

WET CARBON

USING CARBON MARKETS TO MITIGATE CLIMATE CHANGE,
RESTORE WETLANDS AND SECURE LIVELIHOODS

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A CDM A/R methodology for mangrove restoration

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Background

- Danone Fund for Nature (DFN) - Mangrove restoration
- Contract between IUCN and Silvestrum - Expert writing team with top scientists
- Silvestrum:
 - Carbon asset creation
 - Sustainable land use
 - Pioneering in A/R, IFM, REDD and wetlands



Little attention so far to wetlands methodologies due to

- Lack of interest amongst project developers and investors
- Gaps in science regarding GHG emissions of degraded and forested mangrove habitats

Only due to a mandate from COP to the CDM EB is there a small-scale CDM A/R methodology for wetlands



Setting the scope

Wetlands are classified as per the definition of the category “wetlands” provided in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, and Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC 2003), which includes land that is covered or saturated by water for all or part of the year and that does not fall into the forest land, cropland, grassland or settlements categories. Rice cultivation areas are excluded.



A **tidal forest habitat** is a specific case of wetlands where trees or shrubs grow in a tidal environment, and therefore having soil or sediment that is usually water-logged, and saline or of variable salinity. A specific kind of tidal forest is the mangrove forest, where mangrove trees are the dominant tree species and where the climate is tropical.



Reforestation

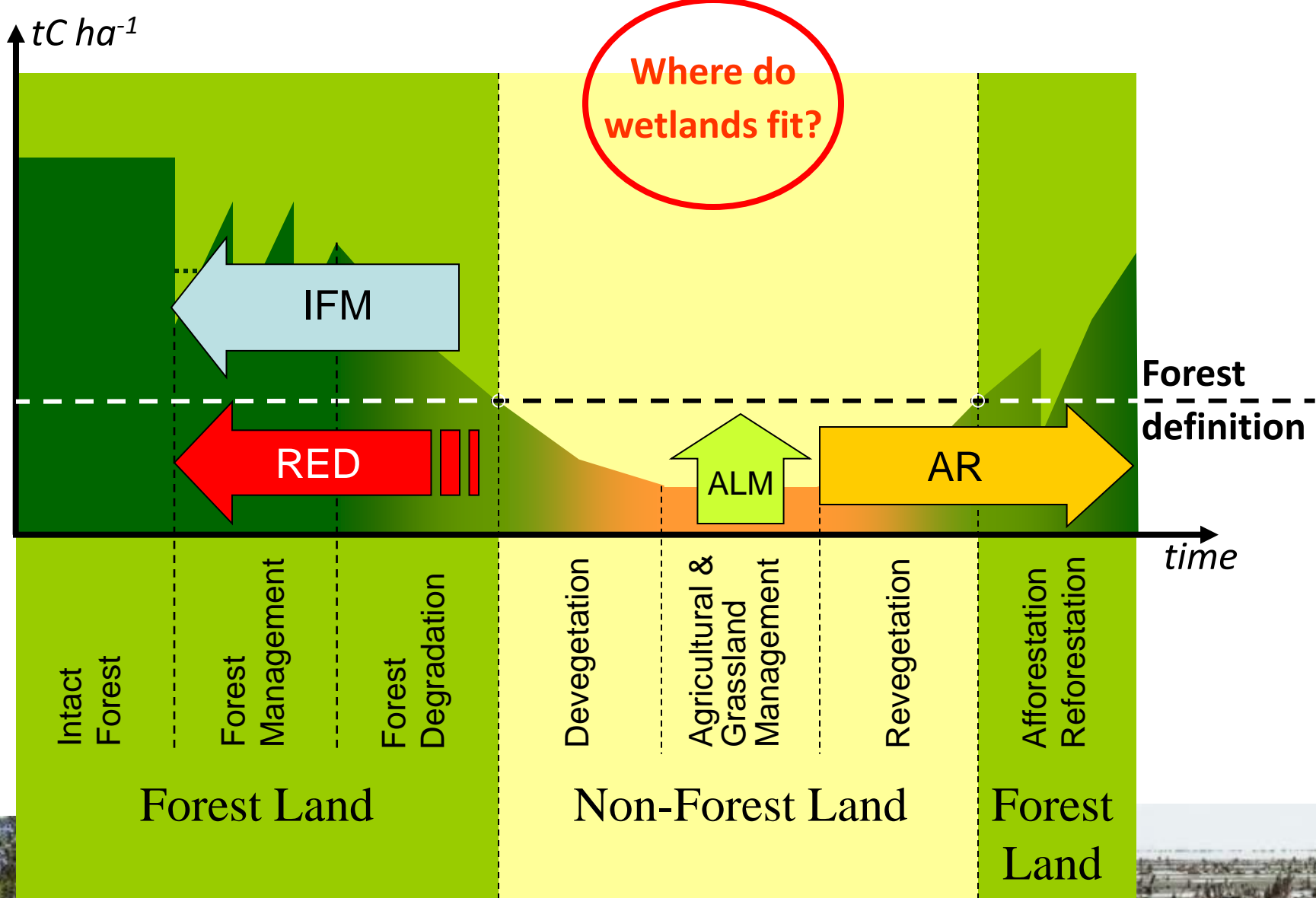
- CDM: “Conversion of non-forest land to forest land either by natural regeneration or by planting.”
- Eligible land:
 - The land at the moment the project starts is not forest
 - The activity is a reforestation project activity
 - The land was non-forest on 31 December 1989
- Country-specific definition of **forest** applies

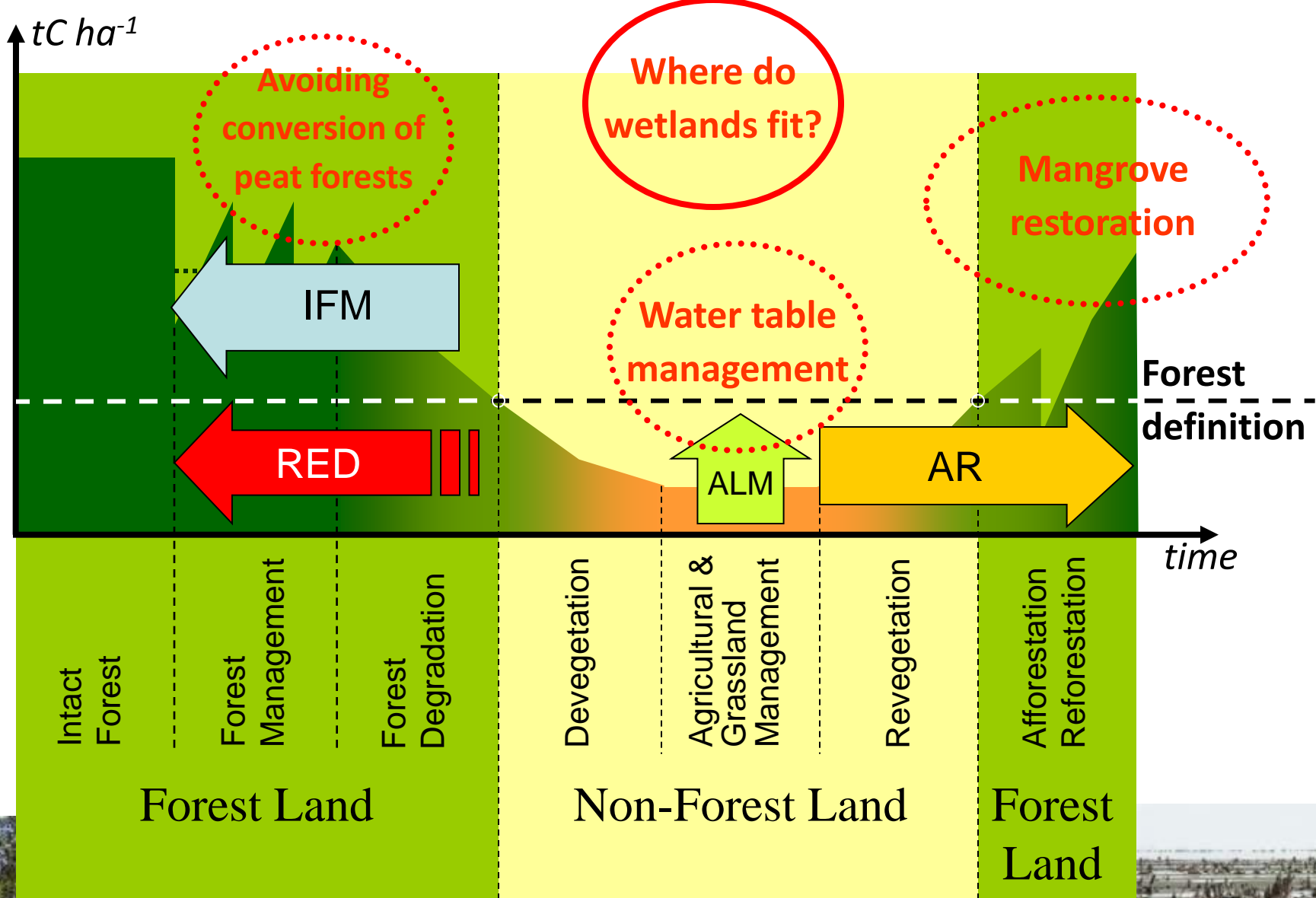


Applicability conditions:

- Limitations to and requirements for baseline conditions
- Limitations to and requirements for project interventions
- Limitations to carbon pools and GHGs, when justified







Alternative standards

- Other standards apply to voluntary markets
- Gold Standard - A/R category not covered
- VCS - most AFOLU covered but approval procedures more challenging
 - VCS includes ARR, and therefore the forest definition is not relevant
 - Land eligibility requirements are limited to that the project area shall not be cleared of native ecosystems within the 10 year period prior to the project start date



VCS AFOLU Peatland Rewetting and Conservation (PRC)

For example:

- Rewetting of drained peatland and ARR
- Conservation of undrained peatland and REDD
- Proxies for GHG estimates
- CH₄ and N₂O



Baseline & monitoring methodology

- 'Methodologies' focus on the assessment of:
 - GHG emissions and removals in the baseline scenario (*ex-ante*)
 - GHG emissions and removals in the project scenario (monitoring; *ex-post*)

In compliance with a standard (CDM, VCS,...)

A project applies the baseline methodology, submits project documentation, gets registered, implements the activity, monitors the results and is issued with carbon credits.



Baseline & monitoring methodology

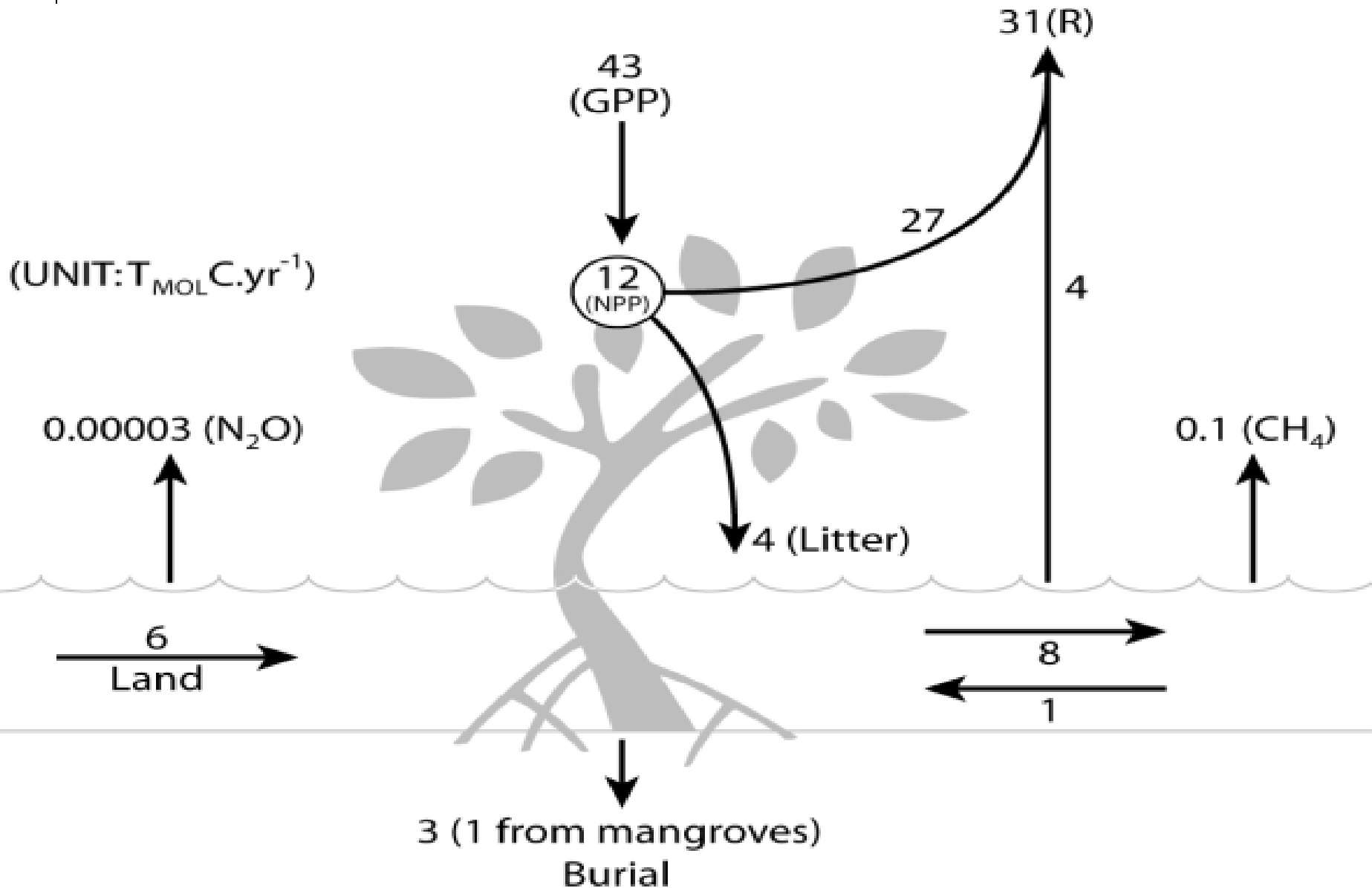
Main chapters:

- Boundaries (geographical, temporal, carbon pools, GHGs)
- Baseline scenario
- Additionality
- *Ex-ante* baseline emissions and removals
- *Ex-post* project emissions and removals
- Leakage
- Monitoring protocol



GHG fluxes in mangrove wetlands

(Alongi, 2007)



Principles of GHG accounting in CDM A/R

- Based on CDM A/R modalities and EB 'case law'
- Baseline scenario expressed in terms of carbon stock changes (gain-loss or stock change approach)
No baseline emissions
- Project scenario to include stock changes as well as on-site (project) emissions and off-site (leakage) emissions
- EB case law: project may omit accounting for project emissions if such emissions already existed in the baseline



General approach for including a pool or GHG

- Include full procedures if assessment/quantification is feasible (technically possible and affordable at the project scale) OR
- Include and adopt a conservative default value OR
- Exclude as per applicability condition
For exclusion might be considered:
 - Changes in SOC
 - CH₄ emissions (fresh organic matter under wet anoxic conditions)
 - N₂O emissions (e.g. N-fertiliser use)



CDM A/R small-scale methodology for wetlands

1. Applicability conditions limit the scope to reduce complexity, for example (not exhaustive):
 - Project activities are on degraded wetlands; tree and/or non-tree components declining or in a low carbon steady state
 - No changes in hydrology (e.g. include drainage, flooding, digging or ditch blocking)
 - <10% of the total surface project area is disturbed as result of soil preparation for planting

Organic soils: ploughing and drainage not allowed



CDM A/R small-scale methodology for wetlands

2. Carbon pools limited to AGB and BGB of trees - to be extended with SOC
3. Simplified baseline selection (= pre-project land used) – to be extended with full procedures
4. Simplified assessment of leakage – to be extended with full procedures



Applicability conditions

- Afforestation or reforestation of degraded tidal forest habitats, which are subject to further degradation or remain in a low carbon steady state, through assisted natural regeneration, tree planting, enhancing tree biomass and SOC.
- Project activities are implemented on degraded tidal forest habitats. The DNA of the host country shall provide a statement that project activities conform to national policies and legislation applicable to wetlands. If the host country is a Party to Ramsar or other conventions applicable to wetlands, the DNA shall additionally provide a statement that project activities conform to the provisions of the convention/s.



- N-fertilisers may not be used in the with-project scenario.
- This methodology is not applicable to project activities that are implemented on wetlands where the predominant vegetation comprises of herbaceous species in its natural state.
- No lowering of the mean annual water level of land subjected to project activities.

Restoring the natural hydrology of the area, e.g. by removing dams installed for pre-project activities such as aquafarming even if this lowers the mean annual water level if the previously dammed area, is allowed.



- If displacement of agricultural activities attributable to the A/R CDM project activity occurs, it shall not cause any drainage of wetlands or peatlands.
- On project land where drained peatland is present in the baseline, A/R activities must be combined with rewetting . The project area may not be affected by drainage activities that occur outside the project area.
- Project activities are implemented on lands where displacement of aquafarming does not result in leakage.

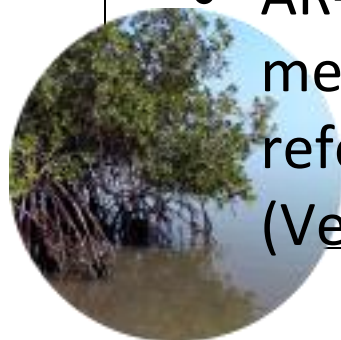


- Ploughing/ripping/scarification attributable to the A/R CDM project activity, if any, is minimised (requirements apply...)
- If at least a part of the project activity is implemented on organic soils, not more than 10% of their area may be disturbed as result of soil preparation for planting.
-and some more....



Methodologies and tools drawn upon

- AR-ACM0001 “Afforestation and reforestation of degraded land” (Version 05);
- AR-ACM0002 “Afforestation or reforestation of degraded land without displacement of pre-project activities” (Version 01);
- AR-AM0004 “Reforestation or afforestation of land currently under agricultural use” (Version 04)
- AR-AM0006 “Afforestation/Reforestation with Trees Supported by Shrubs on Degraded Land” Version 03)
- AR-AMS0003 “Simplified baseline and monitoring methodology for small scale CDM afforestation and reforestation project activities implemented on wetlands” (Version 01).



Tools

- Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities;
- Tool for the identification of degraded or degrading lands for consideration in implementing A/R CDM project activities;
- Tool for estimation of emissions from clearing, burning and decay of existing vegetation due to implementation of an A/R CDM project activity;
- Calculation of the number of sample plots for measurements within A/R CDM project activities;



- Tool for testing the significance of GHG emissions in A/R CDM project activities;
- Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity.
- Procedures to demonstrate the eligibility of lands for afforestation and reforestation CDM project activities.
- Guidance on application of the definition of the project boundary to A/R CDM project activities.



- Procedure to determine when accounting of the soil organic carbon pool may be conservatively neglected in A/R CDM project activities.
- Guidelines on conditions under which increase in GHG emissions attributable to displacement of pre-project crop cultivation activities in A/R CDM project activity is insignificant.
- Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant.



Baseline net GHG removals by sinks

Under the applicability conditions of this methodology:

- Changes in carbon stock of AGB and BGB of non-tree vegetation may be conservatively assumed to be zero.
- It is expected that the baseline dead wood and litter carbon pools will not show a permanent net increase. It is therefore conservative to assume that the sum of the changes in the carbon stocks of dead wood and litter carbon pools is zero for all strata in the baseline scenario.
- Since carbon stock in soil organic carbon (SOC) is unlikely to increase in the baseline, the change in carbon stock in SOC may be conservatively assumed to be zero for all strata in the baseline scenario.



Therefore:

$$\Delta C_{BSL} = \Delta C_{TREE_BSL}$$



Actual net GHG removals by sinks

$$\Delta C_{ACTUAL} = \Delta C_P - GHG_E$$

$$\Delta C_t = \sum_{i=1}^{M_{PS}} (\Delta C_{TREE,i,t} + \Delta C_{DW,i,t} + \Delta C_{LI,i,t} + \Delta C_{SOC,i,t})$$



Soil organic carbon

$$\Delta SOC_{i,t} = (SOC_{For,i,j} - SOC_{Non-For,i}) \times A_{i,j} / T_{For,i,j}$$

? ☹ ?



Project emissions limited to:

$$GHG_E = \sum_{t=1}^{t^*} E_{BIOMASS_BURN,t}$$



Addressing non-CO₂ GHGs

EB 22: “(...) only the increase of pre-project GHG emissions as a consequence of the implementation of the project activity has to be taken into account in the calculation of net anthropogenic GHG removals by sinks.”



Addressing non-CO₂ GHGs

Justification that the project activity does not enhance pre-project emissions (on the basis of CO₂ equivalent emissions)

- Based on own measurements (for which procedures are to be provided in the PDD, taking account of accuracy and uncertainty), or
- Based on transparent and verifiable information (e.g. in the form of peer-reviewed literature)



Time line and process

- Peer review: until 10 December
- Completion of methodology: before end of year
- Validation of methodology early 2011
 - Submission to CDM, not VCS

