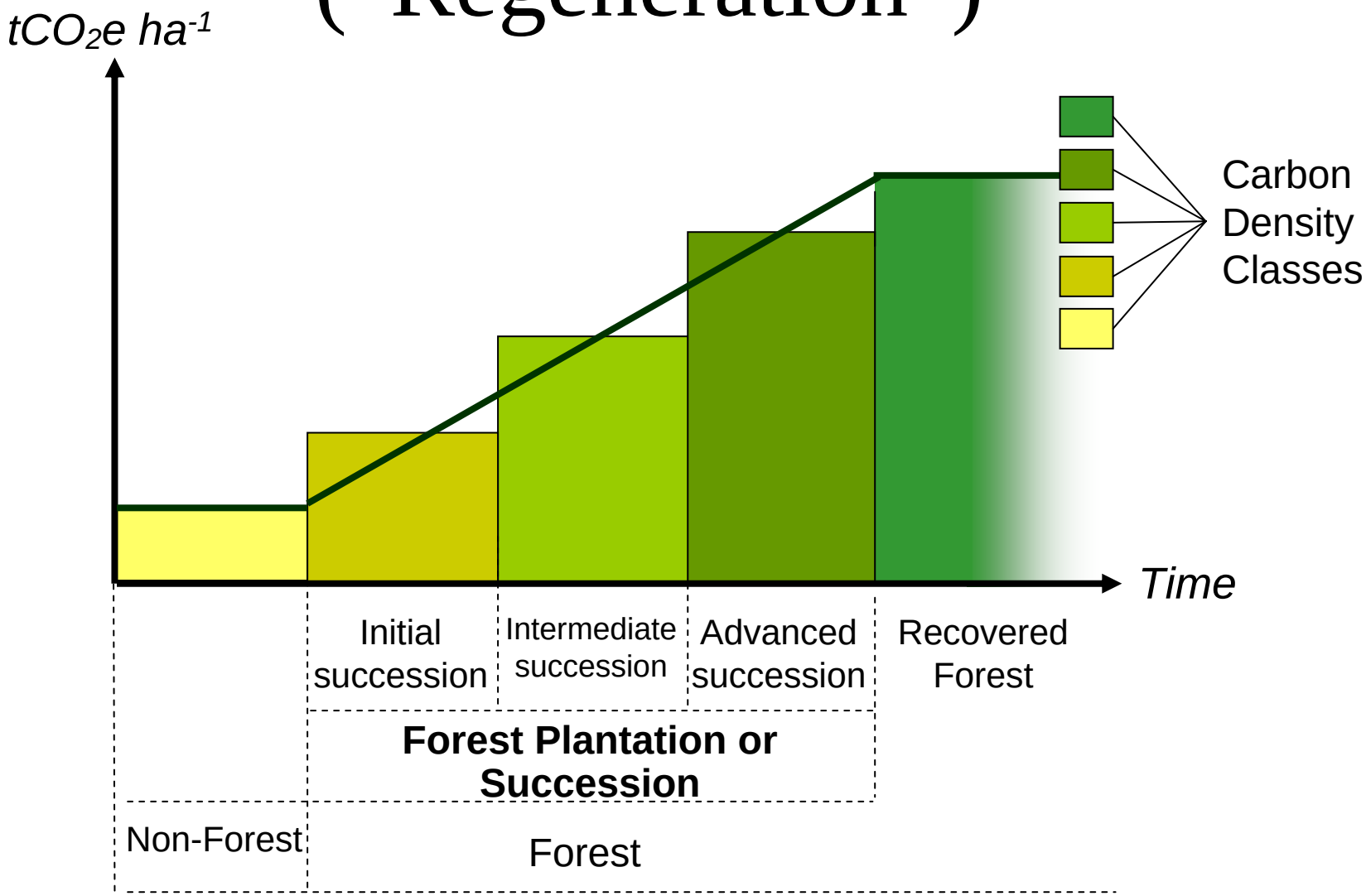
2.5 Assess map accuracy

2.6 Prepare a methodological annex

Degradation



Carbon stock enhancement ("Regeneration")



Step 3. Analysis of agents, drivers, underlying causes and chain of events

3.1 Agents

- Who is deforesting / degrading?

3.2 Drivers:

- What drives the agents to cut the trees?
  (a) Spatial variables (predisposing factors)
  (b) Economic and social variables.

3.3 Underlying causes:

- Ultimate reasons explaining the drivers.

3.4 Chain of events:

- Relationships between agents.
- Typical sequence of events leading to deforestation or degradation.

Step 4. Project the *quantity* of future deforestation and forest degradation

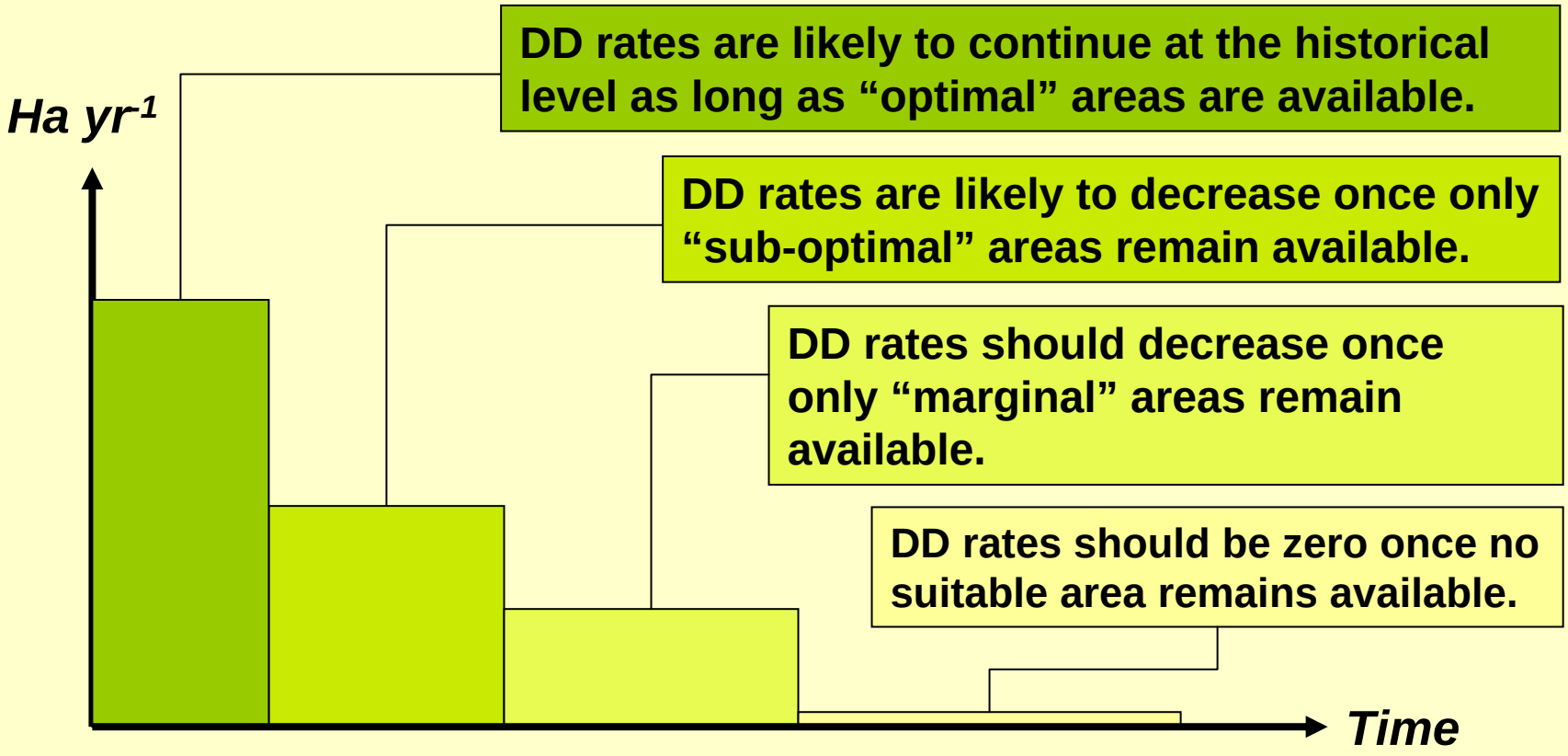
4.1 Analysis of remaining forest area that is suitable for conversion to non-forest use and logging activities:

- optimal areas
- sub-optimal areas
- marginal areas

4.2 Selection of the baseline approach

4.3 Quantitative projection of future deforestation and forest degradation

4.1 Analysis of remaining forest area that is suitable for conversion to non-forest use and logging activities



4.2 Selection of the baseline approach

(a) "Historical approach":

Def. = f (time)

Degr. = f (time)

(a) "Projection approach":

Def. = f (X_1, X_2, …)

Degr. = f (Y_1 , Y_2, …)

Result of Step 4

Year	Deforestation (ha)	Degradation (ha)
1		
2		
3		
4		
5		
6		
7		
8		
…		
Project end		

Step 5. Project the *location* of future deforestation and forest degradation

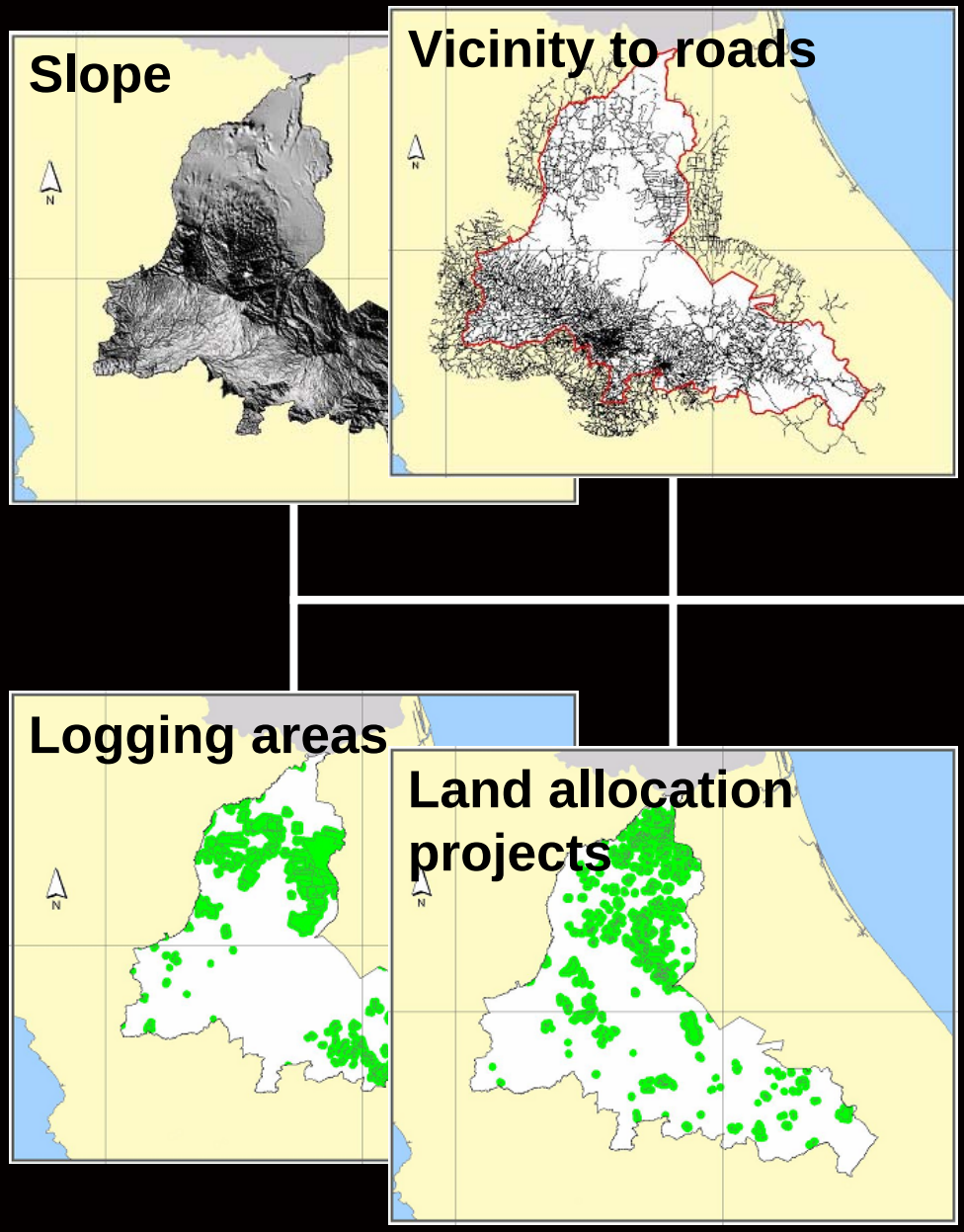
5.1 Create *driver maps* from spatial variables.

5.2 Create *suitability maps* for deforestation and for degradation.

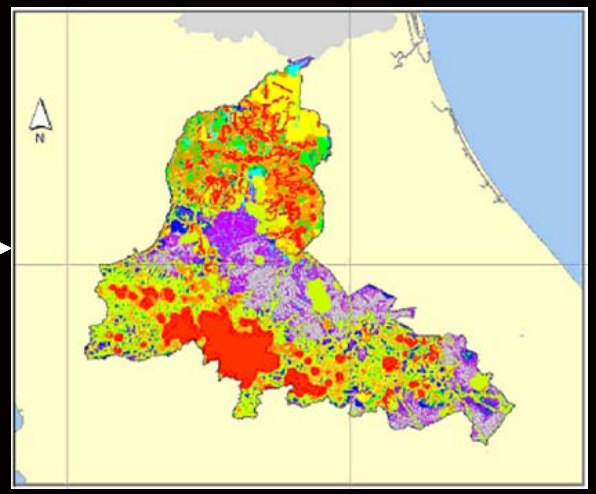
5.3 Select the most accurate suitability map for deforestation and for degradation.

5.4 Locate future deforestation and forest degradation.

Spatial variables → Driver Maps



Suitability Map



CATIE Study in Costa Rica (1996-2006)
Ex post correlation with actual deforestation:
$r = 0.91$ ($p < 0.001$)

Step 6. Project future land-use and land-cover change

6.1 Identification of LU/LC-change categories in "forest land remaining forest land"

- Forest degradation
- Forest regeneration (= carbon stock enhancement)

6.2 Identification of LU/LC-change categories in "forest land converted to non-forest land".

- Deforestation:
  - (1) Historical LU/LC-change;
  - (2) Suitability modeling.

Step 7. Estimate the expected baseline *carbon stock changes* and *non-CO_2 emissions*.

7.1 Estimation of the average carbon stock density of each LU/LC class.

7.2 Estimation of non-CO_2 emissions from forest fires (if applicable).

7.3 Calculation of Emission Factors.

7.4 Calculations of carbon stock changes due to forest degradation and regeneration.

7.5 Calculation of carbon stock changes (and non-CO_2 emissions) due to deforestation.

7.6 Estimation of total baseline carbon stock changes and non-CO_2 emissions ($C_{BASELINE}$)

Step 8. Estimation of the expected *actual carbon stock changes*.

- Estimations are based on planned project activities.
- The expected level of “activity data” is reported in tables similar to the previous ones.
- The numbers of reduced activity data for “degradation” and “deforestation” and the underlying assumptions must be explained and justified.
- If specific measures are undertaken to enhance carbon stocks in “regeneration” forest classes, the *Potential Forest Regeneration Map* must be adjusted accordingly .

Step 9. Estimation of expected *leakage*: carbon stock changes and non-CO_2 emissions ($C_{LEAKAGE}$)

$$C_{LEAKAGE} = E_{Displacement} + E_{LK\ measures}$$

$$E_{LK\ measures} = GHG_{LK,\ fertilization} + GHG_{LK,animals}$$

$$E_{Displacement} = (C_{BASELINE} - C_{ACTUAL}) * X\%$$

Step 10. Calculate the expected *ex ante net anthropogenic GHG emission reductions.*

$$C_{REDD} = C_{BASELINE} - C_{ACTUAL} - C_{LEAKAGE}$$

Ex post
methodology steps

Step 11. Project monitoring.

11.1 Project implementation:

- Measures to reduce deforestation and forest degradation;
- Measures to enhance carbon stocks; and
- Measures to reduce the risk of leakage.

11.2 Land-use and land-cover change in the reference region, project area and leakage belt.

11.3 Driver variables used to estimate the quantity and location of future deforestation and forest degradation

11.4 Carbon stocks.

Step 12. Calculation of *ex post* net anthropogenic GHG emission reductions

$$C_{REDD} = C_{BASELINE} - C_{ACTUAL} - C_{LEAKAGE}$$

***Ex ante* projection**

***Ex post* measured**

***Ex post* measured**

Step 13. Adjustment of the baseline projections for future crediting periods

13.1 Adjustment of the land-use / land-cover change component of the baseline

13.2 Adjustment of the carbon stock-change component of the baseline


Merci beaucoup!
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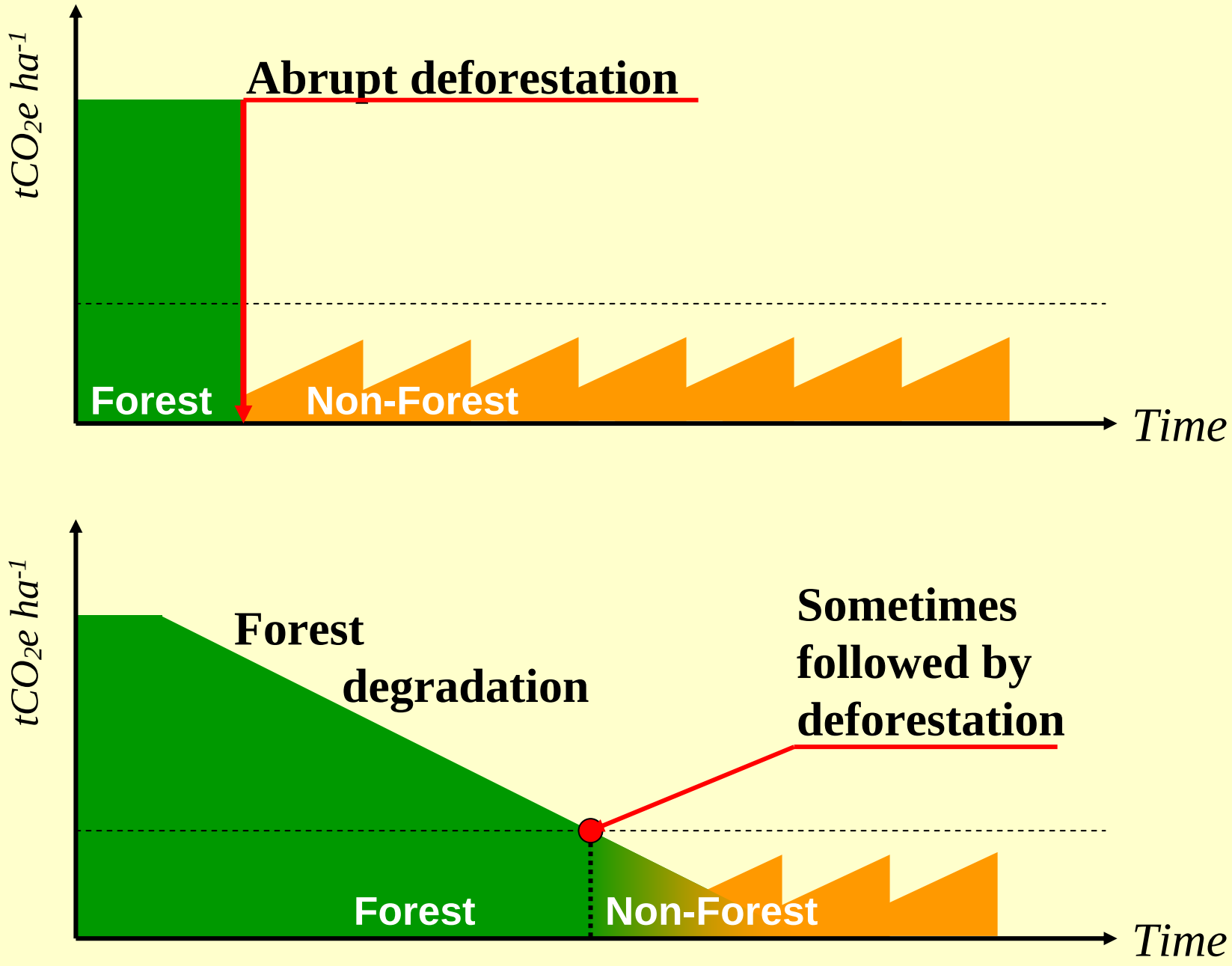
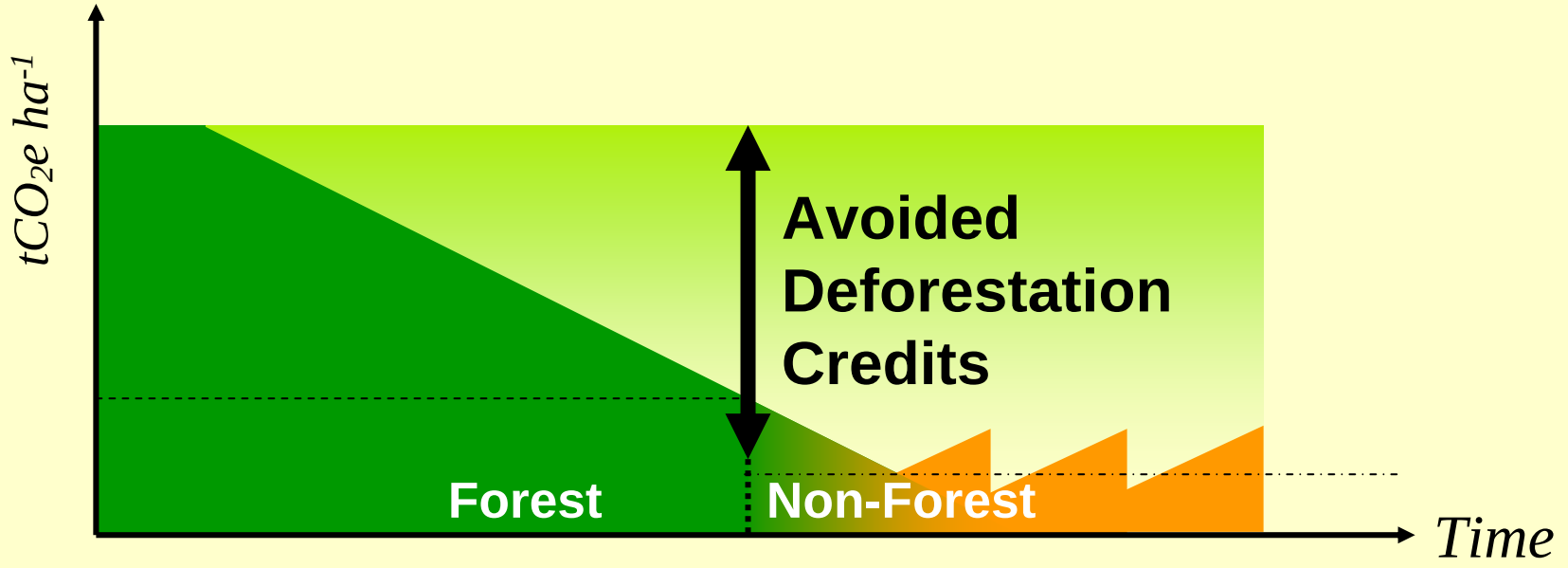
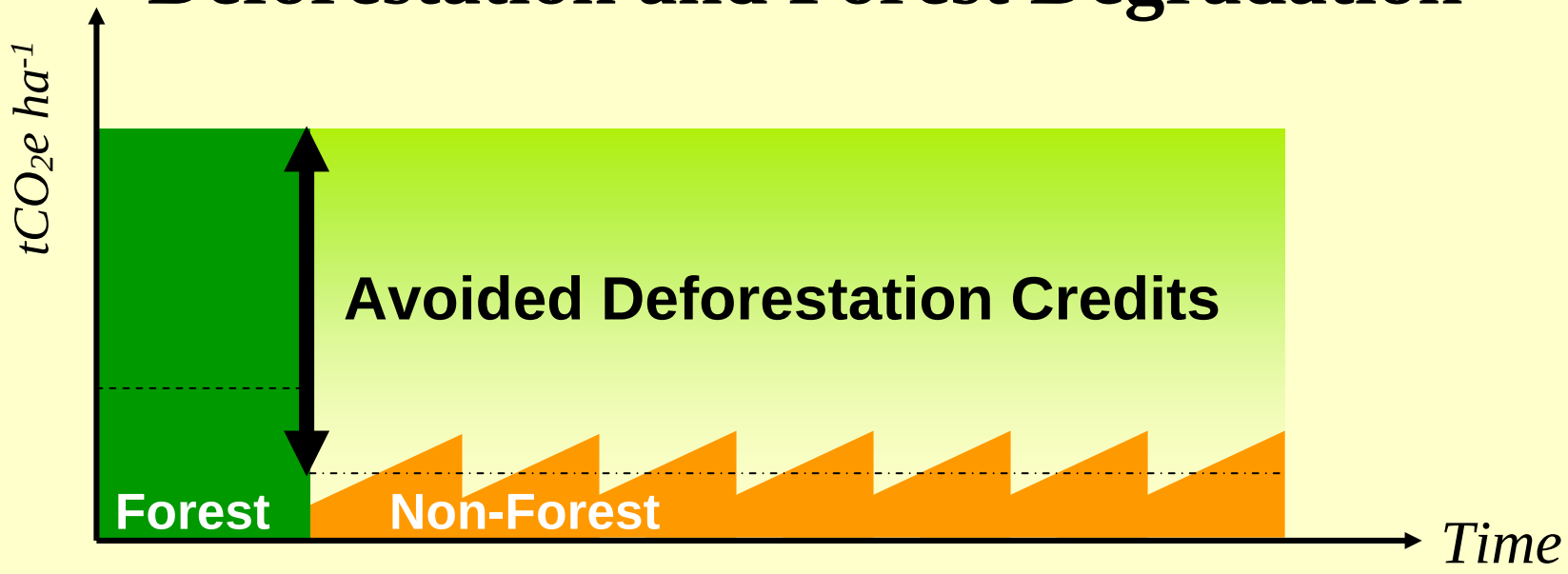
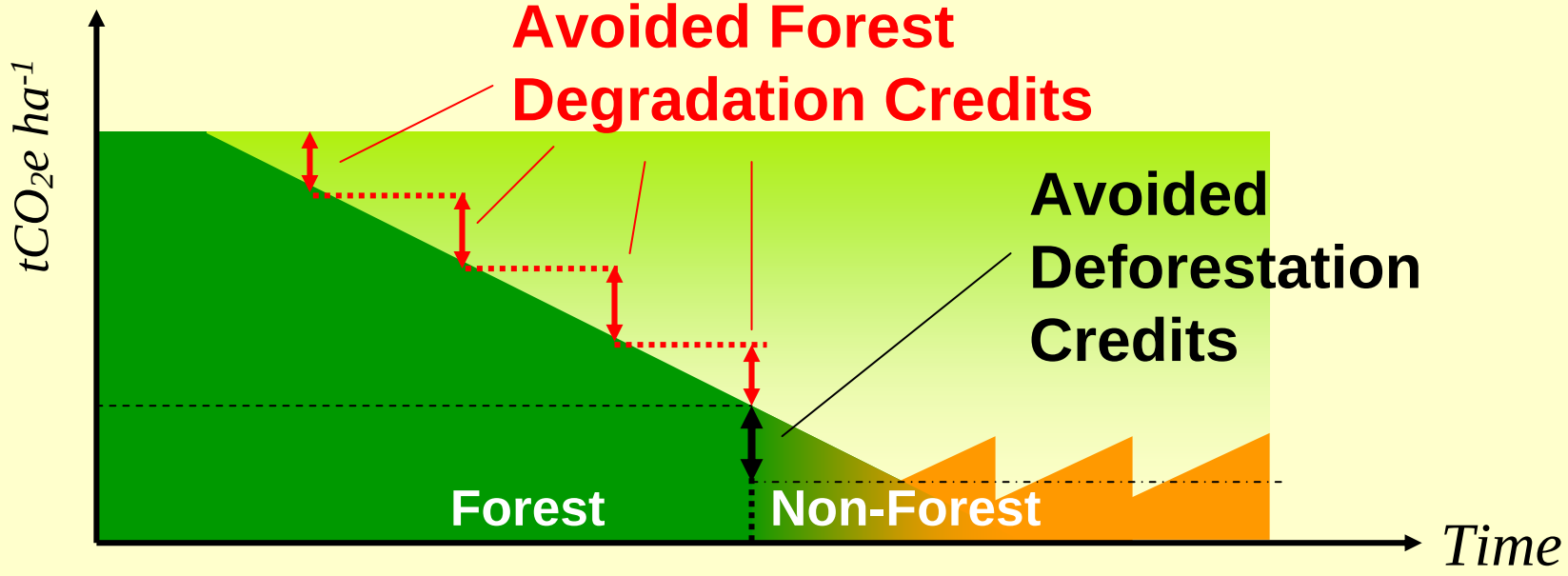

$tCO_2e\ ha^{-1}$
Abrupt deforestation
Forest
Non-Forest
Time
$tCO_2e\ ha^{-1}$
Forest
degradation
Sometimes
followed by
deforestation
Forest
Non-Forest
Time

Only Deforestation

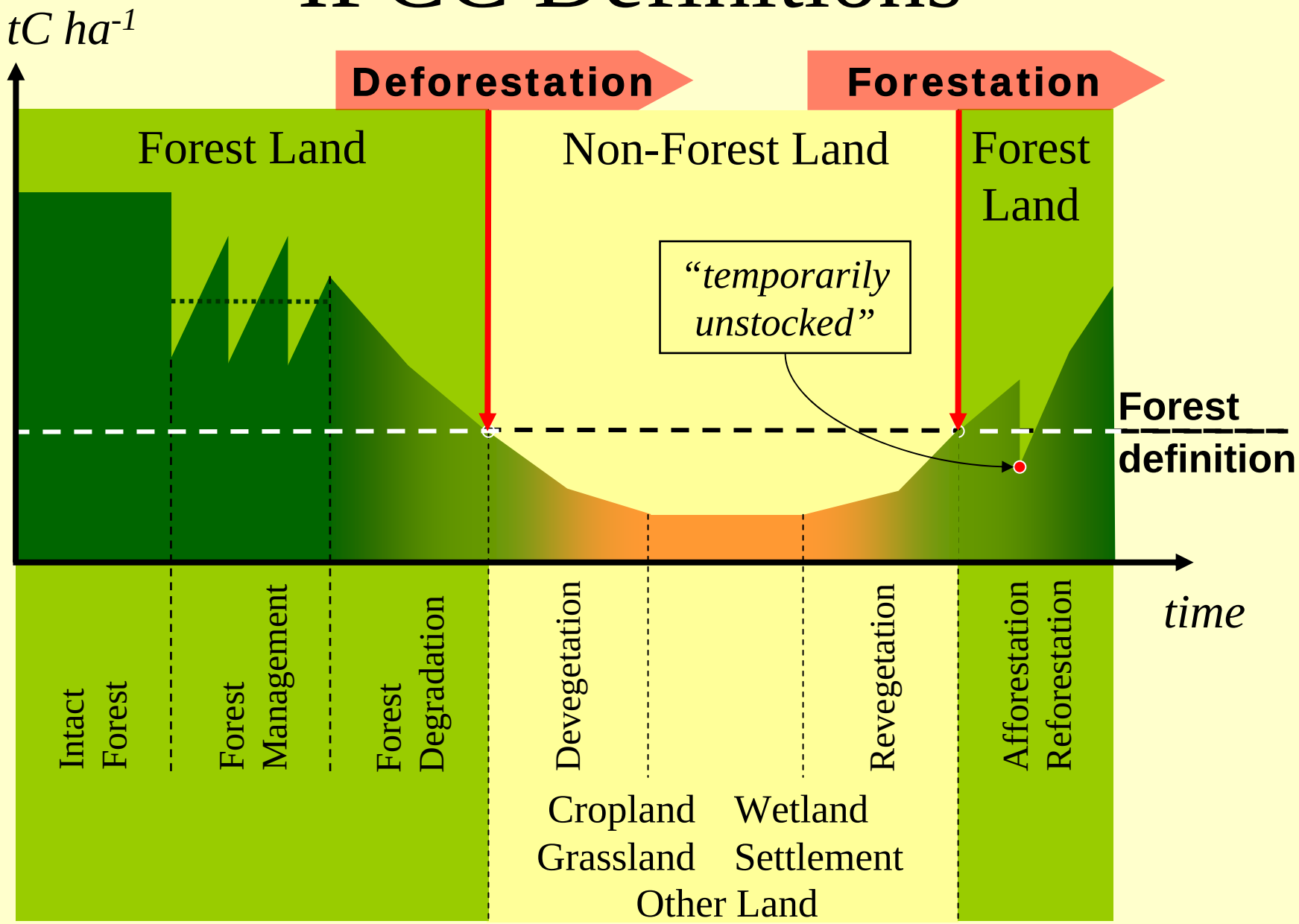


Deforestation and Forest Degradation





IPCC Definitions



Existing guidance

IPCC (www.ipcc.ch):

- Revised 1996 GL for National GHG Inventories.
- 2003 GPG for Land Use, Land Use-Change, and Forestry .
- 2006 GL for National GHG Inventories, Vol. 4, Agriculture, Forestry and Other land Uses (AFOLU).

Winrock International (www.winrock.org):

- Reducing GHG Emissions from Deforestation and Degradation in Developing Countries: a Sourcebook of Methods and Procedures for Monitoring, Measuring and Reporting.
- Land Use, Land Use Change and Forestry Projects.

Voluntary Carbon Standard (www.v-c-s.org):

- Guidance for Agriculture, Forestry and Other Land Use Projects