Monitoring report form
(Version 03.1)

MONITORING REPORT

Title of the project activity	Moldova Community Forestry Development Project
Reference number of the project activity	8244
Version number of the monitoring report	01
Completion date of the monitoring report	15/04/2013
Registration date of the project activity	15/11/2012
Monitoring period number and duration of this monitoring period	First monitoring period (01/11/2006 - 31/12/2012
Project participant(s)	Public entity – Agency Moldsilva, International Bank for Reconstruction and Development as custodian of the BioCarbon Fund
Host Party(ies)	Republic of Moldova
Sectoral scope(s) and applied methodology(ies)	Sectoral scope – 14 Applied methodology - "Restoration of degraded lands through afforestation/reforestation" (AR-AM0002), Version 03.
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	**360,635.0**
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	**328,803.56**

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>> The Moldova Community Forestry Development Project was implemented to achieve multiple objectives of restoring productivity of degraded lands, enhancing forest product supplies to local communities and promoting actual net GHG removals by sinks.

The project seeks to restore degraded lands through afforestation involving Quercus robur, Robinia pseudoacacia and associated species. Other objectives of the project are to promote biodiversity improvement, create wood supply for household and rural construction needs. The project has adopted 30-year crediting period. The project is expected to generate revenue from the sale of timber and fuelwood from thinning and from the sale of temporary Certified Emission Reductions (tCERs) credits.

The total project area is 8,468.84 ha. The project area covers degraded lands eligible for undertaking afforestation and reforestation activities in the northern, central and southern regions of the country. The project consists of several discrete parcels, located in all districts of the Republic of Moldova, except Transnistria. The project is implemented by the Agency Moldsilva, the central public administration body on state policy of forestry and hunting of the Republic of Moldova. In collaboration with communities the Agency Moldsilva reforested mainly communal and some state owned lands

A.2. Location of project activity

>> Republic of Moldova is situated in the Southeastern Europe between $45^0$28' – $48^0$30' Northern latitude and $26^0$30' – $30^0$05' Eastern longitude. The project has been implemented in all districts of Republic of Moldova except the eastern territories of Transnistria, and it covers several categories of degraded lands such as degraded pastures, glades and abandoned arable lands eligible for undertaking afforestation and reforestation activities. Project boundaries were geographically delineated. The geographic coordinates for each project site (polygon) are recorded and are stored in the project data base together with the digital photos of the sites. Quality assurance and quality control procedures implemented as part of project monitoring conform to the requirements of monitoring methodology.

A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Moldova (host)	Public entity – Agency Moldsilva, International Bank for Reconstruction and Development as custodian of the BioCarbon Fund	No

A.4. Reference of applied methodology

>> The baseline and monitoring methodology applied in the project is "Restoration of degraded lands through afforestation/reforestation" (AR-AM0002), Version 03. This methodology uses the "Tool for the demonstration and assessment of additionality for afforestation and reforestation CDM project activities[1] " and "Procedures to define the eligibility of lands for afforestation and reforestation project activities"[2] .

The project also complies with the "Guidelines on application of specified versions of A/R CDM methodologies in verification of registered A/R CDM project activities (version 01.1) (EB 68, Annex31)"[3]; and "Guidelines on accounting of specified types of changes in A/R CDM project activities from the description in registered project design documents (version 01.0) (EB66, Annex 24)"

Finally, the project is in line with the tool for "Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities", EB 65, Annex 28.

[1] Throughout this document, "A/R additionality tool" refers to the document approved by the Executive Board of the CDM and is available at http://cdm.unfccc.int/methodologies/ARmethodologies/approved_ar.html

[2] http://cdm.unfccc.int/EB/022/eb22_repan16.pdf

[3] http://cdm.unfccc.int/Reference/Guidclarif/ar/methAR_guid30.pdf

A.5. Crediting period of project activity

>> 30 years (30yr-00mm) crediting period of the project is from 1 November 2006 to 31 October 2036. The crediting period of 30 years is of the 30 years project period.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

>> The implementation operational status of the project as of this monitoring period is in accordance with the latest version of the CDM Validation and Verification Standard[4]

Project area and boundaries

Project boundary and total area are identical to the details presented in the PDD. Implementation schedule of the planting was revised taking into account the impact of natural disaster events such as droughts, floods and operational conditions in the field. Severe droughts from 2007 – 2008 and 2011-2012, as well as floods during 2008 to 2010 affected the planted area of 100.14 ha.

Table B.1.1. Area planted by year

Plantation year	Plantation age (yr)	Total planted area (ha)	Project area with plantations (ha)	Project area affected by various natural disasters (ha)
A	B	C	D	E
2006	6	2,001.78	1,998.58	3.20
2007	5	2,976.65	2,950.15	26.50
2008	4	2,223.00	2,184.16	38.84
2009	3	1,245.41	1,213.81	31.60
2010	2	10.00	10.00	-
2011	1	12.00	12.00	-
Total		**8,468.84**	**8,368.7**	**100.14**

Note: Column C in the table presents the total project area distributed by planting years. Column D presents the plantations with the survival rate above 25% and column E – plantation area affected by various natural adverse factors and with poor/no plantation establishment (stratum with ERs zero).

1. The information regarding the actual operation of the project activity during this monitoring period, including information on special events, for example overhaul times, downtimes of equipment, exchange of equipment, etc.

Events in the project area are reported by field personnel/guards within current forest protection procedure of Agency Moldsilva and recorded in the event log. For the project purpose, the information is additionally reported in the "monitoring spreadsheet" in the autumn of each year.

Table B.1.2. Events in the project area

Time	Type of event	Data sources
2006-2012	Areas affected by various unfavorable factors that reduced survival rates, of the project in different locations.	Forest enterprise/district's records (hazards notifications, ad-hoc commissions' field check, event confirmation, reports, etc), pictures.

The project area of 100.14 ha (1.2% of project area) has been affected by various natural disasters (droughts, floods etc.) during 2007-2012. From those, 100.14 ha are foreseen for replanting in 2013-2014

[4] http://cdm.unfccc.int/stakeholder/workshops/poa/validation_verification.pdf

(March-April and October-December).

2. A brief description of: (i) events or situations that occurred during the monitoring period, which may impact the applicability of the methodology, and (ii) how the issues resulting from these events or situations are being addressed.

During the monitoring period either events or situations having the impact on the applicability of the methodology have been recorded.

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

>> No temporary deviations from registered monitoring plan or applied methodology are recorded.

B.2.2. Corrections

>> There were no corrections made during the monitoring period**.**

B.2.3. Permanent changes from registered monitoring plan or applied methodology

>> No permanent changes from registered monitoring plan or applied methodology are recorded.

B.2.4. Changes to project design of registered project activity

>> No changes to project design of registered project activity are recorded.

B.2.5. Changes to start date of crediting period

>> There is no change of the start date of crediting period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

>> As per the "Guidelines on accounting of specified types of changes in A/R CDM project activities from the description in registered project design documents" (Version 02.0) (Annex 24, EB 66), the changes in species composition, planting schedule and reduction in project area have not impacted the baseline scenario and additionality of the project. Therefore, as per the paragraph 6 of the "Procedures for notifying and requesting approval of changes from the project activity as described in the registered project design document" (EB 48, annex 66) and the "Guidelines on accounting of specified types of changes in A/R CDM project activities from the description in registered project design documents" (Version 02.0) (Annex 24, EB66), these changes are identified as minor in nature, and are to be confirmed by the designated operational entity at the verification without the need for submitting a notification or a request for approval, as listed in table B.2.6.1 below.

Table B.2.6.1: Types of changes from the description in the registered PDD as outlined in the guidelines (Annex 24, EB66) and their applicability to the implemented project

No.	Types of changes from the project description in the PDD of an A/R CDM project activity	Applicability to the project
a)	Changes in year-wise areas planted, possibly resulting in a part of the project area not being planted;	No, there were no changes in the year-wise area planted.

b)	Changes in species composition, if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage;	No, changes in species composition and stand models did not occur in the project implementation.
c)	Changes in stocking density, if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage;	No, there was no change in the stocking density.
d)	Changes in timing and choice of silvicultural operations;	No, there have been no changes in the timing and choice of silvicultural operation.
e)	Changes in timing of harvest occurring before the third verification;	No, there are no changes in the timing of harvest anticipated prior to third verification.
f)	Changes related to collection of non-timber forest products;	No.
g)	Changes in tree/shrubs propagation method;	No
h)	Changes in post-harvest re-planting/regeneration methods;	Not applicable as planted areas are not harvested
i)	Changes in technology employed;	No
j)	Changes in inputs (e.g. fertilizers, certified seeds, watering);	No
k)	Changes in stratification for sampling;	Yes, ex post stratification has been implemented taking into account site conditions, planting time, growth rates of species and other location specific factors.
l)	Changes in type of sample plots (e.g. temporary, permanent, point-sampling);	No
m)	Changes in number of sample plots and their allocation to strata;	Yes, as a follow up to ex post stratification, the calculation of number sample plots and their allocation has been revised.
n)	Changes in the project boundary (limited to reduction in project area), if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage;	No, changes in project boundary have not occurred. The project boundary at the verification is consistent with that at the baseline identification and additionality demonstration at the validation stage.
o)	Changes in quality assurance/quality control (QA/QC) procedures, where it can be demonstrated that the changed QA/QC procedures are used by the National Forest Inventory or were applied in another registered A/R CDM project activity;	No, there are no changes in quality assurance/quality control procedures.
p)	Changes in parameters, equations, or methods used in tree biomass estimation, if the applicability of the changed parameters, equations, or methods is demonstrated at verification using the "Tool for demonstration of applicability of allometric equations and volume equations in A/R CDM project activities" when available, or if the changed parameters, equations, or methods do not result in a decrease in precision of the estimate of tree biomass;	The project has adopted allometric equations specific to the project area. Some of these allometric equations are based on DCH instead of DBH (please refer to Calculation Sheet, worksheet "Standard Values" for list of allomteric equations by species using DBH or DCH). The parameters, equations or methods used in the biomass estimation are in line with the "Tool for demonstration of applicability of allometric equations and volume equations in A/R CDM project activities". The parameters, equations or methods do not result in the decrease in the precision of the estimate of tree biomass.

q)	Changes from provisions regarding shifting of pre-project activities, if the related emissions are estimated at verification using the tool "Changes from provisions regarding shifting of pre-project activities, if the related emissions are estimated at verification using the tool "Estimation of the increase in greenhouse gas (GHG) emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity". and are accounted for as leakage;	Not Applicable.
r)	Changes in use of fire in site preparation, if the related emissions are estimated at verification using the tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" and are accounted for as project emissions;	Not Applicable.
s)	Changes in extent of soil disturbance in site preparation, if the related emissions are estimated at verification using Equation (2) of the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" and are accounted for as project emissions;	Yes.
t)	Changes in methods of estimation of changes in any carbon pool, if the method applied at verification uses the latest version of the relevant approved tool and the applicability conditions of the methodology applied are consistent with the applicability conditions of the tool.	No, there are no changes in the methods of estimation of changes in carbon pools.

As per the "Guidelines on application of specified versions of A/R CDM methodologies in verification of registered A/R CDM project activities" (Version 01.1) (EB68, Annex31 [5], several early versions of methodologies applied in registered A/R CDM project activities contain requirements that were withdrawn during revisions/improvements of these methodologies. The guidelines (EB68, Annex31) allow a registered A/R CDM project activity to apply, at the time of verification, the improvements in the methodology that occurred after the date of registration of the project activity. The applicability of these guidelines to the implemented project is listed in table B.2.6.2.below.

Table B.2.6.2: Applicability of guidelines to the implemented project

Requirement	Guidelines	Applicability to the project
Monitoring of data and parameters	(i) Only data and parameters obtained from field measurement are required to be monitored; (ii) Monitoring is not required for data, parameters, or variables appearing as intermediate values in calculation steps and those taken	Yes, data and parameters required to be monitored in the methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" were measured.

5 http://cdm.unfccc.int/filestorage/4/4/29ZGXIPMWLUC7QY5R43NABH0SDK68T.pdf/eb68_repan31.pdf?t=STF8bW1mZXlsfDAw0p3_9jqbQ9-Du-NC78K1

	from existing sources (e.g. published literature)	
Sampling design, sample plot lay-out, and marking of permanent sample plots	(i) Use of temporary sample plots; (ii) Random lay-out of sample plots; (iii) A maximum allowable relative margin of error of the mean, for estimation of aboveground tree biomass, of ± 10% at 90% confidence level shall be allowed.	Yes, 90% confidence level was applied.
Accounting for uncertainty	Requirements related to uncertainty assessment, uncertainty analysis, methods of combining uncertainties, and uncertainty in expert judgment are superfluous and compliance with these requirements shall not be enforced.	Uncertainty analysis was not conducted as per these guidelines.
Field measurement of soil organic carbon	(i) Instead of field measurement of soil organic carbon, the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" shall be used for areas which meet the applicability conditions of the tool; or (ii) The value of change in soil organic carbon shall be set to zero. Consequently, monitoring of data and parameters related to estimation of changes in soil organic carbon shall not be required.	Yes, "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" was used for estimation of changes in soil organic carbon pool.
Clearance or burning of herbaceous vegetation	(i) Changes in carbon stocks resulting from clearance of herbaceous vegetation shall be set to zero; (ii) Emissions resulting from clearance or burning of herbaceous vegetation shall be set to zero. Consequently, monitoring of data and parameters related to (i) and (ii) above shall not be required.	Yes, loss of carbon in living herbaceous vegetation was not accounted for.
Estimation of emissions of nitrous oxide from use of fertilizers	Estimation and accounting of emissions of nitrous oxide from use of fertilizers shall not be required. Consequently, monitoring of data and parameters related to the above-mentioned emissions shall not be required.	The project did not use nitrogenous fertilizers. Therefore, emissions of nitrous oxide from use of fertilizers were not required to be monitored.
Burning of fossil fuel	Estimation and accounting of emissions from burning of fossil fuel, both within and outside the project boundary, shall not be required. Consequently, monitoring of data and parameters related to the above mentioned emissions shall not be required.	Yes, emissions from burning of fossil fuel, both within and outside the project boundary were not monitored and accounted for.

SECTION C. Description of monitoring system

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Organization of the project monitoring

The entities in the implementation of the project have responsibilities and obligations defined through operating regulations, orders of the Agency Moldsilva, bilateral contracts / agreements and other related documents in force. Responsibilities are stated in Agency Moldsilva General Director order no. 308-P /2007

I. The Agency Moldsilva will provide through:

a) Forest Fund, Guard and Protection Department:
- General coordination of implementation activities, project control and monitoring, including the cooperation with other ministries, departments, local public authorities, communities, NGO etc.;
- Approval of plans for carrying out of management of forest areas;
- Provision and distribution of forest products among enterprises;
- Approval of technical support and annual inventory of forest areas;
- Approval of forest management plans on tending activities in newly created forests, final harvest, and works on regeneration of stands;

b) Forestry units (forest enterprises, forestry and hunting enterprises and natural reserves):
- Identification of plots available for planting, signing of agreements with possessors of lands;
- Approval of agreements at territorial cadastre agencies and/or public notary;
- Receive plots for management/provisional use;
- Accomplishment of projects for plantation of forest crops;
- Soil preparation, planting, completion of forest crops;
- Technical support and annual monitoring of forest crops;
- Carrying out of tending activities, ensuring protection of forest crops;
- Accounting of expenditures for each plot;
- Coordination of plantation inventory with local public and environmental authorities;
- Transfer of forest crops in canopy closure stage of forest;
- Submission of reports to the Agency Moldsilva and to the PIU.

c) Forest Research and Management Institute (Project Implementation Unit):
- Coordination of project technical and management activities;
- Mapping of project land parcels using GPS and GIS and establishment of polygons
- Supervision of planting activities and technologies;
- Monitoring of carbon stocks, project emissions and ecological and social benefits;
- Monitoring and inventory of plantations;
- Comparison of data obtained from forestry enterprises and data collected independently;
- Preparation of monitoring report for initiating verification of the project by a designated operational entity;
- Preparation and submission of annual progress reports;
- Technical support on forest management (e.g., tending, maintenance, protection etc.);
- Organization of trainings within the framework of the project;
- Coordination and collaboration with other projects.

II. The World Bank (BioCarbon Fund):
- Development of the project documentation (Baseline Study, Monitoring Plan, PDD etc.);
- Submission of the project for registration at UNFCCC Secretariat;
- Verification of the project implementation process, including by the hiring a designated operational entity;
- Payment of contracted emission reductions.

III. Other participants:

a) Communities that allocated lands for the afforestation under MCFDP will carry out:
- Review of afforestation activities at the meetings of local Councils;
- Constitution of commission for selection of lands, consisting of representatives from mayoralties and territorial forestry units etc.;
- Decisions of local councils, that stipulate the use of such lands for growing forestry vegetation for the following 100 years;
- Reporting of identified lands for afforestation;
- Participation in inventory of forest plantations;
- Contribution to the implementation of agreements on afforestation, concluded between

forestry units and resolution of conflicts (e.g., illegal grazing, logging, opening of roads, mines, etc.).

b) Raional cadastre services:
- Participation in selection of lands for afforestation;
- Preparation of documentation for allocation of lands for afforestation;
- Approval of annual monitoring of forest plantations;
- Cadastre accounting of lands;

c) Territory ecological offices:
- Participation in the inventory of forest plantations;
- Monitoring of national and local programs on forest use, regeneration, and protection;
- Supervision of the observance of standards for the use of forest products;
- Protection of rare and endangered fauna and flora and species on the project sites;
- Analysis of the condition of new created forests.

Roles and responsibilities in monitoring

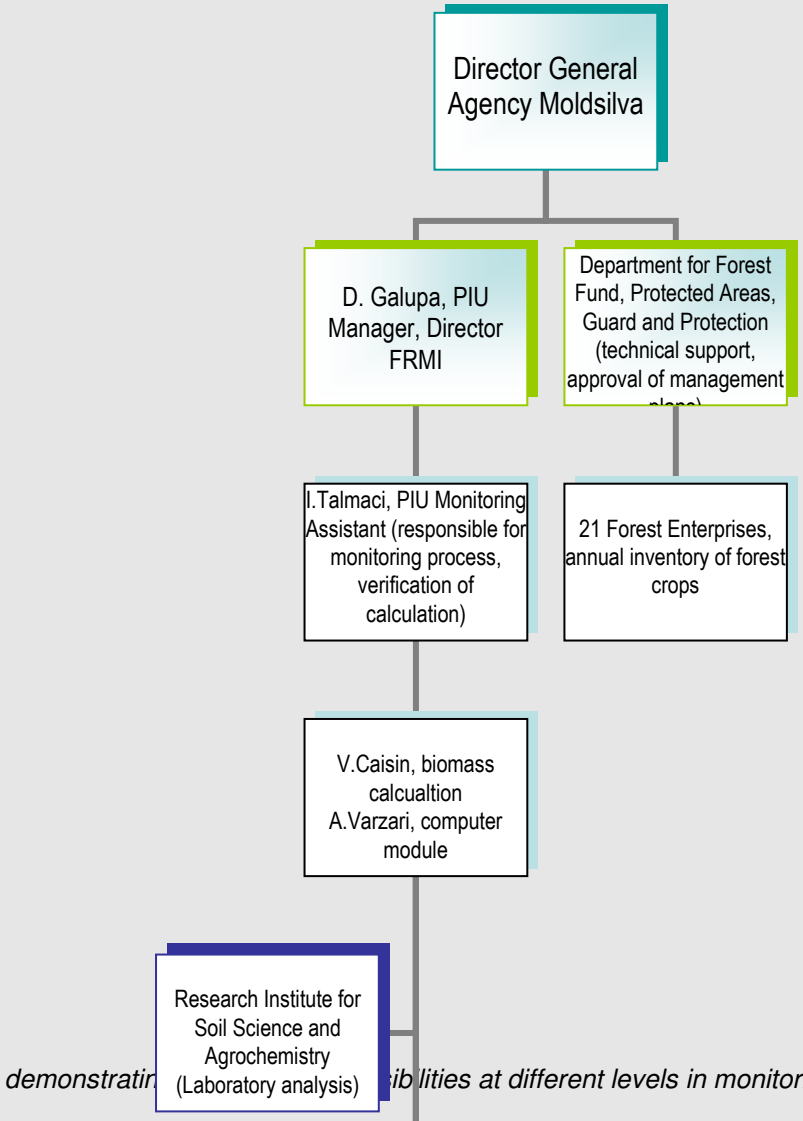

Figure 1. Diagram demonstratin ibilities at different levels in monitoring

Training

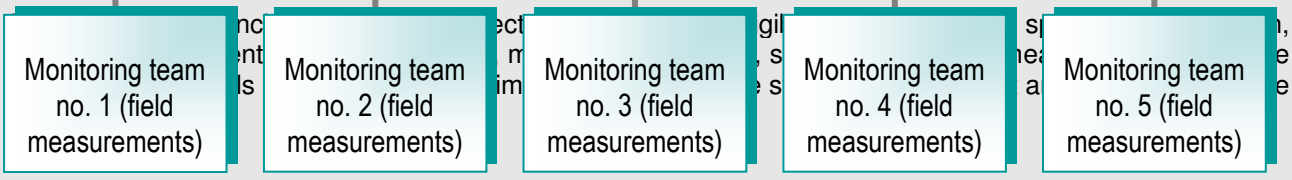

Table C.1. Trainings implemented as part of project implementation and monitoring

Date & place	Participants	Reporters	Issues discussed
12.10.2006, Chisinau	Chief engineers, engineers for forest regeneration from all FE.	P. Rotaru (Moldsilva), D. Galupa, I. Talmaci (FRMI, PIU);	New forestry projects: progress in presentation of initial documentation, present tasks. Progress in MSCP implementation.
12.06.2009, Chisinau	Chief forest engineers, engineers for forest regeneration form all FE	P. Rotaru (Moldsilva); D. Galupa (FRMI, PIU);	MSCP and MCFDP: implementation progress, current tasks etc.
26.11.2009, Chisinau	Chief forest engineers, engineers for forest regeneration form all FE.	P. Rotaru (Moldsilva); dr. D. Galupa (FRMI, PIU);	MSCP and MCFDP: implementation progress, current tasks, results of forest inventory etc.
10.12.2009, Chisinau	Chief forest engineers, engineers for forest regeneration form all FE.	P. Rotaru (Moldsilva); dr. D. Galupa (FRMI, PIU);	MSCP and MCFDP: implementation progress, current tasks, presentation of reports etc.
19.02.2010, Chisinau	Chief forest engineers, engineers for forest regeneration form all FE.	P. Rotaru (Moldsilva); dr. D. Galupa (FRMI, PIU);	MSCP and MCFDP: implementation progress, current tasks, condition of forest crops etc.
13.04.2011, Chisinau	Training of FRMI staff for sampling for the determination of C content in biomass in project area.	Dr. D. Galupa, I. Talmaci, (FRMI, PIU); dr. V. Caisin (head of staff for sampling);	Project Monitoring Plan with relevant annexes.
10.10.2011, Chisinau	Training of FRMI staff for sampling for the determination of C content in biomass in project area.	Dr. D. Galupa, I. Talmaci, (FRMI, PIU); dr. V. Caisin (head of staff for sampling);	Project PDD and Monitoring Plan with relevant annexes.
29.11.2012	Training of FRMI staff for quality control of monitoring activities for Moldova Community Forestry Development Project.	Dr. D. Galupa, I. Talmaci, L. Spitoc (FRMI, PIU); dr. V. Caisin (FRMI, forestry statistics), A. Varzari (IT);	Organization of monitoring process for MCFDP.
04.12.2012	Technical meeting with representatives of Forestry Enterprises and FRMI staff involved in field measurement.	Dr. D. Galupa, I. Talmaci, (FRMI, PIU);	Peculiarities of organization of field work in winter conditions, provision with equipment.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

(Copy this table for each piece of data and parameter.)

Data / Parameter:	C_{BSL}
Unit:	*t CO2-e*
Description:	Baseline net greenhouse gas removals by sinks
Source of data:	PDD, p. 69, Table 25: Baseline net GHG removals by sinks (t CO2e)
Value(s) applied):	13.615 t CO2 e
Purpose of data:	Data based on pre-project afforestation used for calculation of baseline net GHG removals by sinks
Additional comment:	Sum of baseline net greenhouse gas removals by sinks for the monitoring period from 2006 to 2012

Data / Parameter:	
Unit:	Alpha numeric

Description:	Sample plot ID
Source of data:	Project and plot map, GIS
Value(s) applied):	1-203
Purpose of data:	Identification of each sample plot
Additional comment:	

Data / Parameter:	***iID***
Unit:	Alpha numeric
Description:	Stratum *i*D (1, 2, 3, … *mSP* project scenario (*ex post*) strata)
Source of data:	Stand map, GIS
Value(s) applied):	1-10
Purpose of data:	100% /Defined according to the Table 4 of the present MR
Additional comment:	Each stand has a particular year to be planted under each stratum

Data / Parameter:	***IDikt***
Unit:	Alpha numeric
Description:	Stand ID
Source of data:	Stand map, GIS
Value(s) applied):	1- 23,986
Purpose of data:	100% /Defined as per planting distance
Additional comment:	Each stand has a particular year to be planted under each stratum

Data / Parameter:	***Confidence interval***
Unit:	Percent
Description:	Confidence level
Source of data:	
Value(s) applied):	90%
Purpose of data:	For the purpose of QA/QC of measurement, 90% was used as conservative approach
Additional comment:	Not monitored

Data / Parameter:	EF_{CH4}
Unit:	t CH_4 (t C)$^{-1}$
Description:	Emission factor for CH_4
Source of data:	IPCC 1996
Value(s) applied):	0.012
Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	Not monitored

Data / Parameter:	GWP_{CH4}
Unit:	Dimensionless
Description:	Global Warming Potential for CH_4
Source of data:	IPCC 1996
Value(s) applied):	21

Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	Not monitored

Data / Parameter:	EF_{N2O}
Unit:	
Description:	Emission factor for N_2O
Source of data:	IPCC 1996
Value(s) applied):	0.0007
Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	Not monitored

Data / Parameter:	GWP_{N2O}
Unit:	Dimensionless
Description:	Global Warming Potential for N_2O
Source of data:	IPCC 1996
Value(s) applied):	310
Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	Not monitored

Data / Parameter:	***12/44***
Unit:	Dimensionless
Description:	Ratio of molecular weights of carbon and CO_2
Source of data:	Universal constant
Value(s) applied):	12/44
Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	Not monitored

Data / Parameter:	***16/12***
Unit:	Dimensionless
Description:	Ratio of molecular weights of CH_4 and carbon
Source of data:	Universal constant
Value(s) applied):	16/12
Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	Not monitored

Data / Parameter:	***44/28***
Unit:	Dimensionless
Description:	Ratio of molecular weights of N_2O and nitrogen
Source of data:	Universal constant
Value(s) applied):	44/28
Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	Not monitored

Data / Parameter:	*Allometric equation**		
Unit:	Dimensionless		
Description:	Allometric equation for species j		
Source of data:	V.Blujdea, R. Pilli, I.Dutca, I.Ciuvat, I.V.Abrudan: Allometric biomass equations for young broadleaved trees in plantations in Romania., *Forest Ecology and Management (2011)*, doi: 10.1016/j.foreco.2011.09.042		
Value(s) applied):	See Table 9 of the present MR		
Purpose of data:	Allometric equation is used for species for which equations are available to calculate the above ground biomass		
Additional comment:	DBH was used in the calculation when the diameter of stem at breast height was more than 10 cm and/or collar diameter was more than 12 cm. DCH was used in the calculation for shrubs and trees with a high less than 1.5 m and/or with diameter at breast height less than 10 cm.		

Note *- The allometric equations used in this project activity have been published in the well known forestry journal Forest Ecology and Management (2011). As per the tool EB 65 Annex 28 "Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities" one out of three criteria must be fulfilled to show appropriateness of the allometric equation used.

(a) The equation is used in the national forest inventory, or the national GHG inventory, of the host Party:

The allometric equations used for this project have been developed by the Ministry of Research and Education of Romania for use in a Joint Implementation AR project. They have since been published in a peer reviewed article in the Journal of Forest Ecology and Management in 2011[6]. Since this publication, these equations are the best locally available equations to estimate biomass growth. Going forward, these allometric equations will therefore be used in Eastern European countries with similar edapho-climatic conditions as Romania for UNFCCC related projects and initiatives. These allometric equations are therefore applicable for this project.

(b) The equation has been used in commercial forestry sector of the host Party for ten years or more;

As these allometric equations have been developed specifically for young plantations as the ones planted in Romania and in this project, they will not be applied to commercial timber operations.

(c) The equation was derived from a data set of at least 30 sample trees, and the value of coefficient of determination (R^2) obtained was not less than 0.85.

In order to develop these allometric equations for a total of ten different species (either based on dch or dbh), 45 trees have been used. The value of coefficient of determination (R^2) obtained was higher than 0.85, the average R^2 obtained for dch was 0.9321 and for dbh was 0.9074.

It can therefore be concluded that this applicability criterion is fulfilled and that it is appropriate to apply the proposed allometric equations for the ex-post calculation of the GHG removals by sinks from this project.

Data / Parameter:	*CFj*
Unit:	tonnes C (tonne d.m.)-1
Description:	Carbon fraction for species *j (for biomass)*
Source of data:	IPCC (2003) GPG LULUCF
Value(s) applied):	0.5 (default)
Purpose of data:	Carbon fraction default value is used to convert biomass in to carbon stock
Additional comment:	

[6], [10] V.Blujdea, R. Pilli, I.Dutca, I.Ciuvat, I.V.Abrudan: Allometric biomass equations for young broadleaved trees in plantations in Romania., Forest Ecology and Management (2011), doi:10.1016/j.foreco.2011.09.042

Data / Parameter:	***CFj***
Unit:	tonnes C (tonne d.m.)-1
Description:	Carbon fraction for species *j (for roots)*
Source of data:	IPCC (2003) GPG LULUCF
Value(s) applied):	0.48 (default)
Purpose of data:	Carbon fraction default value is used to convert biomass in to carbon stock
Additional comment:	

Data / Parameter:	CF_L
Unit:	tonnes C (tonne d.m.)-1
Description:	Carbon fraction for litter
Source of data:	AR AM0002 Version 03 methodology
Value(s) applied):	0.370 (default)
Purpose of data:	Carbon fraction default value is used to convert biomass in to carbon stock
Additional comment:	

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter:	A_i
Unit:	Hectares
Description:	Area of stratum i
Measured/ Calculated / Default:	Measured
Source of data:	Project, Land use and Cadastre Office, GIS
Value(s) of monitored parameter:	See calculation sheet worksheet 02.5 Stratification
Monitoring equipment:	GIS or/and GPS
Measuring/ Reading/ Recording frequency:	At the start of the project and thereafter at monitoring intervals prior to each verification
Calculation method (if applicable):	
QA/QC procedures:	Checked during monitoring period
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***A***
Unit:	Hectares
Description:	Total area of all strata (A), e.g. the total project area
Measured/ Calculated / Default:	Calculated
Source of data:	Project, Land use and Cadastre Office, GIS

Value(s) of monitored parameter:	8,468.84
Monitoring equipment:	GIS or/and GPS
Measuring/ Reading/ Recording frequency:	At the start of the project and thereafter at monitoring intervals prior to each verification
Calculation method (if applicable):	
QA/QC procedures:	Checked during monitoring period
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	A_{ikt}
Unit:	Hectares
Description:	Area of stratum i, stand model k, at time t
Measured/ Calculated / Default:	Measured/calculated
Source of data:	Project, Land use and Cadastre Office, forest enterprises
Value(s) of monitored parameter:	See Annex 1of this monitoring report.
Monitoring equipment:	GIS or/and GPS
Measuring/ Reading/ Recording frequency:	At the start of the project and adjusted thereafter every 5-year
Calculation method (if applicable):	Calculation of actual net GHG removals by sinks
QA/QC procedures:	Checked during monitoring period
Purpose of data:	
Additional comment:	

Data / Parameter:	***AP***
Unit:	m^2
Description:	Sample plot area
Measured/ Calculated / Default:	Measured
Source of data:	Monitoring measurement
Value(s) of monitored parameter:	250
Monitoring equipment:	GIS or and GPS, compass, tape
Measuring/ Reading/ Recording frequency:	5-year
Calculation method (if applicable):	
QA/QC procedures:	Plot location and area checked and verified during monitoring period
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***t ID***
Unit:	year
Description:	Age of plantation
Measured/ Calculated / Default:	Counted since year of planting
Source of data:	act of technical reception from forest enterprises
Value(s) of monitored parameter:	0-6
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	5-year
Calculation method (if applicable):	Planted in 2006 means 6 years, planted in 2007 means 5 years etc.
QA/QC procedures:	Age is verified during monitoring period
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***tr ID***
Unit:	
Description:	No of tree on plot
Measured/ Calculated / Default:	
Source of data:	Sample plot measurement
Value(s) of monitored parameter:	See Calculation of tCO2e spreadsheet
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	5-year
Calculation method (if applicable):	Trees are counted in the plots of each stratum.
QA/QC procedures:	10% re-measurements have been carried out.
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***n***
Unit:	Number
Description:	Sample size (total number of sample plots required in the project area) in the project area
Measured/ Calculated / Default:	calculated
Source of data:	PDD and re-stratification
Value(s) of monitored parameter:	203

Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	5-year
Calculation method (if applicable):	
QA/QC procedures:	To check the sample size changes after expost-stratification.
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	n_i
Unit:	Number
Description:	Sample size (total number of sample plots required in the project area) in stratum *i*
Measured/ Calculated / Default:	Calculated
Source of data:	PDD and expost-stratification
Value(s) of monitored parameter:	see Table 4 from the present MR
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	5-year
Calculation method (if applicable):	
QA/QC procedures:	To check for the change sin sample size changes after expost stratification
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***Latitude/longitude of sample plot location***
Unit:	lat/long coordinates
Description:	Location of sample plots
Measured/ Calculated / Default:	Measured
Source of data:	Project and plot maps, GPS, GIS
Value(s) of monitored parameter:	GPS coordinates – see Shape files
Monitoring equipment:	Garmin Oregon 450 GPS (for geographical positioning with accuracy of up to 3 m)
Measuring/ Reading/ Recording frequency:	5 years
Calculation method (if applicable):	
QA/QC procedures:	Sample plot locations are checked and verified using GPS coordinates
Purpose of data:	
Additional comment:	

Data / Parameter:	***DBH/***
Unit:	cm
Description:	Diameter at breast height of living trees. It was measured for trees when the diameter of stem at breast height was more than 10 cm and/or collar diameter was more than 12 cm.
Measured/ Calculated / Default:	Measured
Source of data:	Sample plot measurement
Value(s) of monitored parameter:	See calculation of tCO_2e spreadsheet
Monitoring equipment:	Calliper, calibrated to ensure the correctness of measurements.
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	
QA/QC procedures:	Diameter measurements are randomly checked during monitoring period.
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***DCH/collar diameter for shrubs***
Unit:	cm
Description:	Diameter at collar height for shrubs and trees with a height less than 1.5 m and/or with diameter at breast height less than 10 cm.
Measured/ Calculated / Default:	Measured
Source of data:	Sample plot measurement
Value(s) of monitored parameter:	See calculation of tCO_2e spreadsheet
Monitoring equipment:	Calliper, calibrated to ensure the correctness of measurements.
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	
QA/QC procedures:	Diameter measurements (10%) are randomly checked during monitoring period
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***Species j***
Unit:	
Description:	Tree species j in the sample plot
Measured/ Calculated / Default:	Determination
Source of data:	Afforestation projects from forest enterprises

Value(s) of monitored parameter:	Sc – *Robinia pseudoacacia* St – *Quercus* spp.
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	
QA/QC procedures:	10% of PSPs have been randomly re-measured.
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***Standing deadwood***
Unit:	Tonnes C
Description:	Standing dead wood of species j
Measured/ Calculated / Default:	Measured
Source of data:	Sample plot measurement
Value(s) of monitored parameter:	N/A
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	
QA/QC procedures:	Measurements are randomly checked (10%) during monitoring period
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***Lying deadwood***
Unit:	Tonnes C
Description:	Lying dead wood of species j
Measured/ Calculated / Default:	Measured
Source of data:	Sample plot measurement
Value(s) of monitored parameter:	N/A
Monitoring equipment:	Lying dead wood within the sample plots is sampled using the line intersect method (Harmon and Sexton, 1996). Two 50 meter length lines are established bisecting each plot along a random bearing, and the diameters of lying dead wood (≥□5 cm diameter) intersecting the lines are measured at the point of intersection.
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	
QA/QC procedures:	Measurements are randomly checked during monitoring period

Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***Litter (wet litter biomass)***
Unit:	g
Description:	Wet weight of the litter sample
Measured/ Calculated / Default:	Measured
Source of data:	Sample plot measurement
Value(s) of monitored parameter:	See calculation of tCO_2e spreadsheet
Monitoring equipment:	Sample frame (the square of 0,3 m^2) and scales to measure litter in the field and equipment to dry it in laboratory
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	
QA/QC procedures:	Measurements are randomly checked (10%)
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	***Soil carbon***
Unit:	Tonnes C
Description:	Soil carbon
Measured/ Calculated / Default:	Measured
Source of data:	Sample plot measurement
Value(s) of monitored parameter:	0.8 tonnes C/ha/year
Monitoring equipment:	"Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" (version 01.1.0) was used and default soil carbon sequestration value referenced in the tool and applicable to the methodology AR-AM0002 as per the "Guidelines on application of specified versions of A/R CDM methodologies in verification of registered A/R CDM project activities" (version 01.0) (Annex 26, EB63).
Measuring/ Reading/ Recording frequency:	20 year
Calculation method (if applicable):	
QA/QC procedures:	Data used in the calculations using the tool are checked
Purpose of data:	Calculation of actual net GHG removals by sinks
Additional comment:	

Project emissions

Data / Parameter:	B_{ijt}
Unit:	Tonnes d.m. ha-1

Description:	Average above-ground biomass burnt in natural fire for stratum i, species j, time t
Measured/ Calculated / Default:	Measured
Source of data:	Reports from forest enterprises
Value(s) of monitored parameter:	See calculation of tCO_2e spreadsheet
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	After each event
Calculation method (if applicable):	Allometric equations
QA/QC procedures:	Biomass measurement is checked and verified during monitoring period
Purpose of data:	Calculation of project non-CO_2 emissions
Additional comment:	

D.3. Implementation of sampling plan

>>

Sample frame

Out of the total project area (8,468.84 ha), 100.14 ha (1.2% of project area) has been affected by natural disasters (drought, flood etc.) and is consequently designated as a separate stratum with zero GHG removals.

As part of the ex post stratification, 10 strata were recognized, and the sample size of 203 PSP (Permanent Sample Plots) for biomass was calculated using both, AR-AM0002 v.03 equations (section 3, 2.b (i)) and the Winrock Sampling Tool[7]. To sample plots per stratum, the total of 203 samples were allocated to each stratum depending on the weight of the stratum area in the project. The distribution of PSP over the 10 project strata is illustrated in Table 5. Stratification was based on the following indicators: species, site productivity, age and survival: main species (Quercus, Robinia); site productivity (rich soil (humus>2%), poor soil (humus<2%); age (<3 year, >3 year); survival rate category (25.1-50%; >50%). It was decided that if one stratum holds more than 5% of the total project area, then it will obtain one PSP. Given the very uneven representation of the strata in the project and to include some important species such as oak it was decided that some of the strata that represent less than 5% or the project area will also be represented by a PSP.

Current project area stratification which is the basis for GHG computation is shown in Table D.1.

Table D.1.: Planting area breakdown by species, age and survival rate

Stratum	Stratum Name	Area (ha)	Rounded Plot Quantity
stratum 1	Quercus_PoorSoil_Age>3_Surv_>50	37.46	1
stratum 2	Quercus_RichSoil_Age>3_Surv_>50	51.86	1
stratum 3	Robinia_PoorSoil_Age<3_Surv_>50	324.46	6
stratum 4	Robinia_PoorSoil_Age<3_Surv_25,1-50	43.51	1
stratum 5	Robinia_PoorSoil_Age>3_Surv_>50	1,682.54	28
stratum 6	Robinia_PoorSoil_Age>3_Surv_25,1-50	258.82	5

[7] http://www.winrock.org/ecosystems/files/Winrock_Sampling_Calculator.xls

stratum 7	Robinia_RichSoil_Age<3_Surv_>50	824.54	23
stratum 8	Robinia_RichSoil_Age>3_Surv_25,1-50	740.89	20
stratum 9	Robinia_RichSoil_Age>3_Surv_>50	4,404.62	118
stratum 10	Zero emission reductions	100.14	0
TOTAL		**8,468.84**	**203**

For the purpose of defining the location of PSP, the following procedure was applied:

- First, all sectors of a respective stratum were grouped together in an excel database.
- The stratum map of MCFDP was designed in graphic format (figure 2).
- Based on the predefined number of PSP, Visual Basic Application was used to randomly generate the project sectors in which the PSP would be located.
- For the determination of location of PSP within the previously identified sectors, a specially developed computer module (RandRoute) was used to randomly generate GPS coordinates within those sectors. These coordinates represent one corner of the PSP.

The sample plots were used to conduct measurements of the carbon pools of the project. The GHG removals by sinks were calculated by applying the guidance and equations of the methodology to the measurements conducted on sample plots. Sampling, fieldwork and laboratory processing, and data processing were conducted as per the Monitoring Plan of the PDD. As per the guidance of Annex31, EB 68 applicable to AR-AM0002, the calculation of the GHG removals by sinks from soil pool was conducted by applying the “Tool for estimation of change in soil carbon stocks due to the implementation of A/R CDM project activities” (v.01.1.0) (EB 60, Annex 12)

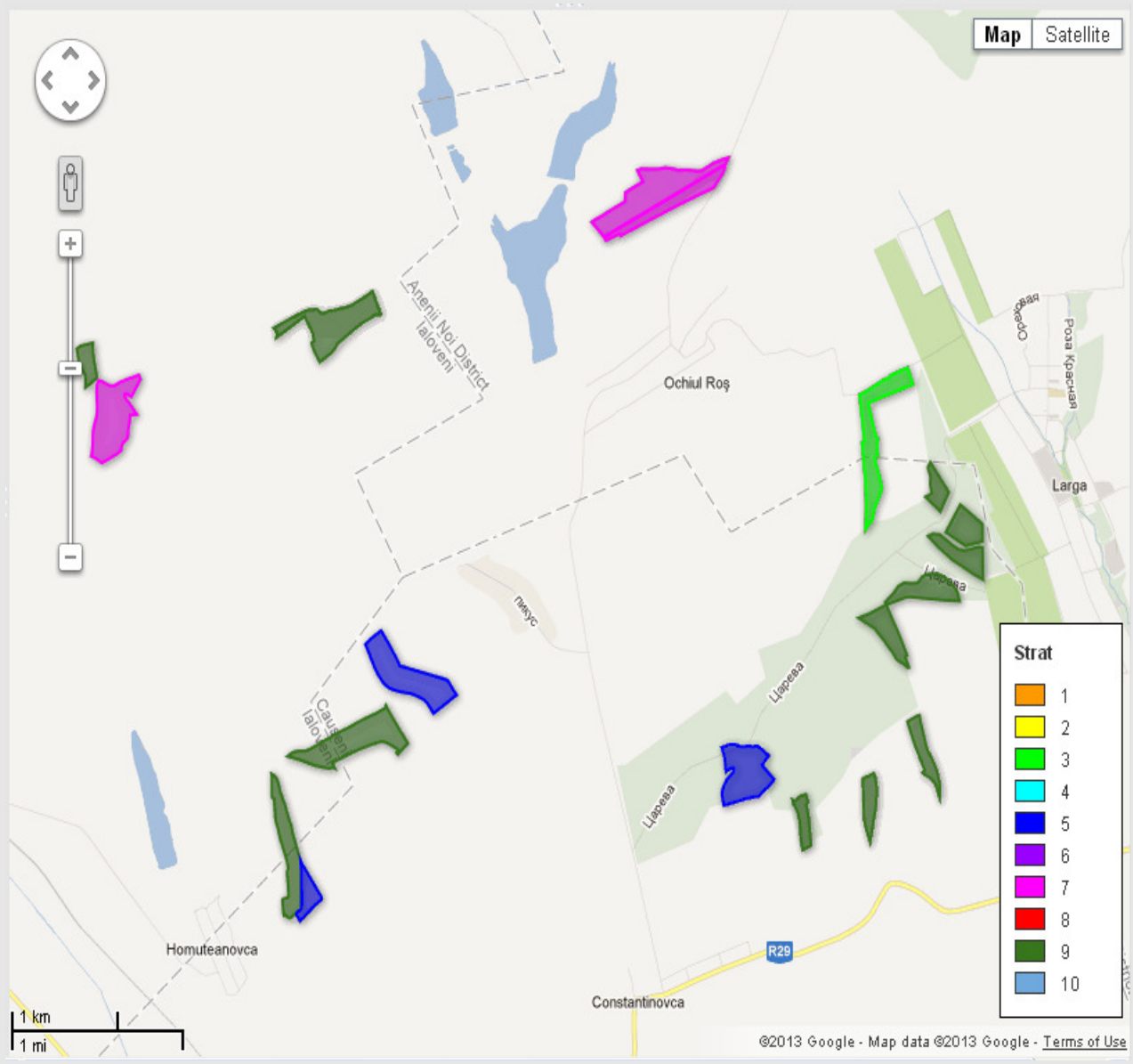

Figure 2. Fragment of the stratum map of the MCFDP.

Monitoring in the field

The plots were marked by GPS coordinates with wooden poles (one of the corner of permanent monitoring plot (PSP). For the purpose of verification, the measurements were conducted on 203 PSPs. These 203 PSPs were located taking into account the proportion of the area of the strata to the total project area. Permanent monitoring plots were established with an area of 250 m^2 (sides of 5 X 50 m), which includes nested small sample plots of 50 m^2 within the large plot.

The following scheme demonstrates the monitoring points of field measurements.

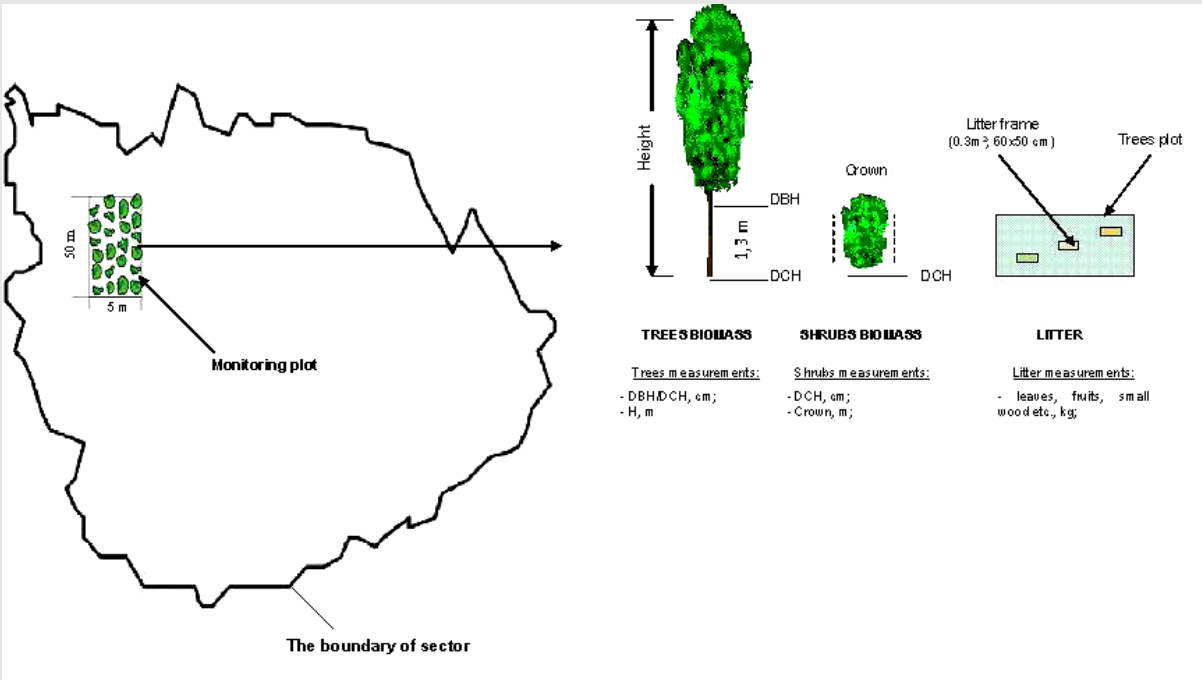

Figure 3. Scheme of the project monitoring points.

Field team members were trained in the theoretic and practical aspects of forest inventory and measurements. Five teams were organized for conducting measurements with two teams working in the Northern part of the country, one team working in the Central part of the country and two teams working in the Southern part. A team was composed of 3 research staff (provided by FRMI). Each team was led by a chief in charge of the survey, collection and recording of data as per the procedures of monitoring.

Collar diameter (DCH) and diameter at breast height (DBH) were measured to determine aboveground biomass. Collar diameter was measured close to the ground surface. DBH was measured when the trees were the higher than 1.3 m and the diameter was bigger than 2.5 cm with the observance of general dendrometry rules. Diameters were measured with callipers in centimeters with a digit after the comma. In the cases of two or more stems from one root, this detail was recorded in the field worksheets. On slopes, diameters were measured only in the upstream.

Basal diameter, height and diameter of shrub crown were measured for shrubs in small plots (5 m x 10 m) that are located within large plots.

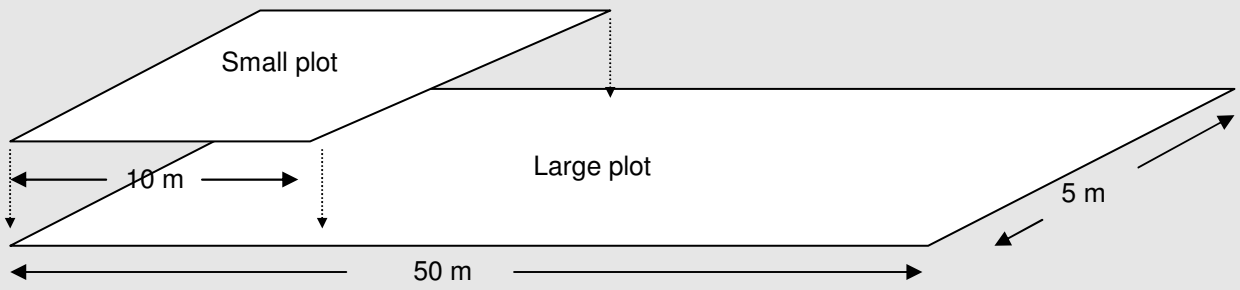

Figure 4. Scheme of nested plots

Litter (all dead organic material on top of mineral soil) samples were collected from the sample plots. One diagonal line was laid from one corner of the sample plot to another, and it was divided into 4 equal parts. On the intersection of short segments, the frame (50 cm x 60 cm) was placed (3 times).

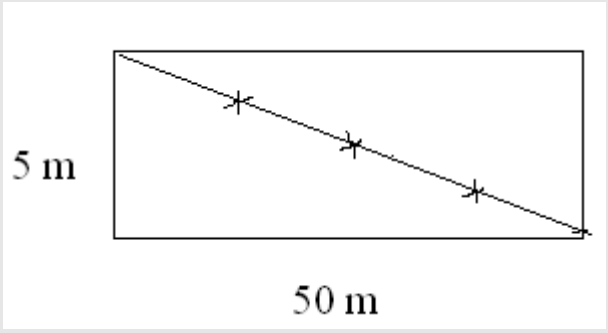

Figure 5. Placement of frame for the litter sampling (indicated as x)

All the litter inside the frame was collected and weighed. Then three litter samples were mixed on a rubber sheet and a subsample of approx. 100-150 g was taken for moisture content determination in laboratory.

To determine biomass, allometric equations with known regression coefficients for the main forest species were used, for forest trees and shrub species for which regression coefficients are not known - general regression coefficients were used.

Biomass data are recorded on each individual tree (dch and/or dbh), in the field sheets. Original field sheets are stored in the project database.

Once measured and calculated, the biomass from the sample plots is expanded and applied to the entire stratum area.

Biomass sub-samples of litter are placed in sealed plastic bags and labeled (according the labeling instructions contained in the monitoring plan).

All field phases are rechecked on the spot by the “team chief”. Tree diameter is re-measured for 10% of trees in the permanent monitoring plot (PSP).

Monitoring equipment

Information on the equipment used for monitoring and measurement in the field is outlined in the Table below.

Table D.2. Monitoring equipment

Manufacturer	Name/Type and serial number	Date of calibration	Uncertainty	Remarks
Compass for measuring bearings;	БГ-1, N00650	03.12.2012		
Metal tapes (20 m) for measuring distances;	Commer ial product	03.12.2012		
Metal tapes (30 m) for measuring distances;	Commercial product	03.12.2012 03.02.2013		
Metal tapes (5 m) for measuring tree height;	Commercial product	03.12.2012		
Global Positioning System (GPS) for locating plots;	Garmin Oregon 300	-	4-10 m 3-10	Calibrated prior to every field use
Global Positioning System (GPS) for locating plots;	Garmin Oregon 450	-	3-10	Calibrated prior to every field use
Tree diameter tape for measuring trees;	Standard			N/A
Hyspometer/Clinometers to measure tree height & slope;	Suunto			Calibrated prior to every field use

Caliper to measure small tree diameters	Commercial product	03.12.2012	-	-
Spring scales for weighing destructive biomass samples;	WH	03.12.2012		

Calibration procedures

The GPS, caliper, clinometers and scales are calibrated prior to every use in the field for monitoring and verification purposes. These instruments are calibrated using standard forest management and inventory operating procedures of Moldsilva.

In the laboratory

Sub-sample of litter has been collected from each PSP for determination of moisture, based on which total dry mass was calculated. Sub- samples were dried in an oven (105℃) to constant mass so as to determine dry mass.

Data entry

Data collected on field forms was transferred to spreadsheets and field forms and laboratory records were archived. A person not involved in the data entry was used to verify the correctness of data entered in the spreadsheets comparing the spreadsheets with the field sheets. In addition, a second spot check was performed by the BioCarbon Fund team in order to compare the data entered into CO_2 calculation spreadsheet and field sheets.

Involvement of third parties

Determination of C content and of dry matter in litter has been established by an independent party: Research Institute for Soil Science and Agrochemistry, 100, Ialoveni str., mun. Chisinau, (results provided under the contract no 43 as of 03 December 2012).

Database and calculation tool

The Project Entity uses excel forms for digitalizing field data. The data for 203 sample plots will be shared with the DOE in smart excel forms.

The data collected and stored in the monitoring system was used to conduct calculations at stratum and project levels.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>> The baseline net GHG removals are not monitored. Therefore, the table below presents the values presented in the PDD at project registration.

Table E.1.: Baseline net GHG removals by sinks

Year	Annual estimation of baseline net anthropogenic GHG removals by sinks in tones of CO_2 e
2006	588
2007	1,059
2008	1,507
2009	1,969
2010	2,428
2011	2,831
2012	3,233

Total estimated baseline net GHG removals by sinks (tones of CO_2 e)	13,615
Total number of crediting years	6
Annual average over the crediting period of estimated baseline net GHG removals by sinks (tones of CO_2 e)	2,269.2

E.2. Calculation of project emissions or actual net GHG removals by sinks

>>**E.2.1.Calculation of project emissions:**

As per the methodology AR-AM0002, the project emissions, i.e., emissions from fossil fuels, emissions from the loss of non-tree biomass, emissions associated with biomass burning and emissions from fertilizer application are examined for the project context.

Emissions from of decrease in carbon stock in living biomass of existing non-tree vegetation

The degraded lands contain small quantities of non-tree herbaceous vegetation. As per Annex 26, EB 63, accounting of project emissions from the loss/decrease in herbaceous non-tree vegetation are considered zero.

Emissions from biomass burning

Emissions from natural fires are calculated according to the approved AR-AM002 v.01 methodology. The steps to be followed in assessing the GHG emissions from biomass burn include: Step 1: The area affected by fires is measured and recorded.

Step 2: The amount of non-CO_2 emissions is dependent on the loss of carbon in biomass burned. Therefore, CO_2 emissions from biomass burning should be estimated prior to the estimation of non-CO_2 emissions.

$$E_{BiomassBum,CO_2} = A_{BiomassBum,i} \bullet B_{AB\_NTree,i} \bullet CE \bullet CF_{NTree} \bullet 44/12 \quad \textbf{(M.32)}$$

where:

$A_{BiomassBum,i}$	Area of biomass burn in stratum *i* in ha yr^{-1}
$B_{AB\_Ntree,i}$	Average stock in aboveground biomass for stratum *i* prior to burn in t.d.m.ha^{-1}
CE	Combustion efficiency, dimensionless, IPCC default=0,5
CF_{NTree}	Carbon fraction of dry biomass, dimensionless

Step 3. The methane (CH4) from biomass burn:

$$E_{BiomassBum,CH_4} = E_{BiomassBum,CO_2} \bullet GWP_{CH4} \bullet EF_{CH4} \bullet 12/44 \bullet 16/12 \quad \textbf{(M.33)}$$

where:

$E_{BiomassBum,CH4}$	CH_4 emission from biomass burning in slash and burn in t CO_2eq yr^{-1}
GWP_{CH4}	Global warming potential for CH4 (IPCC default=21)
EF_{CH4}	Emission factor for CH4, tCH4 (t C)$^{-1}$ (IPCCC default emission ratio for CH_4 = 0.012)
12/44	Ratio of molecular weights of carbon and CO_2, dimensionless
16/12	Ratio of molecular weights of CH_4 and carbon, dimensionless

Step 4: Sum of all non-CO2 emissions from biomass burning.

$$E_{NON-CO2\_BiomassBum} = E_{BiomassBum,CH4} \quad \textbf{(M.34)}$$

where:

$E_{Non-CO2,BiomassBum}$ Increase in non-CO2 emissions as a result of biomass burning in slash and burn in t CO_2eq yr^{-1}

Table E.2.1.1: Scaling up of non-CO_2 emission calculation to project strata

Stratum no.	Stratum Name	CH4 emissions	N2O emissions	Sum of non-CO2 emissions from biomass burning, (tCO2e)
1	Quercus_PoorSoil_Age>3_Surv_>50	-	-	-
2	Quercus_RichSoil_Age>3_Surv_>50	-	-	-
3	Robinia_PoorSoil_Age<3_Surv_>50	-	-	-
4	Robinia_PoorSoil_Age<3_Surv_25,1-50	-	-	-
5	Robinia_PoorSoil_Age>3_Surv_>50	-	-	-
6	Robinia_PoorSoil_Age>3_Surv_25,1-50	-	-	-
7	Robinia_RichSoil_Age<3_Surv_>50	-	-	-
8	Robinia_RichSoil_Age>3_Surv_25,1-50	-	-	-
9	Robinia_RichSoil_Age>3_Surv_>50	-	-	-
10	Natural disaster impacts	-	-	-
TOTAL		**-**	**-**	**-**

Emissions from burning fossil fuels for site and soil preparation

As per Annex 26, EB63, estimation and accounting of emissions from burning of fossil fuel within the project boundary is not required. Consequently, these emissions are considered zero. The project does not use nitrogenous fertilizers. Therefore, these emissions are not relevant for the project. Moreover, as per Annex 26, EB63, monitoring of emissions from nitrogenous fertilizers is not required.

E.2.2. Actual net GHG removals by sinks

Summary of the calculations of the actual net GHG removals by sinks based on the measurements of sample plots are provided as the annex 2 to the Monitoring report.

Tree biomass

Individual tree biomass (dry matter, C content) is computed with site specific and specie-specific allometric equations, established by ICAS/Romania and applicable also for the conditions of the Republic of Moldova (see Table E.2.2.1).

Changes in the carbon stocks of above-ground biomass

The changes in the *ex post* actual carbon stocks of above-ground biomass are calculated from the inventory and measurement data collected at the end of the monitoring period.

$$\Delta C_{AB,ijk,t} = (C_{AB,m_2,ijk} - C_{AB,m_1,ijk}) / T_B \quad \textbf{(M.6)}$$

$$C_{AB,m,ijk} = A_{m,ijk} \bullet MC_{AB\_m,ijk} \quad \textbf{(M.7)}$$

where:

$\Delta C_{AB,ijk}$	Average annual changes in carbon stock of above-ground biomass for stratum *i* sub-stratum *j* species *k* in t C yr^{-1} in year *t*
$C_{AB,m2,ijk}$	Carbon stock of above-ground biomass for stratum *i* sub-stratum *j* species *k* calculated at monitoring event m_2 in t C
$C_{AB,m1,ijk,t}$	Carbon stock of above-ground biomass for stratum *i* sub-stratum *j* species *k* calculated at monitoring event m_1 in t C
$A_{m,ijk}$	Area of stratum *i* sub-stratum *j* species *k* at monitor event *m* in ha
$MC_{AB,m,ijk}$	Average carbon stock of above-ground biomass for stratum *i* sub-stratum *j* species *k* at monitoring event *m* in t C ha^{-1}
T_B	Time in years between monitoring events m_2 and m_1 of the biomass monitoring

The average carbon stock of above-ground biomass is the sum of changes in the tree and the non-tree components.

$$MC_{AB,m,ijk} = MC_{AB\_Tree_{m,ijk}} + MC_{AB\_NTree\_Shrub_{m,ijk}} \quad \textbf{(M.8)}$$

where:

$MC_{AB\_Tree,m,ijk}$	Average carbon stock of aboveground tree biomass in stratum *i* sub-stratum *j* species *k* at monitoring event *m* in t C ha^{-1}
$MC_{AB\_NTree\_Shrub,m,ijk}$	Average annual change in carbon stock of aboveground non-tree shrub component in stratum *i* sub-stratum *j* species *k* at monitoring event *m* in t C ha^{-1}

The average carbon stock of tree and shrub for each stratum was calculated by averaging across the plots in a stratum or sub-stratum as outlined below.

$$MC_{AB\_Tree,m,ijk} = \frac{\sum_{p=1}^{P_{ijk}} C_{AB\_Tree,m,ijk,p}}{P_{ijk}} \quad \textbf{(M.9)}$$

$$MC_{AB\_NTree\_Shrub,m,ijk} = \frac{\sum_{p=1}^{P_{ijk}} C_{AB\_NTree\_Shrub,m,ijk,p}}{P_{ijk}} \quad \textbf{(M.10)}$$

Note: The subscripts *ij* refers to the strata and sub-strata (stands) of planted tree species.

where:

$C_{AB\_Tree,m,ijk,p}$	Plot level above-ground tree carbon stock in stratum *i* substratum *j* species *k* at monitoring event *m* in t C ha^{-1}
$MC_{AB\_NTree\_Shrub,m,ijk,p}$	Plot level above-ground non-tree shrub carbon stock in stratum *i* substratum *j* species *k* at monitoring event *m* in t C ha^{-1}
p	Plot number in stratum *i*, substratum *j* species *k*
P_{ijk}	Number of plots in stratum *i* substratum *j* species *k*

The carbon stock of per tree above-ground biomass was estimated by relating the biomass to DBH and height using selected allometric equations applied to the tree measurements and multiplying the carbon fraction of tree biomass.

$$C_{AB\_Tree_k} = f(DBH_k, H_k) \bullet CF_k \quad \textbf{(M.11)}$$

where:

$C_{AB\_Tree_k}$	Carbon stock of above-ground tree biomass of species *k* in t.d.m. ha^{-1}
$f(DBH_k, H_k)$	Allometric equation linking merchantable volume to the mean diameter at breast height (*DBH*) in meters and tree height (*H*) meters

The above-ground biomass carbon per plot on a per area basis was calculated by summing the biomass carbon per tree within each plot and multiplying with the plot expansion factor which is proportional to the area of the measurement plot and then divided by 1,000 to convert from kg to tonnes.

$$C_{AB\_Tree,m,ijk,p} = \frac{\left(\sum_{tr=1}^{TR} C_{AB,Tree,m,ijk} \cdot XF\right)}{1000} \quad \textbf{(M.12)}$$

$$XF = \frac{10{,}000}{A_p} \quad \textbf{(M.13)}$$

where:

C_{AB_Tree,m,k,p_k}	Plot level above ground tree carbon stock of stratum *i* sub-stratum *j* species *k* p monitoring event *m* in t C ha^{-1}
XF	Expansion factor to represent the per plot value to per hectare value
A_p	Plot area in m^2
tr	Tree (TR=total number of trees in the plot)

The average carbon stock of tree and shrub for each stratum was calculated by averaging across the plots in a stratum or sub-stratum as outlined below.

Non-tree shrub biomass ($C_{AB\ NTree}$)

The parameters of height and diameter shall be measured to estimate the shrub biomass. The allometric equations
for shrubs used diameter at base (*DB*), shrub height (*H*), crown area (*CA*) and the number of stems (*N*).

$$C_{AB\_NTree\_Shrubs_{ijk,p}} = f_k(DB, H, CA, N) \bullet CF_{Shrub} \quad \textbf{(M.15)}$$

Note: ij refer to the shrubs present in the stratum and substratum (stand) of planted tree species.

where:

$C_{AB\_NTree\_Shrub,m,ijk,p}$	Carbon stock of above-ground shrub biomass for tree stratum *i* sub-stratum *j* species *k* plot *p* at monitoring event *m* in t C.ha^{-1}
$f_k(DB, H, CA, N)$	Allometric equation linking above-ground biomass (d.m. ha^{-1}) of shrubs to diameter at base (*DB*), shrub height (*H*), crown area (*CA*) and number of stems per hectare (*N*)
CF_{Shrub}	Carbon fraction of the above ground shrub biomass; dimensionless

Table E.2.2.1: Allometric equations for tree biomass[8]

Item	Type of relation	Format of equations			
Tree dry biomass	Allometric equations (site-specific, specie-specific). Equations are valid for trees in plantations under 6 years	$M=e^{a} *X^{b}*CF$ where, M is the dependent variable (biomass); X is the independent variable (Dbh, Dch, H); a, b are the regression coefficients and CF is the correction factor. After logarithmical transformation into linear, implemented in Excel as: ln M = ln a + b ln D where M = ABGTB aboveground total biomass (g), or Roots for calculated species e – the base of natural logarithm a – scaling factor of the equation b – scaling exponent of the equations D) Dch) Collar diameter (mm), Dbh – Breast diameter (cm) CF) correction coefficient (computed base don standard error of the estimate)			
			ln a	b	CF
		Eleagnus angustifolia ABGTB (dch)	-3.9276	3.1470	1.1009
		Eleagnus angustifolia ROOTS (dch)	-3.3168	2.5595	1.1882
		Eleagnus angustifolia ABGTB (dbh)	4.9209	2.7844	1.1604
		Eleagnus angustifolia ROOTS (dbh)	3.9099	2.2295	1.2238
		Fraxinus excelsior ABGTB (dch)	-2.6559	2.7697	1.1669
		Fraxinus excelsior ROOTS (dch)	-0.7746	1.8574	1.2696
		Fraxinus excelsior ABGTB (dbh)	4.0043	3.0495	1.2045
		Fraxinus excelsior ROOTS (dch)	3.5168	2.1242	1.2564
		Gledicia triacantos ABGTB (dch)	-2.9685	2.7390	1.1117
		Gledicia triacantos ROOTS(dch)	-2.5047	2.4291	1.2293
		Gledicia triacantos ABGTB (dbh)	4.6960	1.7067	1.0856
		Gledicia triacantos ROOTS(dbh)	4.4138	1.3856	1.1345
		Populus alba ABGTB	-1.2947	2.1367	1.1188
		Populus alba ROOTS (dch)	-0.8599	1.6970	1.1471
		Populus alba ABGTB (dbh)	4.3886	2.1848	1.2183
		Populus alba ROOTS (dbh)	3.5877	1.6989	1.2044
		Querqus sp. ABGTB (dch)	-1.5672	2.1580	1.0808
		Querqus sp. ROOTS (dch)	0.1197	1.5019	1.0850
		Robinia pseudoacacia ABGTB (dch)	-2.2535	2.5887	1.0245
		Robinia pseudoacacia ROOTS (dch)	-1.1378	1.9850	1.0526

[8] Allometric biomass equations for young broadleaved trees in plantations in Romania, V. Blujdea, R. Pilli, I. Dutca, L. Ciuvat, I.V. Abrudan. Forest Ecology and Management. http://www.elsevier.com/locate/foreco

		Robinia pseudoacacia ABGTB (dbh)	4.3827	2.4631	1.0310
		Robinia pseudoacacia ROOTS (dch)	3.6264	2.0413	1.0538
		Salix alba ABGTB (dch)	-5.3386	3.2297	1.0994
		Salix alba ROOTS (dch)	-4.7489	2.8426	1.2161
		Other species ABGTB (dch)	-2.6761	2.6494	1.1401
		Other species ROOTS (dch)	-1.8654	2.0900	1.1636
		Other species ABGTB (dbh)	4.4414	2.3666	1.1979
		Other species ROOTS (dbh)	3.7327	1.8965	1.1955

Calculation of aboveground biomass

Steps in calculation of above ground tree biomass are as follows.

- Basal diameter was individually recorded for each tree species on each PSP in the field sheets;
- Numbers of trees for each species for each PSP (N) were counted;
- Biomass of individual trees by species in the PSP was calculated using allometric equations;
- Biomass of each species calculated based on number of trees and biomass of individual trees of a species in the PSP;
- Total aboveground tree biomass on PSP was calculated;
- Aboveground tree biomass is expanded from the area of PSP (50 m^2) to 1 ha by multiplying with a factor of 10^4.
- Biomass transformation from (g DM) to (to DM) was multiplied by a factor of 10^6. To transform DM to C) the biomass on ha was multiplied by 0.5 (to convert dry matter to carbon content) and then multiplied by 44/12 to transform C content in CO_2 removal.

Below-ground biomass (C_{BB})

The below-ground biomass pool is estimated from the above-ground biomass using the root-to-shoot ratio. The carbon stock of below-ground biomass is calculated as a product of above-ground biomass of tree and shrub components and the root-shoot ratio of the species in the respective components.

$$C_{BB,m,ijk} = A_{m,ijk} \bullet MC_{BB,m,ijk} \quad \text{(M.16)}$$

$$MC_{BB,m,ijk} = A_{m,ijk}[MC_{AB\_Tree,m,ijk} \bullet R_{T,jk} + MC_{AB\_NTree\_Shrub,m,ijk} \bullet R_S] \quad \text{(M.17)}$$

where:

$A_{m,ijk}$	Area of stratum *i* sub-stratum *j* species *k* at monitoring time *m* in ha
$MC_{BB,m,ijk}$	Average carbon stock of below ground biomass for stratum *i* sub-stratum *j* tree species *k* at monitor time *m* in t C ha^{-1}
$R_{T,jk}$	Root-shoot ratio for tree species *k* age class *j*; dimensionless
R_S	Root-shoot ratio for shrub; dimensionless

The average annual carbon stock change in the below-ground biomass is estimated from the data on carbon

stock measurement at two monitoring intervals.

$$\Delta C_{BB,ijk,t} = (C_{BB,m_2,ijk} - C_{BB,m_1,ijk}) / T_B \quad \text{(M.18)}$$

where:

$C_{BB,ijk,t}$	Average annual carbon stock change in the below-ground biomass in stratum *i* sub-stratum *j* species *k* in t C. yr^{-1} in year *t*
$C_{BB,m2,ijk}$	Carbon stock of the below-ground biomass for stratum *i* sub-stratum *j* species *k* calculated at monitoring event m_2 in t C
$C_{BB,m1,ijk}$	Carbon stock of the below-ground biomass for stratum *i* sub-stratum *j* species *k* calculated at monitoring event m_1 in t C
T_B	Time in years between monitoring events m_2 and m_1 of the biomass monitoring

Scaling up of carbon stock to strata and project levels

Biomass calculated on 1 ha was scaled up to the corresponding homogenous area of strata and then summed up to the total area shown below. This calculation represents aboveground and below ground tree biomass.

Table E.2.2.2. Scaling of tree biomass up to project strata

Stratum no.	Stratum Name	Sum of Area (ha)	Average biomass (t d.m. ha-1)	Total biomass on strata (t d.m.)	Total Carbon on strata (t C)	Actual net GHG removals in biomass (t CO2e)
1	Quercus_PoorSoil_Age>3_Surv_>50	37.46	2.09	78.11	39.06	143.21
2	Quercus_RichSoil_Age>3_Surv_>50	51.86	2.80	145.39	72.70	266.55
3	Robinia_PoorSoil_Age<3_Surv_>50	324.46	3.48	1,127.75	563.87	2,067.54
4	Robinia_PoorSoil_Age<3_Surv_25,1-50	43.51	1.62	70.65	35.33	129.53
5	Robinia_PoorSoil_Age>3_Surv_>50	1,682.54	15.65	26,337.74	13,168.87	48,285.85
6	Robinia_PoorSoil_Age>3_Surv_25,1-50	258.82	4.62	1,195.02	597.51	2,190.86
7	Robinia_RichSoil_Age<3_Surv_>50	824.54	5.34	4,402.23	2,201.12	8,070.76
8	Robinia_RichSoil_Age>3_Surv_25,1-50	740.89	10.94	8,102.65	4,051.32	14,854.86
9	Robinia_RichSoil_Age>3_Surv_>50	4,404.62	21.81	96,073.11	4,8036.56	176,134.04
10	Natural disaster impacts	100.14	0.00	0.00	0.00	0.00
TOTAL		**8,468.84**	**-**	**137,532.65**	**68,766.33**	**252,143.19**

Note: DM – dry mass.

Litter

Due to the young age of trees, dead wood was not found in this first monitoring period. Litter was sampled using a fixed-area sampling frame of 0.30 $m^{2.}$ One diagonal line was laid from one corner of the sample plot to another, measured and divided into 4 equal sides. On the intersection of short segments the frame was placed (3 times). At each location, all litter (leaves, fruits, small wood, etc.) that fell inside the frame was

collected and oven dried (105° C) to a constant weight to determine dry mass. The fresh weight of the total sample was recorded in the field, and a sub-sample taken for moisture content determination, from which the total dry matter was calculated.

$$C_{L_{m,ijk}} = A_{ijk} \bullet C_{L\_wet_{m,ijk}} \bullet (1 - MP_L) \bullet (1/a_{ijk}) \bullet (1/100) \quad \textbf{(M.23)}$$

where:

$C_{L,m,ijk}$	Carbon in dry litter biomass at monitor time *m* in t·C
$C_{L\_wet,m,ijk}$	Carbon in wet litter biomass at monitoring time *m* in g·m^{-2}
MP_L	Weight fraction of moisture of litter biomass (0 to 1) [(wet weight – dry weight)/wet weight], dimensionless
a_{ijk}	Area of sampling frame in m^2

The average annual change in the carbon stock of litter from the data at two monitoring intervals shall be calculated.

$$\Delta C_{L,m_{ijk},t} = [(C_{L_{m_2,ijk}} - C_{L_{m_1,ijk}}) / T_L] \bullet CF_L \quad \textbf{(M.24)}$$

where:

$\Delta C_{L,m,ijk,t}$	Average annual change in the biomass of litter in stratum *i* sub-stratum *j* species *k* at monitoring event *m* in t C yr^{-1}
$C_{L,m2,ijk}$	Carbon stock of litter in stratum *i* sub-stratum *j* species *k* at monitoring event m_2 in t C
$C_{L,m1,ijk}$	Change in the biomass of litter in stratum *i* sub-stratum *j* species *k* at monitoring event m_1 in t C
T_L	Monitoring interval for litter $T_L=m_2-m_1$ in years
CF_L	Carbon fraction of litter; dimensionless

Carbon fraction in litter is 0.37 according to IPCC (2003) Default values Table 3.2.1. Updated Default for Litter Carbon Stocks (tonnes c ha-1) and Transition Period (Years) Source: Siltanen et al., 1997; and Smith and Heath, 2002; Tremblay et al., 2002; and Vogt et al.,1996, converted from mass to carbon by multiplying by conversion factor of 0.37 (Smith and Heath, 2002).

Table E.2.2.3: Scaling up of litter calculation to project strata

Stratum no.	Stratum Name	Sum of Area (ha)	Average litter biomass (t d.m. ha-1)	Total litter biomass on strata (t d.m.)	Total litter carbon on strata (t C)	Actual net GHG removals in biomass (t CO2e)
1	Quercus_PoorSoil_Age>3_Surv_>50	37.46	3.88	145.16	53.71	196.93
2	Quercus_RichSoil_Age>3_Surv_>50	51.86	2.72	141.06	52.19	191.37
3	Robinia_PoorSoil_Age<3_Surv_>50	324.46	3.71	1,203.42	445.27	1,632.64
4	Robinia_PoorSoil_Age<3_Surv_25,1-50	43.51	3.69	160.58	59.41	217.85
5	Robinia_PoorSoil_Age>3_Surv_	1,682.54	5.59	9,409.22	3,481.41	12,765.17

	>50					
6	Robinia_PoorSoil_Age>3_Surv_ 25,1-50	258.82	5.35	1,384.01	512.09	1,877.65
7	Robinia_RichSoil_Age<3_Surv_ >50	824.54	5.58	4,603.37	1,703.25	6,245.25
8	Robinia_RichSoil_Age>3_Surv_ 25,1-50	740.89	5.37	3,977.71	1,471.75	5,396.42
9	Robinia_RichSoil_Age>3_Surv_ >50	4,404.62	6.94	30,588.62	11,317.79	41,498.56
10	Natural disaster impacts	100.14	0.00	0.00	0.00	0.00
TOTAL		**8,468.84**	**-**	**51,613.16**	**19,096.87**	**70,021.85**

Soil Carbon

The rate of change in SOC stock in project scenario is estimated as per the latest version of *A/R Methodological Tool - Tool for estimation of changes in soil organic carbon stocks due to the implementation of A/R CDM project activities*, version 01.1.0 (EB 60 Annex 12).

The project complies with all the applicability conditions of the tool as described below.

(a) The areas of land to which this tool is applied:

(i) Do not fall into wetland category: None of the project areas fall in the category wetlands.

- The areas of the project do not fall into the category of wetland. This has been confirmed by the information from cadastre and field visits conducted during project design, implementation, and site visits during validation and verification.

(ii) Do not contain organic soils as defined in Annex A: glossary of the IPCC GPG LULUCF 2003:

- The soils of the project are chernozems[9]. These soils are not organic soils and comply with the requirements 1 and 2 of the glossary of IPCC GPG LULUCF 2003 as outlined below.
- The surface horizon can extend from 20 cm thick to a depth of more than 2 metres in well-developed Chernozems.
- Chernozem surface soils contain between 5 and 15 percent of mild humus with a high proportion of humic acids and a C/N-ratio of around 10.

(iii) Are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2;

- The project soils are not subjected to land management practices and input applications listed in Table 1 of the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities"(Version 01.1.0) as the project lands are not croplands as they are degraded lands that are not in cultivation; and the practices outlined in Table 2 of the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" (Version 01.1.0) do not apply to the project lands as they severely degraded and are not actively managed with inputs.

(b) The A/R CDM project activity meets the following conditions:

(i) Litter remains on site and is not removed in the A/R CDM project activity;

- Litter is accumulated throughout the period of forest establishment and growth and remains undisturbed in the project area during entire rotation period of the forest.

(ii) Soil disturbance attributable to the A/R CDM project activity is:

• In accordance with appropriate soil conservation practices, e.g. follows the land contours;

[9] http://www.fao.org/DOCREP/003/Y1899E/y1899e11.htm#P54_7290

- Soil disturbance from site preparation in the project activity is as per the land management and soil conservation practices implemented by Moldsilva under the land and forest management policies of Moldova.
- Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years.
- There is a limited soil disturbance from site preparation in the project activity and the site disturbance is not repeated within 30 year period. The repeat of site preparation activity in the project is expected to occur after 31 years at the end of the rotation period in some areas planted under *Robinia sp.* Therefore site disturbance is not expected to take place during 30 years, i.e., until the end of the crediting period of the project.

$$SOC_{INITIAL,i} = SOC_{REF,i} * f_{LU,i} * f_{MG,i} * f_{IN,i}$$ AR Tool (1)

where:

$SOC_{INITIAL,i}$	SOC stock at the beginning of the A/R CDM project activity in stratum *i* of the areas of l ha^{-1}
$SOC_{REF,i}$	Reference SOC stock corresponding to the reference condition in native lands (i. degraded, unimproved lands under native vegetation. normally forest) by climate reg soil type applicable to stratum *i* of the areas of land; t C ha^{-1}
$f_{LU,i}$	Relative stock change factor for baseline land-use in stratum i; the land use factor of gr is adopted as the lands under the baseline are degraded lands and pastures. As Methodological Tool - *Tool for estimation of change in soil organic carbon stocks du implementation of A/R CDM project activities,* Table 6, Annex 12, EB60, land use facto is applied.
$f_{MG,i}$	Relative stock change for management regime, dimensionless; as per A/R Method Tool - *Tool for estimation of change in soil organic carbon stocks due to the implemen A/R CDM project activities,* Table 6, Annex 12, EB60, the management factor of severely degraded lands is applied.
$f_{IN,i}$	Relative stock change factor for baseline inputs in stratum *i* of the areas o dimensionless. No inputs are used in the baseline, therefore as per A/R Methodologica *Tool for estimation of change in soil organic carbon stocks due to the implementation CDM project activities,* Table 6, the input factor of 1.0 is applied.
i	= 1, 2, 3, … strata of project, dimensionless.

As per paragraph 8 of the tool, the values $SOC_{REF,1}$, $f_{LU,i}$, $f_{MG,i}$, and $f_{IN,i}$ are taken from the Table 3 and Table 6. The climate regime applicable to the project is cold temperate dry as per the IPCC climate zones[10] and soils of the project are chernozems[11]. Therefore, SOC_{REF} stock for mineral soil corresponding to moist cold temperate moist climate regime and high activity clay (HAC) in Table 3 has been adopted.

$$SOC_{INITIAL,i} = SOC_{REF,i} * f_{lu,i} * f_{MG,i} * f_{IN,i}$$

[10] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_03_Ch3_Representation.pdf
Approved spreadsheet to facilitate the calculation of changes in soil organic carbon showing IPCC major climate zones, Annex to **A**/R Methodological Tool - *Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities*

[11] First National Communication of the Republic of Moldova, Ministry of Environment and Territorial Development, Chisinau and Programa osvoienia degradirovannyh zemeli I povyshenia plodorodia pochv, Chisinau, Pontos, 2005 (Program for the development of degraded sites and increasing of soil fertility, developed by the Academy of Sciences of Moldova, Ministry of Agriculture, Agency and Land relation and Cadastre, Research Institute for Soil Science and Agrochemistry)

$$SOC_{INITIAL,i} = 50 * 1.0 * 0.7 * 1.0$$

= 35.0 t C ha^{-1}

For each stratum, which is subjected to soil disturbance attributable to project activity over and above the area disturbed in the baseline, is greater than 10% of the area of the stratum, therefore, as per the paragraph 9 of the tool, equation 2 of A/R Methodological Tool is applied to assess the soil carbon loss.

$$SOC_{loss,i} = SOC_{INITIAL,i} * 0.1 \qquad \text{AR Tool (2)}$$

$SOC_{loss,i}$ = Loss of SOC caused by soil disturbance attributable to the A/R CDM project activity, in stratum *i* of the areas of land; t C ha^{-1}

i = 1, 2, 3, … strata of the project, dimensionless

$$SOC_{loss,i} = 35.0 * 0.1$$

$$SOC_{loss,i} = 3.5$$

The rate of change in SOC stock in project scenario until the steady-state SOC content is reached is estimated as follows:

$$dSOC_{t,i} = 0 \quad \text{for } t < t \text{ prep, I} \qquad \text{AR Tool (4)}$$

$$dSOC_{t,i} = \frac{SOC_{LOSS,i}}{1 year} \quad \text{for } t = t \text{ prep,I} \qquad \text{AR Tool (5)}$$

$$dSOC_{t,i} = \frac{SOC_{REF,i} - (SOC_{INITIAL,i} - SOC_{LOSS,i})}{20} \quad \text{for t prep i} < t \leq t \text{ prep,I} + 20 \qquad \text{AR Tool (6)}$$

Where,

$dSOC$	Rate of change in SOC stock in stratum I of the areas of land in year t, t C $ha^{-1}yr^{-1}$
$t_{PREP,i}$	= The year in which first soil disturbance takes place in stratum *i* of the areas of land
$SOC_{LOSS,i}$	= Loss of SOC caused by soil disturbance attributable the A/R CDM project activity in s of the areas of land; t C ha-1
$SOC_{REF,i}$	Reference SOC stock corresponding to the reference condition in native lands (i. degraded, unimproved lands under native vegetation, normally forest) by climate reg soil type applicable to stratum *i* of the areas of land; t C ha^{-1}
$SOC_{INITIAL,i}$	SOC stock at the beginning of the A/R CDM project activity in stratum *i* of the areas of la t C ha^{-1}
i	= 1, 2, 3, … strata of project, dimensionless
t	= 1, 2, 3, … years elapsed since the start of the A/R CDM project activity

$$dSOC_{t,i} = \frac{50-(35.0-3.5)}{20} = 0.925$$

As per the tool, value of the rate of change of SOC stock is not accounted as more than 0.8 t C ha^{-1} yr^{-1}, i.e.,

If $dSOC > 0.8$ t C ha^{-1}yr^{-1} ; then $dSOC = 0.8$ t C ha^{-1}yr^{-1} AR Tool (7)

As project dSOC $_{t,i}$= 0.925 > 0.8; dSOC = 0.8 t C ha^{-1}yr^{-1} has been adopted for the project

The change in SOC stock for all the strata of the areas of land, in year *t,* is calculated as:

$$dSOC_{i,t} = \frac{44}{12} * \sum_{i} Ai * dSOC_{i,t} * 1year$$

AR Tool (8)

where:

$\Delta SOC_{i,t}$ = Change in SOC stock in areas of land meeting the applicability conditions of this tool, in year *t*; t CO2-e

A_i = The area of stratum *i* of the areas of land; ha

$dSOC_{t,i}$ = The rate of change in SOC stocks in stratum *i* of the areas of land; t C ha^{-1} yr^{-1}

i = 1, 2, 3, … strata of project, dimensionless.

Table E.2.2.4: Scaling up of SOC calculation to project strata

Stratum no.	Stratum Name	Sum of srea (ha)	Sum of srea disturbed (ha)	Percent of disturbed area per stratum (%)	Carbon per ha per stratum (t C ha-1 t, i)	Carbon per stratum (t C t,i)	Emission reductions per stratum (tCO2e)
1	Quercus_PoorSoil_Age>3_Surv_>50	37.46	10.08	26.90	1.00	37.46	137.35
2	Quercus_RichSoil_Age>3_Surv_>50	51.86	17.28	33.32	1.00	51.86	190.15
3	Robinia_PoorSoil_Age<3_Surv_>50	324.46	100.32	30.92	(1.25)	- 405.58	-1,487.11
4	Robinia_PoorSoil_Age<3_Surv_25,1-50	43.51	9.58	22.02	(1.25)	- 54.39	-199.42
5	Robinia_PoorSoil_Age>3_Surv_>50	1,682.54	653.55	38.84	1.00	1,682.54	6,169.31
6	Robinia_PoorSoil_Age>3_Surv_25,1-50	258.82	72.96	28.19	1.00	258.82	949.01
7	Robinia_RichSoil_Age<3_Surv_>50	824.54	400.70	48.60	(1.25)	- 1,030.68	-3,779.14
8	Robinia_RichSoil_Age>3_Surv_25,1-50	740.89	221.34	29.87	1.00	740.89	2,716.60
9	Robinia_RichSoil_Age>3_Surv_>50	4,404.62	1,790.10	40.64	1.00	4,404.62	16,150.27
10	Natural disaster impacts	100.14	9.99	-	-	-	-
TOTAL		8,468.84	3,285.89	-	-	5.685.55	20,847.03

Actual GHG removals by sinks

The verifiable changes in the *ex post* carbon stocks are calculated by applying the stock change method to the data collected at the end of first monitoring period

$$\Delta C_{ijk,t} = [\Delta C_{ABijk,t} + \Delta C_{BBijk,t} + \Delta C_{DWijk,t} + \Delta C_{Lijk,t} + \Delta C_{SOC\ ijk,t}] \bullet [44/12] \quad \text{(M.5)}$$

where:

$\Delta C_{,ijk,t}$	Verifiable annual changes in the carbon stock of pools for stratum *i* sub-stratum *j* species *k* in t CO_2-eq yr^{-1} in year *t*
$\Delta C_{AB,ijk,t}$	Verifiable annual changes in the carbon stock of aboveground biomass for stratum *i* sub-stratum *j* species *k* in t C yr^{-1} in year *t*
$\Delta C_{BB,ijk,t}$	Average annual changes in the carbon stock of belowground biomass for stratum *i* sub-stratum *j* species *k* in t C yr^{-1} in year *t*
$\Delta C_{DW,ijk,t}$	Average annual changes in the carbon stock of deadwood for stratum *i* sub-stratum *j* species *k* in t C yr^{-1} in year *t (considered zero in the project)*
$\Delta C_{L,ijk,t}$	Average annual changes in the carbon stock of litter for stratum *i* sub-stratum *j* species *k* in t C yr^{-1} in year *t*
$\Delta C_{SOC,ijk,t}$	Average annual changes in the carbon stock of soil organic matter for stratum *i* substratum *j* species *k* in t C yr^{-1} in year *t*
44/12	Ratio of molecular weights of carbon and CO_2; dimensionless

GHG removals by sinks in biomass (aboveground and belowground), litter and soil pools

The verifiable changes in the *ex post* carbon stocks accumulated in biomass (aboveground and belowground), litter and soil pools were summed up to calculate the actual GHG removals by sinks:

- GHG removals by sinks in biomass: 252,143.19 tCO2e;
- GHG removals by sinks in litter: 70,021.85 tCO2e;
- GHG removals by sinks in soil organic carbon: 20,847.03 tCO2e;

Actual GHG removals by sinks in the project: 343,012.06 tCO2e;

Actual GHG rounded down removals by sinks in the project: 343,012 tCO2e;

E.3. Calculation of leakage

>> As per Annex 26, EB63, the estimation and accounting of emissions from burning of fossil fuel outside the project boundary is not required. Consequently, the project is not subject to leakage emissions.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

This section shall include the formulae used to calculate the emission reductions and the total of the emission reductions achieved during the monitoring period.

$$\Delta C_{ACTUAL,t} = \sum_i \sum_j \sum_k \left[\Delta C_{ijk,t} - GHG_{E,t}\right] \quad \textbf{(M.35)}$$

where:

$\Delta C_{ACTUAL,t}$	Actual net greenhouse gas removals by sinks in t CO_2-eq yr^{-1} for year *t*
$\Delta C_{,ijk,t}$	Average annual change in carbon pools for stratum *i* sub-stratum *j* species *k* in t CO_2 yr^{-1} for year *t*
$GHG_{E,t}$	GHG emissions by sources within the project boundary as a result of the implementation of an A/R CDM project activity in t CO_2-eq yr^{-1} for year *t*
t	Year 1 to the end of crediting period
i	Stratum
j	Substratum (age class)
k	Species

Calculation of t-CERs

T-CERs reflect the existing stock change at the time of verification minus project emissions minus leakage (t CO_2):

$$t-CER(t_v) = C_p(t_v) - C_B(t_v) - \sum_0^{t_v} E_t - \sum_0^{t} LK_t \quad \textbf{(M.38)}$$

$$C_p(t_v) - \sum_0^{t_v} E_t = \sum_1^{t_v} \Delta C_{Actual,t} \quad \textbf{(M.39)}$$

$$C_B(t_v) = \sum_1^{t_v} \Delta C_{BSL,t} \quad \textbf{(M.40)}$$

t-CERs attributed to the project at the time of the actual verification constitute 343,012.06 tCO2e.

Item	Actual net GHG removals by sinks (t CO_2e)	Project emissions (t CO_2e)	Baseline net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total	**343,012.06**	**593.5**	**13,615.0**	**0**	**328,803.56**

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	**360,635.0**	**328,803.56**

E.6. Remarks on difference from estimated value in registered PDD

>> Please provide an explanation of the cause of any **increase** in the actual emission reductions achieved during the current monitoring period (e.g. higher water availability, higher load plant factor, etc), including all information (i.e. data and/or parameters) that is different from that stated in the registered CDM-PDD.

There is decrease in actual values reached during the monitoring period in comparison to the values assessed in ex-ante calculation of the registered CDM PDD of about 8.8%. This can be explained by the following.

According to the A/R Methodological Tool - *Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities,* a penalty of 10% is to be applied to the areas of the project strata subjected to more than 10% of soil disturbance attributable to project activity over and above the area disturbed in the baseline. Therefore, as per the paragraph 9 of the tool (equation 2 of A/R Methodological Tool), the calculations of GHG removals by sinks from soil pool were adjusted for the loss of soil organic carbon due to soil disturbance.

Actual calculations are based on field measurement of aboveground tree biomass and litter. Taking into consideration that forest growth is influenced by many factors (temperature, precipitations, slope, soil, site preparation etc.), and the influence of these factors cannot be assessed during ex-ante estimation.

The calculated net anthropogenic GHG removals by sinks are lower than the ex ante estimates of the registered confirms the conservative approach adopted in the ex post calculations of GHG removals by sinks from the project.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO_2e)	**328,803.56**	Not Applicable (as the first periodic verification ends on 31 December 2012). This column is therefore intentionally left blank.

Annex 1 Area of Sectors (Stands)

Sector	Area (ha)
C010111088	20
C010111090	19,8
C010111090	4
C010111092	3,7
C010111093	2,5
C010111105	10
C010121096	4,14
C010121096	4,22
C010121096	4,54
C010121098	11,66
C010121100	2,93
C010121100	1,52
C010121100	1,05
C010121101	0,9
C010121102	3,6
C010121103	6,2
C010121800	6
C010121849	1
C010121850	25
C010121851	6
C010122074	8,5
C010122075	8,5
C010131095	11
C010131107	5
C010131848	2
C020211001	8,97
C020211004	4,13
C020211004	0,87
C020211016	10
C020211037	4,66
C020211037	28,96
C020211043	12,21
C020211048	7,5
C020211852	14
C020211853	13,77
C020221060	17,1
C020221060	33,00
C020221068	57,6
C020221069	9,2

Sector	Area (ha)
C020221072	15,1
C020221073	16,2
C020221074	8,95
C020221796	2,3
C020221797	4,6
C020221798	4,26
C020231023	31
C020231076	7,73
C020231077	11,52
C020231078	1
C020231078	5
C020231083	4,7
C020231086	9,7
C020231854	9,64
C020231855	5,65
C020231857	31
C020241055	8,5
C020241063	4,74
C020241066	4
C020241070	33,75
C020241071	28,8
C020241860	3,45
C020241861	2,45
C020241862	1,1
C020241863	13,21
C020241864	10
C020241865	3,02
C020243002	8,61
C020243002	1,95
C020243017	5,24
C020243018	3,74
C030311616	12,20
C030311617	24,00
C030311618	12,90
C030311619	15,80
C030311620	4,50
C030311622	9,30
C030311866	11,70
C030313019	5,50

Sector	Area (ha)
C030321615	4,00
C030321621	1,90
C030321867	2,40
C030331588	10,50
C030331589	40,00
C030331591	2,80
C030331594	3,00
C030331868	20,00
C030333020	8,00
C030341600	4,00
C030341601	8,50
C030341602	7,00
C030341603	10,50
C030341604	11,50
C030341605	11,00
C030341606	5,00
C030341607	6,00
C030341608	5,00
C030341609	10,50
C030341610	4,00
C030341869	5,50
C030341870	11,50
C030341871	3,00
C030351611	10,00
C030351613	7,30
C030351806	3,80
C030351808	7,50
C030351872	6,50
C030351873	10,00
C030353021	5,00
C030361592	11,3
C030361592	4,7
C030361595	8,80
C030361596	2,00
C030361597	7,00
C030361598	7,30
C030361599	4,20
C030361874	17,60
C030361875	3,10

Sector	Area (ha)
C030361876	15,00
C030361877	6,50
C050511763	9,66
C050531769	6,00
C050531776	16,79
C050531777	20,00
C050531778	8,00
C050541781	2,50
C050541782	22,51
C050551760	11,00
C050551768	15,00
C050551773	1,00
C050551774	1,20
C050551779	4,00
C060611173	19,20
C060611174	6,00
C060611179	25,15
C060621170	4,40
C060621171	4,00
C060621175	5,70
C060621177	10,73
C060621178	22,80
C060621878	34,00
C060621880	9,24
C060623004	3,06
C060631166	27,50
C060631167	20,00
C060631879	24,00
C060631881	4,00
C060641168	10,50
C060641169	2,00
C060641172	7,00
C060641180	6,00
C070711433	1,60
C070711434	1,20
C070711473	20,80
C070711475	3,20
C070711477	6,00
C070711478	5,01

Sector	Area (ha)
C070711479	2,20
C070711480	0,40
C070711482	12,00
C070711499	34,00
C070711500	82,50
C070711500	3,50
C070711894	3,60
C070711895	4,50
C070711896	12,56
C070711897	34,00
C070711898	21,00
C070711899	21,64
C070711900	28,00
C070721429	14,90
C020231086	3,3
C070721430	4,90
C070721435	8,10
C070721438	0,53
C070721440	0,88
C070721441	5,30
C070721443	2,95
C070721444	5,84
C070721445	0,39
C070721447	1,20
C070721449	6,80
C070721451	2,00
C070721452	1,00
C070721453	7,70
C070721454	5,60
C070721455	13,20
C070721457	23,40
C070721458	6,30
C070721459	18,00
C070721460	5,20
C070721461	13,30
C070721461	6,20
C070721463	6,40
C070721465	55,64
C070721466	3,00

Sector	Area (ha)
C070721467	41,65
C070721468	16,20
C070721468	2,00
C070721470	51,80
C070721472	6,80
C070721492	57,80
C070721495	10,01
C070721496	10,00
C070721497	17,00
C070721498	17,90
C070721785	1,50
C070723007	2,60
C070723008	1,50
C070731456	10,00
C070731485	21,00
C070731485	10,00
C070731486	7,00
C070731488	9,50
C070731489	4,30
C070731491	4,01
C070731502	24,50
C070731884	4,30
C070731885	0,70
C070731886	0,70
C070731901	65,00
C070731902	15,00
C070731903	5,00
C070731904	15,00
C070731905	4,00
C070731906	14,80
C070741887	2,20
C070741888	0,90
C070741889	6,50
C070741891	1,00
C070741892	13,20
C070741893	0,60
C070741907	46,38
C070741909	25,01
C080811637	10

Sector	Area (ha)
C080811638	5,7
C080811639	5
C080811643	4,26
C080811644	7
C080811910	8,5
C080821631	5,24
C080821640	3
C080821641	2,46
C080821642	5,3
C080821911	6,7
C080821912	3,3
C080821913	2,46
C080821913	4,64
C080821914	34,3
C080821915	7,7
C080821916	4,1
C080823009	0,74
C080831661	8,5
C080831918	13
C080831919	9,21
C080841922	9
C080851629	15
C080851923	18
C080851924	25,3
C080861626	13,8
C080861654	1,5
C080861657	0,7
C080861925	4,66
C080861926	11,31
C080861927	4,7
C080863011	2
C080871649	4,25
C080871650	2,1
C090911576	5,40
C090911577	3,90
C090911578	4,00
C090911580	77,00
C090911581	18,00
C090911582	5,00

Sector	Area (ha)
C090911584	20,00
C090913012	1,50
C090921585	49,60
C090921586	40,50
C090921587	10,20
C090931568	11,00
C090931569	8,00
C090931570	5,00
C090931571	25,00
C090931572	6,50
C090931574	23,00
C101011191	8,40
C101011195	4,40
C101011196	5,20
C101011197	3,60
C101011940	4,00
C101011941	7,00
C101011942	9,00
C101021189	14,00
C101021190	6,80
C101021193	8,10
C101021198	7,90
C101021930	5,20
C101021931	7,10
C101021938	7,96
C101021939	6,30
C101031181	3,30
C101031182	5,50
C101031183	2,70
C101031184	5,60
C101031185	1,60
C101031186	1,80
C101031188	20,00
C101031192	5,23
C101031928	9,10
C101031929	6,90
C101031936	10,00
C101031937	3,90
C101041199	3,00

Sector	Area (ha)
C101041932	2,30
C101041933	3,50
C101041934	5,50
C101041935	12,00
C101041943	2,00
C111111110	10,20
C111111134	15,00
C111111135	1,00
C111111136	4,00
C111111137	4,00
C111111138	6,10
C111111139	3,00
C111111140	12,00
C111111141	16,00
C111111142	6,00
C111111143	15,00
C111111144	4,00
C111111145	7,00
C111111944	25,00
C111111945	15,00
C111111946	5,80
C111121121	25,00
C111121121	3,20
C111121121	4,30
C111121121	5,70
C111121122	4,10
C111121123	5,00
C111121127	9,70
C111121128	2,60
C111121130	7,00
C111121131	2,30
C111121132	9,00
C111121133	3,00
C111121947	6,00
C111121947	6,90
C111121947	4,90
C111121947	17,00
C111121947	5,20
C111123022	2,20

Sector	Area (ha)
C111131108	4,80
C111131108	7,10
C111131111	6,20
C111131112	15,00
C111131115	7,00
C111131116	17,50
C111131117	12,80
C111131952	23,00
C111131953	11,00
C111133023	1,90
C111133024	5,50
C111133025	16,00
C111133026	4,00
C121211341	14,38
C121211341	20
C121211341	15
C121211342	16
C121211342	22,8
C121211344	6,05
C121211346	16
C121211346	17,6
C121211346	40
C121211346	8
C121211349	2
C121211349	47
C121211350	15
C121211351	11,9
C121211352	40
C131311504	1,81
C131311505	2,09
C131311506	3,40
C131311507	4,44
C131311508	3,65
C131311508	4,08
C131311515	6,00
C131311516	5,78
C131311525	0,70
C131311526	4,73
C131311528	1,84

Sector	Area (ha)
C131311529	1,85
C131311542	2,00
C131311554	0,81
C131311554	2,52
C131311554	1,38
C131311554	0,41
C131311554	3,69
C131311554	2,52
C131311554	2,00
C131311554	0,64
C131311554	1,94
C131311564	3,39
C131311564	1,09
C131311822	1,00
C131311822	6,47
C131311824	8,73
C131311824	3,27
C131311954	2,92
C131311955	0,88
C131311956	5,83
C131321503	12,00
C131321519	4,14
C131321537	3,00
C131321537	4,00
C131321537	1,16
C131321537	1,20
C131321537	1,29
C131321543	4,02
C131321543	2,45
C131321545	15,32
C131321545	4,00
C131321549	11,16
C131321549	4,78
C131321549	9,43
C131321549	29,33
C131321957	9,60
C131331512	5,50
C131331513	6,09
C131331514	12,33

Sector	Area (ha)
C131331566	6,00
C131331567	1,43
C141411201	0,70
C141411202	1,90
C141411209	8,56
C141411213	10,00
C141411214	6,92
C141411214	6,92
C141411214	9,33
C141411219	10,00
C141411220	5,00
C141411221	1,00
C141411222	6,00
C141411225	1,45
C141411226	2,50
C141411227	4,04
C141411228	2,07
C141411229	0,56
C141411230	1,85
C141411231	1,20
C141411235	12,4
C141411235	13,5
C141411235	13
C141411235	25
C141411235	8,2
C141411235	3,2
C141411243	3,85
C141411244	5,18
C141411245	1,00
C141411246	4,47
C141411247	13,88
C141411960	8,00
C141411961	4,49
C141411962	4,20
C141411963	1,00
C141411964	10,01
C141411965	9,40
C141413028	2,40
C141421204	6,90

Sector	Area (ha)
C141421205	31,20
C141421206	8,70
C141421207	5,52
C141421210	3,00
C141421959	10,80
C141421967	8,75
C141421968	3,10
C141421971	21,30
C141421972	19,10
C141421973	8,50
C141431212	6,80
C141431218	3,46
C141431223	8,75
C141431223	0,91
C141431233	1,40
C141431240	4,84
C141431248	21,00
C141431249	6,00
C141431250	5,50
C141431253	7,58
C141431974	15,00
C141431975	4,00
C141431976	10,30
C141431977	10,00
C141431978	20,00
C141431979	5,20
C141431980	3,85
C141431981	4,00
C141433030	2,73
C141433031	2,58
C151511366	16
C151521375	2,87
C151521376	20
C151521376	15,5
C151521377	24,5
C151521380	10,6
C151521381	7,64
C151521383	6
C151521384	6,4

Sector	Area (ha)
C151521385	4
C151521982	3
C151521983	11,73
C151521984	16,3
C151531358	33,6
C151531360	2
C151531363	2
C151531985	43
C151531986	7,3
C151531987	19,35
C151531988	15
C151533033	33,7
C151541387	21
C151541989	31,1
C151541990	31,6
C151541991	6,5
C151541992	7,8
C151541995	6,3
C151551394	40
C151551395	10,5
C151551397	2
C151551398	44
C151551401	2,8
C161611279	1
C161611280	2,8
C161611291	5
C161611332	3
C161611333	19
C161611334	14
C161611335	7
C161611820	1,8
C161621281	0,5
C161621284	17
C161621285	7
C161621286	4
C161621287	20
C161621288	9,4
C161621289	7
C161621292	5

Sector	Area (ha)
C161621293	4
C161621294	14
C161621295	4,8
C161621296	15,8
C161621297	21
C161621298	13,5
C161621299	6,9
C161621300	4
C161621304	2
C161621319	4,78
C161621319	6,22
C161621324	4,5
C161621337	9
C161621339	7
C161621340	30,02
C161621340	6,5
C161621816	1
C161621817	4,01
C161621818	3,2
C161621996	20
C161631282	1,6
C161631305	1,3
C161631306	1,8
C161631306	1,5
C161631306	6,4
C161631306	3,2
C161631310	5,00
C161631311	3,00
C161631313	7,70
C161631322	7,00
C161631323	10,00
C161631326	5,8
C161631326	5,8
C161631329	3,70
C161631331	3,60
C161631815	11,01
C161631997	23,00
C161631998	15,00
C161631999	10,00

Sector	Area (ha)
C161632000	17,00
C161632001	4,80
C161632002	3,00
C161632003	3,70
C161632004	12,00
C161632005	10,50
C161642006	6,60
C161642007	2,10
C161642008	1,41
C161642009	3,00
C161642010	3,50
C161642011	3,30
C161642012	4,80
C181811684	17,58
C181811685	37,1
C181811700	40,34
C181811700	24,36
C181811701	15,63
C181811827	7,10
C181812013	3,19
C181812015	15,90
C181813034	2,50
C181813035	12,35
C181821687	9,10
C181821689	6,90
C181821693	3,40
C181821695	14,60
C181821695	4,00
C181821843	3,25
C181821844	12,70
C181821845	5,34
C181821845	7,11
C181831674	13,77
C181831675	16
C181831675	2
C181831677	17,60
C181831677	20,00
C181831678	13,00
C181831679	19,50

Sector	Area (ha)
C181831690	6,00
C181831837	15,07
C181831838	5,85
C181831839	29,00
C181832017	27,59
C181832018	17,12
C181832019	1,36
C181841663	6,51
C181841664	5,52
C181841665	9,00
C181841666	4,72
C181841667	3,00
C181841668	1
C181841668	1,4
C181841672	17,02
C181841672	17,20
C181841691	4,7
C181841692	9,70
C181841833	8,2
C181841834	15
C181841835	3,6
C181841836	6,85
C181851671	1,5
C181851680	5,10
C181851681	3,50
C181851682	3,50
C181851683	6,00
C181851696	3,01
C181851696	10
C181851698	6
C181851698	5
C181851828	2
C181851830	5,00
C181851831	9
C191911412	10,50
C191911788	18,02
C191912020	3,62
C191912021	49,94
C191912022	7,00

Sector	Area (ha)
C191912023	50,71
C191921409	28,25
C191921415	6,00
C191921416	16,00
C191921417	18,00
C191921418	5,00
C191921419	7,92
C191921420	18,00
C191921421	23,41
C191921787	25,19
C191921789	16,12
C191921790	5,90
C191921791	4,00
C191922026	32,00
C191922038	4,80
C191923013	50,30
C191931406	15,00
C191931407	53,67
C191931408	19,10
C191932027	27,61
C191932028	26,10
C191932029	19,14
C191932030	9,10
C191932037	25,31
C191941427	32,87
C191941427	13,83
C191942031	19,50
C191951403	90,00
C191951403	80,00
C191951405	29,00
C191951405	14,40
C191951410	10,00
C191952033	70,13
C191952034	6,00
C191952035	20,00
C191952036	17,00
C191953014	15,01
C191961422	1,30
C191961423	3,23

Sector	Area (ha)
C191961425	1,26
C202011270	60
C202011271	48
C202011271	2
C202011271	14
C202012042	60
C202032043	2,2
C202032044	1,7
C202032045	12
C202041269	20
C202041274	25
C202042046	20
C212111713	1,2
C212111714	3,02
C212111716	0,7
C212111716	0,6
C212111716	0,3
C212111726	2
C212111733	7,06
C212111733	5,23
C212111733	2
C212111733	1,44
C212111733	8
C212111733	6
C212111733	0,77
C222211743	14,1
C222211745	8,9
C222211747	3,6
C222211748	4,30
C222211751	6,5
C222211752	11,5
C222211753	4,5
C222211755	2,78
C222211757	11,8
C232311150	35,56
C232311151	2,00
C232311152	21,42
C232312047	44,31

Sector	Area (ha)
C232312050	14,60
C232312051	2,38
C232312052	2,41
C232312052	4,77
C232312054	19,32
C232312069	8,75
C232313038	32,60
C232321154	21,00
C232321155	35,00
C232322056	103,8
C232322057	6,99
C232322058	40,51
C232322059	5,45
C232322059	9,55
C232322060	8,00
C232331156	13,55
C232331157	10,70
C232331158	9,50
C232331159	25
C232331159	10
C232331160	5
C232331161	12
C232331161	8
C232332062	8,16
C232332063	2,00
C232332064	3,20
C232332065	20,50
C232333016	8,5
C232333016	2,2
C232341163	16,20
C232341812	10,80
C232342067	39,46
C232342070	12,53
C232342071	9,76
C232342072	17,00
C232342073	2,74
C232343015	10,43

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Document information

Version	*Date*	*Description*
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

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