विद्युत मंत्रालय
MINISTRY OF
POWER
सत्यमेव जयते

METHODOLOGY

BM FR05.002

Afforestation and reforestation of lands except wetlands

INDIAN Carb•n MARKET

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Version 1.0

Sectoral scope(s): Forestry

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1. Introduction

1. This methodology is adopted and refers to the latest approved version of the UNFCCC Clean Development Mechanism Methodology AR-ACM0003 (as valid from 04 October 2013).

2. It shall be the responsibility of the non-obligated entity and Accredited Carbon Verification Agency (ACVA) to note of any subsequent changes or revisions in the above-mentioned methodology while developing projects and performing validation and/or verification activity respectively.

3. This methodology allows afforestation and reforestation of any land that does not fall into the category of wetland. Where the land in its baseline land-use has soil organic carbon (SOC) content that is expected to be higher than that under the land-use of "forestry", the methodology restricts the extent of soil disturbance in the project to be no more than 10 per cent. The higher SOC content in the baseline may result either because of the nature of the soils (e.g. the soils are organic soils) or because of anthropogenic activities (e.g. soils are not tilled and external organic matter is added as inputs). Apart from this restriction on the extent of soil disturbance in certain types of soils and land-use practices, the methodology has a broad scope of application[1]. Project activities applying this methodology may choose to exclude or include accounting of any of the three carbon pools of dead wood, litter, and soil organic carbon.

2. Definitions

4. The definitions contained in the following documents shall apply:[2]

   (a) "Detailed Procedure for Offset Mechanism under CCTS";

   (b) "2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories".

5. For the purpose of this methodology, the following definition shall apply:

   (a) **Soil disturbance -** refers to any activity that results in a decrease in soil organic carbon (SOC), for example ploughing, ripping, scarification, digging of pits and trenches, stump removal, etc.

3. Scope & Applicability

3.1. Scope

6. This methodology excludes from its scope the land that falls into the category of wetland.

3.2. Applicability

7. This methodology is applicable under the following conditions:

   (a) The land subject to the project activity does not fall in wetland category;

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[1] For example, the land to be afforested or reforested does not have to be degraded land.

[2] These documents are available at https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html.

(b) Soil disturbance attributable to the project activity does not cover more than 10 per cent of area[3] in each of the following types of land, when these lands are included within the project boundary:

(i) Land containing organic soils;

(ii) Land which, in the baseline, is subjected to land-use and management practices

8. A project activity applying this methodology shall also comply with the applicability conditions of the tools contained within the methodology and applied by the project activity.

3.3. Methodology Approval Date

9. The date of adoption of this document shall be effective from 08/09/2025.

3.4. Applicability of approved adopted tools

This methodology also refers to the latest approved versions of the following adopted ICM tools.

(i) "BM-T-AR-001: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R ICM project activities" (hereinafter referred to as BM-T-AR-001);

(ii) "BM-T-AR-002: Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R ICM project activity" (hereinafter referred to as BM-T-AR-002);

(iii) "BM-T-AR-003: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R ICM project activities" (hereinafter referred to as BM-T-AR-003);

(iv) "BM-T-AR-004: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R ICM project activities" (hereinafter referred to as BM-T-AR-004);

(v) "BM-T-AR-005: Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R ICM project activity" (hereinafter referred to as BM-T-AR-005).

(vi) "BM-T-AR-006: Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R ICM project activities" (hereinafter referred to as BM-T-AR-006);

[3] For example, digging pits of size 0.50 m × 0.50 m (length × width) at a spacing of 3 m × 3 m is equal to a coverage of 2.78 per cent; continuous ploughing of land is equal to a coverage of 100 per cent.

4. Methodology: Baseline and Monitoring Component

4.1. Selection of carbon pools and greenhouse gases accounted

10. The carbon pools selected for accounting of carbon stock changes are shown in table 1.

Table 1. Carbon pools selected for accounting of carbon stock changes

Carbon pool	Whether selected	Justification/Explanation
Above-ground biomass	Yes	This is the major carbon pool subjected to project activity
Below-ground biomass	Yes	Carbon stock in this pool is expected to increase due to the implementation of the project activity
Dead wood Litter and Soil organic carbon	Optional	Carbon stock in these pools may increase due to implementation of the project activity

11. The emission sources and associated GHGs selected for accounting are shown in table 2.

Table 2. Emission sources and GHGs selected for accounting

Sources	Gas	Whether Selected	Justification/Explanation
Burning of woody biomass	CO_2	No	CO_2 emissions due to burning of biomass are accounted as a change in carbon stock
	CH_4	Yes	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology
	N_2O	Yes	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology

4.2. Identification of the baseline scenario and demonstration of additionality

12. The non-obligated entity shall identify the baseline and demonstrate that the project activity is additional by using BM-T-AR-001.

4.3. Stratification

13. If biomass distribution over the project area is not homogeneous, stratification should be carried out to improve the precision of biomass estimation. Different stratifications may be appropriate for the baseline and project scenarios in order to achieve optimal precision of estimation of net GHG removals by sinks. In particular:

(a) For baseline net GHG removals by sinks, it is usually sufficient to stratify the area according to major vegetation types and their crown cover and/or land use types;

(b) For actual net GHG removals by sinks the stratification for ex ante estimations is based on the project planting/management plan and the stratification for ex post estimations is based on the actual implementation of the project planting/management plan. If natural or anthropogenic impacts (e.g. local fires) or other factors (e.g. soil type) significantly alter the pattern of biomass distribution in the project area, then the ex-post stratification is revised accordingly.

4.4. Baseline net GHG removals by sinks

14. The baseline net GHG removals by sinks shall be calculated as follows:

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t} \quad \text{Equation (1)}$$

Where:

$\Delta C_{BSL,t}$	= Baseline net GHG removals by sinks in year *t*; t CO_2-e
$\Delta C_{TREE\_BSL,t}$	= Change in carbon stock in baseline tree biomass within the project boundary in year *t*, as estimated in BM-T-AR-004"; t CO_2-e
$\Delta C_{SHRUB\_BSL,t}$	= Change in carbon stock in baseline shrub biomass within the project boundary, in year *t*, as estimated in BM-T-AR-004; t CO_2-e
$\Delta C_{DW\_BSL,t}$	= Change in carbon stock in baseline dead wood biomass within the project boundary, in year *t*, as estimated in BM-T-AR-003; t CO_2-e
$\Delta C_{LI\_BSL,t}$	= Change in carbon stock in baseline litter biomass within the project boundary, in year *t*, as estimated in BM-T-AR-003; t CO_2-e

4.5. Actual net GHG removals by sinks

15. GHG emissions resulting from removal of herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero.

16. The actual net GHG removals by sinks shall be calculated as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t} \quad \text{Equation (2)}$$

Where:

$\Delta C_{ACTUAL,t}$	=	Actual net GHG removals by sinks, in year *t*; t CO_2-e
$\Delta C_{P,t}$	=	Change in the carbon stocks in project, occurring in the selected carbon pools, in year *t*; t CO_2-e
$GHG_{E,t}$	=	Increase in non-CO_2 GHG emissions within the project boundary as a result of the implementation of the A/R ICM project activity, in year *t*, as estimated in BM-T-AR-002; t CO_2-e

17. Change in the carbon stocks in project, occurring in the selected carbon pools in year *t* shall be calculated as follows:

$$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta SOC_{AL,t}$$ Equation (3)

Where:

$\Delta C_{P,t}$	=	Change in the carbon stocks in project, occurring in the selected carbon pools, in year *t*; t CO_2-e
$\Delta C_{TREE\_PROJ,t}$	=	Change in carbon stock in tree biomass in project in year *t*, as estimated in BM-T-AR-004"; t CO_2-e
$\Delta C_{SHRUB\_PROJ,t}$	=	Change in carbon stock in shrub biomass in project in year *t*, as estimated in BM-T-AR-004"; t CO_2-e
$\Delta C_{DW\_PROJ,t}$	=	Change in carbon stock in dead wood in project in year *t*, as estimated in the tool BM-T-AR-003; t CO_2-e
$\Delta C_{LI\_PROJ,t}$	=	Change in carbon stock in litter in project in year *t*, as estimated in the tool BM-T-AR-003; t CO_2-e
$\Delta SOC_{AL,t}$	=	Change in carbon stock in SOC in project, in year *t*, in areas of land meeting the applicability conditions of BM-T-AR-006; t CO_2-e

4.6. Leakage

18. Leakage emissions shall be estimated as follows:

$$LK_t = LK_{AGRIC,t}$$ Equation (4)

Where:

LK_t	=	GHG emissions due to leakage, in year *t*; t CO_2-e
$LK_{AGRIC,t}$	=	Leakage due to the displacement of agricultural activities in year *t*, as estimated in BM-T-AR-005"; t CO_2-e

4.7. Net anthropogenic GHG removals by sinks

19. The net anthropogenic GHG removals by sinks shall be calculated as follows:

$$\Delta C_{AR,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$$ Equation (5)

Where:

$\Delta C_{AR,t}$	=	Net anthropogenic GHG removals by sinks, in year *t*; t CO_2-e
$\Delta C_{ACTUAL,t}$	=	Actual net GHG removals by sinks, in year *t*; t CO_2-e
$\Delta C_{BSL,t}$	=	Baseline net GHG removals by sinks, in year *t*; t CO_2-e
LK_t	=	GHG emissions due to leakage, in year *t*; t CO_2-e

4.8. Calculation of CCCs

20. The CCCs for a verification period T = $t_2 - t_1$, (where t_1 and t_2 are the years of the start and the end, respectively, of the verification period) shall be calculated as follows:

$$tCCC_{t_2} = \sum_{1}^{t_2} \Delta C_{AR,t} \qquad \text{Equation (6)}$$

$$lCCC_{t_2} = \sum_{t_1+1}^{t_2} \Delta C_{AR,t} \qquad \text{Equation (7)}$$

Where:

$tCCC_{t_2}$	=	Number of units of temporary Carbon Credit Certificates issuable in year t_2
$lCCC_{t_2}$	=	Number of units of long-term Carbon Credit Certificates issuable in year t_2
$\Delta C_{AR,t}$	=	Net anthropogenic GHG removals by sinks, in year t; t CO_2-e
t_1, t_2	=	The years of the start and the end, respectively, of the verification period

21. If $ICCC_{t2} < 0$ then $ICCC_{t2}$ represents the number of *lCCCs* that shall be replaced because of a reversal of net anthropogenic greenhouse gas removals by sinks since the previous certification.

5. Monitoring Procedure

5.1. Monitoring plan

22. The monitoring plan shall provide for collection of all relevant data necessary for:

(a) Verification that the applicability conditions listed under paragraphs 3 and 4 have been met;

(b) Verification of changes in carbon stocks in the pools selected;

(c) Verification of project emissions and leakage emissions.

23. The data collected shall be archived for a period of at least two years after the end of the last crediting period of the project activity.

5.2. Monitoring of project implementation

24. Information shall be provided, and recorded in the project design document (PDD), to establish that the commonly accepted principles and practices of forest inventory and forest management in the host country are implemented. If such principles and practices are not known or available, standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for inventory operations, including field data collection and data management, shall be identified, recorded and applied. Use or

adaptation of SOPs available from published handbooks, or from the “IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry 2003”, is recommended.

5.3. Precision requirements

25. For this methodology, the precision requirements are those listed in BM-T-AR-004”.

5.4. Data requirements under the methodology

26. Description of data and parameters can be found in the tools used in this methodology.

27. Data and parameters obtained from measurement shall be monitored as required in the tools.

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Revision/Changes in the Document

Version	*Date*	*Description*
1.0	08 September 2025	Initial Adoption