AFFORESTATION OF DEGRADED AGRICULTURAL LAND PROJECT IN ROMANIA
MONITORING REPORT FORM

CONTENTS

Annexes

Version ……, August ….., 2018

Initial remarks

The monitoring plan contained in the project design document is to be implemented by the project participants and the monitoring report shall be written in accordance with project partner's agreed MONITORING PLAN FOR CHANGES IN CARBON STOCKS IN FOREST PLANTATIONS, dated November 24, 2003. This monitoring plan is part of the Emission Reduction Purchase Agreement (ERPA) between PCF (World Bank) and National Forest Administration (NFA Romsilva), signed in May 2004. This monitoring plan contains the monitoring methodology.

SECTION A. General project activity information

A.1 Title of the project activity

ROMANIA AFFORESTATION OF DEGRADED AGRICULTURAL LAND PROJECT

A.2. Registration number

JI project number: RO 1000080 of 14.06.2002

A.3. Short description of the project activity

National Forests Administration Romsilva of Romania and Prototype Carbon Fund (administrated by World Bank) have been implementing a Kyoto Protocol activity-based project since 2002. The Emission Reduction Purchase Agreement between the 2 partners was concluded on 26 of September 2003. Project activity is "afforestation" under art. 3.3 of the Kyoto Protocol. Project lands are located in the South-Western, South-Eastern and Eastern part of Romania, in areas showing extremely low percentage of forests, as being under desertification. Land use change from non-forest to forest was endorsed by a Governmental decision, according to legal requirements. Afforested lands are now under forest land use category, falling under specific forest legislation and ruling.

PDD reported an area of 6,728 ha, which was later on reduced by 232 ha to final project area of 6,496 ha, because of:

1) *area corrections* (caused by mismatches between areas mentioned in the transfer documents, namely governmental decision HG 357/2002, and true area measured by Romsilva).
2) *uncertainty on the ownership of some lands* initially thought to be involved in the project under restitution process (land returned to pre-communism owners).

From this total area, only 6,033 ha were considered suitable for "afforestation".
Project lands, both planted (as "forest") and non-planted (as "unproductive"), can be tracked down on forest maps (typical scale 1:10000) and forestry management plans ("*Amenajamantul unitatii de productie*" to which the new lands were attached for forestry management purpose). In the field they are identified by landmarks (for regular forest management) and GPS coordinates (land parcel where PMPs are located for JI monitoring purpose).

Out of the total project area of 6,496 ha, afforested area at the end of 2017 was 5,789.1 ha and the remaining area of 706.9 ha were unproductive lands.

The project focuses on improvement of degraded lands by afforestation giving priority to native species where appropriate (Quercus cerris, Q. pedunculiflora, Q. robur, Populus alba, P. nigra and Salix sp., including accompanying species which explains the high diversity of these plantations. In certain locations black locust (*Robinia pseudoaccacia* L.) was used because of constraints imposed by local soil conditions (e.g. sand dunes). The project improves significantly the forest cover in project regions. The biodiversity improvement is through a mix of afforestation species creating habitats for fauna. Social benefits of the project include fuel wood supply for households, wood for rural construction and beekeeping opportunities.

A.4. Monitoring period

This report covers the third monitoring period starting from 1 January 2013 to 31 December 2017. The GHG removals by sinks are shown for both 1st and 2nd monitoring period, while for the 3rd monitoring period, the claimed amounts resulted from the difference in total net GHG removals between 2nd and 3rd

monitoring period. First project verification resulted in 10,767.1 tCO_2eq (between 2002-2007) and second verification for the period (2008-2012) amounted to 229,641 tCO2eq.

A.5. Methodology applied to the project activity

A.5.1. Baseline methodology relies on the most attractive economical option for lands involved in the project. It is provided according to *ROMANIA AFFORESTATION OF DEGRADED AGRICULTURAL LAND PROJECT - BASELINE STUDY and the EMISSION REDUCTIONS PROJECTIONS AND MONITORING PLAN, reports prepared for the World Bank, 2002, 144 p, authors: Sandra Brown, Phillips H., Voicu Malina, Abrudan I., Blujdea V., Pahontu C., Kostyuhin V.*

A.5.2. Monitoring methodology: relies on Project's *MONITORING PLAN (MP) FOR CHANGES IN CARBON STOCKS IN FOREST PLANTATIONS*, agreed between The National Forest Administration – Romsilva and The Prototype Carbon Fund (PCF) administered by the International Bank for Reconstruction and Development, on November 24, 2003 *(available at: http://wbcarbonfinance.org/Router.cfm?Page=Projport&ProjID=9614)*

A.6. Status of implementation including time table for major project parts

ERPA signature was concluded on 26 of September 2003

Project area for the 1st (2008), 2nd (2012) and 3rd (2017) monitoring remained 6,496 ha (Table 1).

Table 1. Breakdown of project's total and afforestation area on counties for 3rd monitoring in 2017

County/Forest branch	Total project area (ha)	Afforested area in 2017 (ha)	Un-productive land in 2017 (ha)
Mehedinti	86.6	86.6	0
Dolj	2,138.9	1,926.9	212
Olt	1,048	1,017.6	30.4
Tulcea	729.8	716.1	13.7
Braila	1,585.5	1,557	28.5
Galati	192.3	190.1	2.2
Vaslui	304.9	294.8	10.1
Total	**6,086**	**5,789.1**	**296.9**
Initial unproductive land	410	-	410
Total	**6,496**	**5,789.1**	**706.9**

Afforested project area of 5,789.1 ha includes *state/public* land of 5,341.5 ha and *private* land covering the area of 447.6 ha. Out of the 447.6 ha restituted private land, NFA Romsilva has signed, by January 2016, contractual agreements with 25 private land owners that establish their carbon rights, for 380.9 ha. The plantations belonging to other private owners that did not sign subcontracts until that date (66.7 ha) were not considered. The details on private land owners that signed contractual agreement on carbon rights are presented in Annex 4.
Un-productive project area of 706.9 ha includes - (a) 410 ha area existing within the project boundaries from the beginning and recorded by the forest management plans as "neproductive" ("unproductive" lands) and considered as inappropriate for afforestation (rocks, sand dunes and gravels levee, Tamarix sp; roads and channels, Typha sp. associations and temporary ponds, etc), and, (b) 296.9 ha of channels, roads and high voltage electricity lines, areas with repeated failures of plantations, and areas of water stagnation after seasonal Danube flooding.

A.7. Intended deviations or revisions to the registered PDD

Difference of total project area by that reported in PDD is explained under points A.3 and A.6, above.
Project implementation schedule differed from the planned one because of natural disturbances and operational conditions. Most significant disturbance was due to major flooding of Danube in March – April

2006, which affected a planted area of 1,730 ha (successful plantations under different ages between 1 to 4 years old). These areas were replanted in 2011, 2012 and 2013.

A.8. Intended deviations or revisions to the registered Monitoring Plan

None.

A.9. Changes since last verification

None.

A.10. Person(s) responsible for the preparation and submission of the monitoring report

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SECTION B. Key monitoring activities according to the monitoring plan for the monitoring period stated in A.4.

B.1. Monitoring equipment

B.1.2. Information on the equipment used (incl. manufacturer, type, serial number, date of installation, date of last calibration, information to specific uncertainty, need for changes and replacements)

Equipment used is listed in Table 2.

Table 2. Equipment used for determining the necessary parameters

Equipment/ Manufacturer	Type and serial number	Date of calibration	Accuracy	Need for changes and replacements
Metric tape	-	-	-	OK
Field scale - RADWAG WPT 150 C2/K and PS 6000R2	SNR/546042 SNR/532472	29.06.2017	± 0.1 g	OK
Lab. scales - Sartorius	BP 300S/60404951 BP 300S/60309540	06.03.2017	± 0.0001 g	OK
Owen drier	Y49038 UE500/ C5040263	-	-	OK
Organic C analyzer - LECO	TrueSpec CNS Serie 3927	24.05.2017	25 ppm or 0.5% RSD	OK
Forest calipers	-	-	-	OK
Garmin	GPS map 60csx	-	5-10 m	OK
Soil core sampler	-	-	-	OK

B.1.3. Calibration procedures

The scales were calibrated as per regular calibration of laboratory equipment, fulfilled with an independent service provider. Calibrations were also performed by technicians before going and in the field by weighing precision mass standards available in the laboratory according the balance size, as follows: 100 g weight for small scales of < 200 g (allowed less than 0.4 g under repeated weighing) and two standard weights of 500 and 100 g for 600/1000 g scales (allowed max 1 g).

B.1.4. Involvement of Third Parties

Laboratory equipment was calibrated by independent accredited company (contract with LECOROM Srl, Bucharest, Romania).

B.2. Data collection (accumulated data for the whole monitoring period)

B.2.1. List of fixed default values

Default parameter values used to estimate changes in C pools (biomass, litter).

C content in **biomass** dry matter:	0.48: 48% according to IPCC 2006 (TABLE 4.3 CARBON FRACTION OF ABOVEGROUND FOREST BIOMASS, page 4.48) http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf
C content in **litter** dry matter:	0.37: 37% of Dry Matter (page 2.23 of Ch.2 'Generic methodologies Applicable to multiple land use' in 2006 IPCC Guidelines for National Greenhouse Gas Inventories) http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf

Additionally, default parameters used for estimation of GHG emissions from sources are presented in Table 7.

B.2.2. Considered variables/parameters for project monitoring activity

B.2.2.1 Land identification and tracking

Table 3. Land identification and tracking

Parameters/ indicators	Features/description/ measurement units	Data and information provider /Sources, documents	Project Input
1. Former land use, soil type, type and share of pre-existing vegetation and pre-project carbon density according to baseline strata. Fixed with baseline assessment / no monitoring frequency.	Identification code of the land unit (parcel, management unit, forest district, branch, county) (ha)	Forest district/ Afforestation plan ("proiectul technic", achieved by different authorized companies and approved by NFA Romsilva headquarters) Forest district/ Yearly/seasonal planning of afforestation/reforestation works (METEO Plan – Technical and Organizational Measures for afforestation) and forest management plans in force ("Amenajamentul unitatii de productie")	2017 updated planted area sheets, according to Annex 1 of the MP – Monitoring Plan
2. GIS data for afforested area	Geo-referenced areas subject to afforestation (perimeters), including digital photographs.	GIS Forest Management Planning database (held by INCDS), GPS field measurements	ARCGIS database
3. GPS coordinates	Geographic coordinates of the Permanent Monitoring Plots (PMP)	PMPs location by GPS	List of geographic coordinates in the project database

B.2.2.2 Parameters of the project implementation

Table 4. Parameters of project implementation status

Parameters/ indicators	Features/description/ measurement units	Data and information provider /Sources, documents	Project Input
1. Afforested area (species, planting seasons) for additionality assessment reasons	ha, plantations age, number of planted seedlings Survival rate (%)	All forest districts in the country/ Annual Regeneration Registry Forest district/ Record of activities (original name: *Fisa de evidenta a plantatiilor*) includes technical, material and financial inputs history for afforestation of any specific parcel. The record is archived for 5 years after canopy closure of the plantation	Statistical report SILV 4 (compiled by National Statistics Institute)

B.2.2.3 Monitoring of parameters for GHG calculation

Table 5. Parameters for GHG estimation

Parameters/ indicators	Features/description/ measurement units	Data and information provider /Sources, documents	Project Input
1. Removal of pre-existing vegetation (type, area, application time)	per unit area (ha)	Forest District/ Annual Regeneration Registry Forest district/ Record of activities (original name: Fisa de evidenta a plantatiilor) includes technical, material and financial inputs history for afforestation of a specific parcel. The record is archived for 5 years after canopy closure of the plantation	PLANTED AREA SHEET, according Annex 1 of the MP – Monitoring Plan
2. Species composition	Composition of species on each parcel included in the project (in %)	Forest District/ Annual Regeneration Registry	PLANTED AREA SHEET, according Annex 1 of the MP – Monitoring Plan
3. Survival rate of seedlings	(%) of surviving seedlings compared to number of seedlings planted on ha and species (no. of seedlings/ha) every autumn until canopy closure for gap filing needs on each parcel included in the project	Forest District/ Annual Regeneration Registry	PLANTATION MONITORING SHEET, according Annex 1 of the MP)
4. Seedlings biometrics: Collar diameter (DCH), diameter at 1.3 m (DBH) and	DCH (mm), DBH (mm), and H (cm) measured for each tree in the project Permanent Monitoring Plots	INCDS field teams/ Field sheets	BIOMASS SHEET (according Annex 4 of MP)

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Parameters/ indicators	**Features/description/ measurement units**	**Data and information provider /Sources, documents**	**Project Input**
total height (H)	(PMP)		
5. Dead Organic Matter (DOM)	**Litter** (g DM), collected in the field from four 0.25 m^2 samples within PMPs, then oven-dried at 70^0C **Soil** (g) collected in the field from four samples (30 cm depth) within PMPs	INCDS field teams/ Field sheets	Field sheet - SAMPLING FOR SOIL CARBON CONTENT, BULK DENSITY AND DEAD ORGANIC MATTER, (accord. Annex 2 and 3 of MP). Additionally, see Annex 3. Litter samples laboratory processing protocol
7. Tree biomass components	g FM (grams fresh matter of biomass components (measured and available on roots, stem, branches, foliage), sub-samples for humidity corrections	INCDS field teams/ Field teams	BIOMASS SHEET (according Annex 4 of MP)
8. Biomass sub-samples for humidity corrections	g DM/g FM, ratio after drying biomass at 70 ^{0}C	INCDS laboratory/ Project database (excel files, printed papers with sub-samples on individual tree)	BIOMASS SHEET (according Annex 4 of MP)
9. Dry matter of tree biomass components	g DM of biomass components	INCDS laboratory/ Project database (excel files, printed papers with individual tree)	BIOMASS SHEET (according Annex 4 of MP)
10. Hazard records (fires, flooding, drought)	type of hazard, area affected in ha, time of event pools affected (litter, litter + biomass etc)	Forest District/ Forest Protection Registry	PLANTATION MONITORING SHEET, according Annex 1 of the MP)
11. Fertilizers	Application area (ha) amount applied (to/ha) type (active matter) application time (month)	Forest District/ Annual Regeneration Registry Forest district/ Record of activities (original name: Fisa de evidenta a plantatiilor) includes technical, material and financial inputs history for afforestation of a specific parcel. The record is archived for 5 years after canopy closure of the plantation	PLANTATION MONITORING SHEET, ACCORDING TO ANNEX 1 OF THE MP)
12. Fuels	Application area (ha) type (diesel, essence) amount (liters/ha)	Forest District/ Annual Regeneration Registry Forest district/ Record of activities (original name: Fisa de evidenta a plantatiilor) includes technical, material and financial inputs history for afforestation of a specific parcel. The record is archived for 5 years after canopy closure of the plantation	PLANTATION MONITORING SHEET, ACCORDING TO ANNEX 1 OF THE MP)

B.2.2.4 Monitoring of biodiversity and socio-economic parameters

Table 6. Biodiversity and socio-economic parameters

Parameters/ indicators	Features/description/ measurement units	Data and information provider /Sources, documents	Project Input
1. Temporary or/and permanent birds that live, shelter or occasional	List of species; Population size	INCDS field teams + NFA Romsilva field personnel and specialised observations in natural parks/ INCDS report on biodiversity and social assessment (Technical Assistance Report INCDS 16.3/2017: "*Monitorizarea plantaţiilor incluse în Proiectul de Împădurire a Terenurilor Agricole Degradate din România, determinarea acumulării de carbon şi stabilirea contravalorii reducerilor de emisii generate")*	Questionnaire
2. Traces of birds presence	No. of nests/ ha in plantation areas, species (in winter); Food rests; Damages to neighbour agricultural crops;	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire
3. Predators (birds and mammals) populations	Lists of birds and mammals. Population size;	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire
4. Status of canopy closure of plantations	Age of plantations; Consistency (canopy closure);	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Plantation monitoring sheet
5. General income and income trend for local population	Planting related work payments; Working days per season per person;	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire
6. Other direct community benefits from the project	Local protection of settlements and crops against snows or sand storms Increased area of pasture and identifying of other forage sources Organized grazing	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire
7. Other direct individual benefits out of the project	Permanent or temporary income of local people	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire
8. Community level negative impact	Change of routes for access to fields for machineries or herds	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire
9. Investment of gain from working for plantation	Own local people investment in regular economic activity Mechanisation of activities	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire
10. Availability and interest for continuing the afforestation	Identification of AR appropriate lands	INCDS field teams + NFA Romsilva field personnel observations (Report INCDS 16.3/2017)	Questionnaire

B.2.3. Data concerning GHG emissions by sources of the project activity

The list of references for the default parameters/emission factors used is shown in Table 7.

Table 7. Default factors for GHG emissions by sources

Fertilizers (direct N2O emissions from fertilization)	Emission Factor for emissions from N inputs, tonne-N_2O-N (t-N input)$^{-1}$ = 1.25%, according to *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Chapter 4 Agriculture, item* 4.7.1.2 Choice of emission factors, Table 4.17 - Updated default emission factors to estimate direct N_2O emissions from agricultural soils, page 460 http://www.ipcc-nggip.iges.or.jp/public/gp/english/4_Agriculture.pdf
GWP for N2O	*310: according IPCC's Assessment Report 4* *http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html*
C content of the fuels (Diesel)	2.73 tCO_2/1000 litters of Diesel according US Environmental Protection Agency http://www.epa.gov/cpd/pdf/brochure.pdf (page 2 Table CO_2 Emission Factors by Fuel Type per Unit Volume, Mass, and Energy). Mass of CO_2 from one gallon of conventional Diesel is computed as: • 1 gallon × 3.240kg/gallon (fuel density) × 87.0% (C content of fuel) × 44/12 = 10.336kg CO_2; • 1 gallon = 3.7854 litters, it results that • 1 litter Diesel equivalent of 2.73 kg CO_2.

B.2.4. Data concerning GHG emissions by sources of the baseline GHG emission/removal

Not recalculated (thus baseline estimates apply).

B.2.5. Data concerning leakage

The project did not displace local activities; therefore, leakage due to activity displacement is not an issue.

There are no activities on the "unproductive" lands included in the project, thus we assume no emissions. Even if such lands do not have trees, grazing does not occur as all 'forest fund' land are protected against any grazing activity.

B.2.6. Data concerning environmental impacts

Biodiversity associated with project is assessed based on dynamics of bird populations especially the predator bird species, which are "at the top of food chain" and serve as indicators of ecosystem diversity. The main species of predatory birds identified in the project area are presented in Annex 5. Monitoring procedures of biodiversity and socioeconomic parameters were fulfilled according to PDD provisions.

A priori environmental assessment of the project implementation did not identify specific threats for flora, fauna, habitat, and ecosystem biodiversity. In certain locations, such as Small Island of Braila, the project implementation included a set of biodiversity risk mitigation actions that matched the local conservation circumstances (e.g. only indigenous poplars were planted (*Populus alba* & *Populus nigra*) and planting of hybrid black poplar (*Populus x canadensis*) was avoided; existing bushes of *Tamarix ramossisima* were not removed, etc).

Monitoring indicators used for assessing biodiversity improvement are:
temporary or/and permanent birds that live, shelter or are occasionally identified in the project lands;
traces of bird presence (nests, etc);
predator populations (both animals and birds);
status of canopy closure of plantations project.

Socioeconomic assessment during the third monitoring period was fulfilled by filing in designated questionnaires. Indicators for monitoring were the same as those used in initial assessment (2002) and previous ones (2007 & 2012) (Table 34, Annex 6). Communities have accepted the land use change and adapted to it, although in some areas some people complained about restricted access to former grazing land (around Small Island of Braila) and in response, compensatory measures were implemented (creating a 600 ha grazing area in Stancuta and neighbouring villages and a bakery in Marasu village).

Monitoring indicators used for socioeconomic assessment are:
Household income and income trend for local population
Other direct community benefits out of the project
Other direct individual benefits out of the project
Community level negative impact
Individual level negative impact
Investment of gain from working for plantation
Presumptive gain of crop due to plantations
Availability and interest for continuing the afforestation
Availability for afforestation of own degraded land (if any).

B.3. Data processing and archiving (including use of software)

Field data were recorded on the sheets provided as part of the monitoring plan. Laboratory data was recorded on regular laboratory registries. Project documentation is archived both in digital and hard copy formats in INCDS (National Institute for Research and Development in Forestry "Marin Dracea", Voluntari, Romania), Laboratory of Ecology and Scientific Secretariat. With every annual monitoring, a hard copy (as an annual report) is provided and approved by NFA Romsilva, which keeps it in its own archive.
Data was processed mainly in Microsoft Office (Word & Excel).

B.4. Special event log

Events in the project area are reported by field personnel/guards within current forest protection procedure of NFA Romsilva. For the project purpose, the information is additionally reported in the "project monitoring sheet" in the autumn of each year (excerpt of the event log is presented below in Table 8).

Table 8. Special events occurrence

Time	Type of event	Data sources
Spring 2010	Flooding of Project's plantations along Danube plain in: Lacu Sarat and Braila Forest Districts, on 242.8 ha.	Forest District's records (hazards notifications, RNP Romsilva ad-hoc commissions for field check, event confirmation, reports, etc), pictures and video. Input in the project follows B.2.2.2.
Summer 2007, 2008, 2009	Localized drought reduced survival rates, on 60.3 ha in Braila and Vaslui Forest counties	
Spring 2006	Flooding of 1,800 ha in Dolj and Olt counties	
Annual flooding (since concerned area is not guarded by dikes)	Braila (Lacu Sarat and Braila districts, Small Island of Braila)	

SECTION C. Quality assurance and quality control measures

C.1. Documented procedures and management plan

C.1.1. Roles and responsibilities

Project implementation has been carried out by National Forest Administration Romsilva and its technical unit on Forest Regeneration and is supported by other units such as International Relations Department (communication responsibilities), National Institute for Research and Development in Forestry "Marin Dracea" (responsible for monitoring and measurement of C stocks, reporting to WB, as well as with ensuring consistency with National GHG inventory /National Environmental Protection Agency and accounting under 1st CP of Kyoto Protocol) and county branches and forest districts (in charge of planting, gap-filling, plantation maintenance and administration of projects lands). Responsibilities are clarified in NFA Romsilva General Director order no. 712/2003. Subsequent to measurement of tree biomass, teams comprising two INCDS members - one dealing with soil sampling and the other covering litter sampling and each team supported by relevant technical units collected data on non-tree biomass pools.

C.1.2. Trainings

Trainings were conducted to familiarize staff participating in the project monitoring and measurement activities, which are summarized in Table 9 below.

Table 9. Training activities

Activity	Date and justification document	Course document	Participants
1. Training of Forest District responsible in charge with forest regeneration	Joint activity NFA Romsilva – INCDS * (trainers: L. Pavel – NFA Romsilva & L.Ciuvat– ICAS)	Introduction in KP and Project Monitoring Plan (chapter III, item III.1, chapter V), with relevant annexes	Personnel in charge of forest regeneration from Romsilva's county branches and districts as trainees
2. Training of INCDS staff on soil sampling and for assessing initial C content in the project soils	INCDS, 2012 and 2017 (trainers: Dr. L. Dinca & L.Ciuvat – INCDS)	Project Monitoring Plan (chapter II), with relevant annexes	Technical personnel from INCDS
3. Training of INCDS staff for collecting field data and harvesting biomass and litter	INCDS, 2012 and 2017 (trainers: Dr. L. Dinca & L.Ciuvat – INCDS)	Project Monitoring Plan (chapter III.1 and III.2, III.3 and III.4), with relevant annexes	Technical personnel from INCDS
4. Laboratory procedures	INCDS, 2012 and 2017 (trainers: Dr. L. Dinca & L.Ciuvat – INCDS)	Project Monitoring Plan (SOM, DOM, Biomass chapters, chapter VI, VII, VIII), with relevant annexes. Additional procedure for laboratory processing of litter samples	Technical personnel /laboratory staff from INCDS

* National Forest Administration Romsilva contracted National Institute for Research and Development in Forestry (INCDS) for the project monitoring, and field sampling, processing, archiving and reporting of the data collected under the project. In NFA - INCDS research program, the project codes are 15.4/2015, 16.3/2016 and 16.3/2017. The contract is renewed yearly.

C.2. Involvement of Third Parties

2. INCDS "Marin Dracea" implements URS ISO 9001 since 2007 and ALLCERT ISO 14001 since 2015.

C.3. Internal audits and control measures

Implementation of the QA/QC

Check against official records of National Forest Administration - Romsilva, reports to National Institute of Statistics and national GHG inventory of Romania (latest submission to UNFCCC in 2018)

These checks refer to areas of land involved in the project. They are performed annually as part of annual project monitoring.

National GHG inventory also reports JI land as a subdivision "JI project" within KP CRF Table 5 (KP-I) A1.1, of afforestation/reforestation. For the 2019 submission, an update of the JI project details will be presented considering the results of this 3rd verification.

Field activities - measuring trees in the PMP
Field team members have been trained, both in theory and in practice. A team was composed of 2 research staff (provided by INCDS), one forest ranger and 2-3 workers (provided by NFA Romsilva). During the period from 1 July to 1 November 2017, there was one permanent team in the field with each team having a chief in charge of GPS use, implementation of field measurements and recording of data and information as per standard procedures on PMP. Location of PMPs centre was done by identifying (via GPS coordinates) the landmarks of the plots of the previous monitoring period.
"Team chief" also observed measuring techniques (including DCH or DBH measurement) and cross-checked measurements (for example, inclusion or exclusion of trees from the sampling area limit etc).
Tree collar diameter was re-measured for 10 % of trees in the permanent monitoring plot (PMP) by the team chief.

Sampling biomass for tree allometric equations
Biomass measurements were achieved "tree by tree" to avoid mixing of biomass components. Biomass data were recorded for each individual tree in the field sheet (DCH, DBH, stem length, fresh matter of biomass on components: stem, foliage and branches). Original field sheets have been stored in the project database. Biomass sub-samples (for humidity correction) were packed in closed plastic bags and labelled (according the labelling instructions contained in the monitoring plan) and stored in shaded place.

Measurement of litter
One member of the INCDS team was in charge of collecting litter (assisted by the workers) with the help of a standard wooden frame (50x50 cm) laid out randomly in the PMP. The team member ensured that the pins are inserted and frame is fixed, and that a sharp knife was used to separate necro mass inside the frame and also ensured that only biomass from inside the frame is collected.

Laboratory activities
The 10 % biomass samples were reprocessed (samples weighting for humidity correction).
10 % of soil samples are blindly processed within every batch in the laboratory. Results are shown under the verification headings below.

Office activities
Data has been recorded in spread-sheets, and original sheets with recorded measurements are stored in the laboratory archives.
Another person verified the quality of data entry in the spread sheets.
Basic statistics allow eliminating outliers (for biomass samples, humidity value, if individual value > 2 Standard Deviation of original pool was used for eliminating outliers).

Checks and verification
Data manipulation is checked in the spreadsheets
Formulas and conversion from g to kg to tons and further to C content are checked;
Ratio of DBH (breast height diameter) to DCH (diameter collar height) < 1;
Based on general ecological knowledge, check that ratio of C stock in Litter is < 5%, if not recheck laboratory results;
Horizontal or vertical totals are used to verify reshuffled column/lines;
Check if values of the Implied Emission Factors (general values for aggregated values of C stock change per area) are realistic.
Additionally, various checks are performed against reference literature, e.g. *IPCC GPG LULUCF 2003*, scientific papers or other national documentation.

Check of C stock in Living biomass pool

Filtering of DCH & DBH of individual trees inputs. Because the biomass equations were derived for certain range of diameters (DCH and DBH), there is a small risk that trees being much outside this range may yield unrealistically higher biomass (also because of the property of biomass power function used). It was checked that the total number of 9870 measured trees in 165 PMPs, respect the condition DCH>DBH. The isolated cases when errors were found (around 50 trees) the values were corrected (coloured red in the *Biomass accumulation calculations_2017.xls* biomass calculation file). Largest trees were shown by Poplar, Salix and Robinia.

File: *Biomass accumulation calculations_2017.xls*
Sheets: *SMP data_2017, QAQC*

Checks of living biomass standing stock. Estimated C stock in living biomass in the oldest stands/plantations (i.e. 13, 14 and 15 years old pooled together) were checked against C stock derived from standing stock volumes available from *Modele matematico-auxologice si tabele de producție pentru arboreta (Giurgiu Victor, Draghiciu Dorin, 2004. Editura Ceres, pp. 227-259, ISBN 973-40-0639-8)* as shown in Table 10 below. The national average values of apparent density of wood as used in the National Inventory Report of Romania 2012 (UNFCCC submissions) were used. The biomass estimation considered country specific average values of wood density of 600 kg/mc for Robinia sp., 400 kg/mc for Populus sp. and 645 kg/mc for Quercus sp. It is noticeable that Giurgiu et al. values include only stem and branches; while project measured values include foliage, standing dead wood and litter (according IPCC 2003 foliage may account as 3-5 % and roots as 25 % of aboveground biomass, litter some 5%). This demonstrates that the project results are realistic and correspond to volumes accumulated for mid-superior site index (IIIrd production class).

Table 10. Check of measured C stock for oldest plantations against site index standing volume in Romanian yield tables

Species	**DBH (cm)**			**Height (m)**			**C stock (tC/ha)**		
	Average			Average			Average		
Values measured in the plantations									
Poplar	16.3			12.7			54.50		
Robinia	8.4			9.2			26.67		
Oak	4.6			5.2			20.31		
Species	**Average DBH (cm)**			**Average (m)**			**C stock (tC/ha) from yield tables**		
Values from Romanian yield tables									
Yield class	**III**	**IV**	**V**	**III**	**IV**	**V**	**III**	**IV**	**V**
Poplar	12.5	10.3	8.2	14.3	10.6	6.8	109.81	66.36	31.6
Robinia	11	8.4	5.9	12.6	9.6	6.6	84.53	52.93	29.23
Oak	4.5	NA	NA	5.2	NA	NA	35.55	NA	NA

C.4. Troubleshooting procedures

In case of the Biomass dataset: outlier values were removed completely from the pool.

Biomass samples for humidity factor, litter and SOC: gap filling strategy consists in using average values instead of the values proved as outliers (a value was taken as an outlier if > 3 SDTEV of dataset).

SECTION D. Calculation of GHG net removal

According to the data from the annual monitoring sheets submitted by the forest districts, the project strata were structured based on land use and age (Table 11). Largest strata are the plantations older than 12 years (63% of total project area), while less than 1% are those under 5 years of age. The unproductive lands represent 10% (643 ha) of total project area.

Table 11. Project strata area (ha) based on land use and age of plantations (years) at the end of 2017

STRATA (species, land use)	Age (years)																TOTAL (ha)
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
GL	0	51.1	107.87	21.03	0	0	5.5	0	0	53.8	114.43	1.75	0.6	0	0	0	356.08
PLA	193	247.9	298.1	211.21	46.7	70.5	10.96	0	0	90.25	68.6	72.74	0	0	0	0	1,309.96
SA	21.9	43.2	137	87.77	5.1	26.5	1	0	0	0	1.9	1	0	0	1.6	0	326.97
SC	0	820.3	453.58	476.44	15.71	2.42	2.60	19.8	0	147.8	154.85	257.41	0	8.8	0	0	2,359.71
SL	0	13.88	1.8	8.83	0	0	0	0	0.3	1	0	0	0	0	0	0	25.81
STB	3.1	247.33	169.12	292.92	22.4	0	0	0	0	35.9	40.51	23.07	0	0	0	0	834.35
*MIXT	0	63.75	48.99	53.2	24.5	0	17.7	0	0	106.03	156	100.13	4.9	1	0	0	576.20
Plantations area (ha)	**218**	**1,487.5**	**1,216.5**	**1,151.4**	**114.41**	**99.42**	**37.76**	**19.8**	**0.3**	**434.78**	**536.29**	**456.1**	**5.5**	**9.8**	**1.6**	**0**	**5,789.08**
Area under regeneration (ha)	areas of plantations with survival rate zero (%)																63.65
Unproductive - Reclassified	Areas which were reclassified as unproductive after successive afforestation failure																233.29
Unproductive - Original	Areas which were classified as unproductive at the beginning of the project																410.03
TOTAL PROJECT AREA																	**6,496.05**

* includes species used in mixed stands: Fraxinus sp., Ulmus sp., Acer sp., Prunus sp. etc.

Calculation of GHG removals by sinks includes carbon stock changes in living biomass, litter and dead wood pools and soil organic matter pools.
Dead wood includes standing dead tress with diameter at the thick end < >5.6 cm.

D.1. Ex post stratification of the project area within the project boundary

D.1.1 Ex post stratification for C stock change estimation for living biomass, litter and dead wood pools

Ex post Stratification (Table 12) takes into consideration following two criteria:

- *Current stand composition/tree species as proxy for forest type*, as the key factor in forest management planning (e.g. rotation cycle length of stands concerned);
- *Current overall performance of the plantations* (plantation success / survival rate in the 15th year of the project) with grouping on age. Age is given according to the year and season of last major gap filling (when in the previous year the survival rate was < 50%).

Such stratification is efficient considering early age of the plantations, and the unproductive nature of the lands/sites, as it is early to make adequate prognosis on stands productivity and production especially in the case of long cycle species la oak (e.g. rotation cycle of >100 years).

Table 12. Criteria for ex-post stratification of project area for stock change estimation in the C pools

Composition/Species groupings (1st level)	Tree species	Age grouping (2nd level)	Justification for grouping
LPS (low productive sites)	Elaeagnus sp., Gleditschia sp., Ailanthus sp., Prunus sp. *Rosa canina,*	AGI (≤ 5 years old)	Repeated failure and low survival rate of plantations after 15 years since project start (subject to extreme dry sites or coupled flooding/drought). C stocks in biomass are low and within a narrow range irrespective of tree species.
		AGII (> 5 years old)	Successful plantations. Plots are scattered all across the project boundary. Cycle length is short.
STB	*Quercus sp (xerofilous), Fraxinus communis, F. ornus, Ulmus sp., Pyrus sp., Malus sp., Acer sp., Crataegus sp., Tilia sp.*	AGII (≥ 5 years old)	Successful plantations of Quercus sp. Forestry cycle of 100 years.
PLA	Indigenous poplars (in majority *Populus alba*)	AGII (≥ 5 years old)	Successful plantations of poplars. Forestry cycle of 60 or more years (include conservation regime).
SA	Wilow (*Salix sp*.)	AGII (≥ 5 years old)	Successful plantations of willow. Forestry cycle of 15 years, also subject to extreme flooding.
SC	Black locust plantations (*Robinia pseudoacacia*)	AGII (≥ 5 years old)	Successful plantations of *Robinia*, most often pure stands, on HAC soils. Forestry cycle of 25 years. Biomass accumulation rate is different in Eastern and Western strata.
Shrubs	*Amorpha fruticosa.*		Understory of *Amorpha fruticosa*. It was exclusively associated to poplar and willow plantations for an area of 1636ha.
Unproductive	*Spontaneous herbaceous and possibly non-woody vegetation (scattered throughout the project boundary)*		Composed of 2 categories: “originally unproductive” of 410.03 ha and 233.3 ha “reclassified unproductive” through forest management planning under local circumstances. Both such lands are classified as “N” by the forest management plans of forestry districts. They may become subject of future afforestation. All these areas are monitored as part of the project since they are included under the management plans and forest maps.

Consequently, a structure with 7 strata of the project area was used for estimation of LB, DW and LT pools (Table 13).

Table 13. Ex-post stratification of project area for stock change estimation in C pools and distribution of permanent monitoring plots (PMP)

Strata	**Age grouping**	**Area (ha)**	**Number of LB plots**	**Number of DW plots**	**Number of LT plots**
LPS	AGI	473.00	10	2	-
LPS	AGII	849.71	24	5	5
STB	AGII	811.28	29	11	11
PLA	AGII	1,170.52	36	14	13
SA	AGII	324.37	16	3	4
SC	AGII	2,093.5	50	21	40
Unproductive	**-**	706.97	9		
Private lands with non-claimed ERs for 2012-2017	**-**	66.70	2	-	-
Total (ha)		**6,496.05**	**176**	**56**	**73**

D.1.2 Ex post stratification for C stock change estimation for soil organic matter pool

Mineral soil organic matter

Soil is an implicit criterion for stratification of project area as long as planted species are very much related to soil and site: most of Robinia plantations are linked to sandy soils, most of Poplar plantations are related to alluvial soils and most of oak plantations are related to high clay soils (chernozems) although, the match is not full (e.g. some Robinia plantations on heavy soils both in E and W sites). Also, soil distribution does not represent a management criterion in Romanian forestry and its inclusion as strata may involve additional monitoring effort for the implementing agency.

Soil organic C stock change is estimated as a separate pool following baseline stratification on soil types and disturbance level according the land use (Table 14). The entire project area subject of soil disturbance for plantation (no matter if afforestation was successful or not) was included in the calculation of SOC change. Early age of plantations has not yet generated significant impact on soil C pool (annual biomass inputs are still low). Data on soil type and land use was provided by the afforestation studies at the beginning of the project.

Table 14. Baseline stratification on soil type and land use (before the project). LAC is low activity clay and HAC is high activity clay soils.

Soil type & land use strata	Default classification	Area (ha)
Psamosol & arabil (arable)	Sandy & arable	1,071.97
Psamosol & vie/livada/pasune(orchards/vineyards)	Sandy & pasture	1,323.57
Aluvial & arabil	LAC & arable	1,675.3
Aluvial & pasune (pasture)	LAC & pasture	576.9
Cernoziom & arabil	HAC & arable	493.35
Cernoziom & pasune	HAC & pasture	925.16
TOTAL project		**6,066.25**

More on stratification and aggregation is available in file:

File: *SOC_Accumulation calculation_2017.xlsx*

Organic layers

Litter and dead wood were estimated and applied to strata where pool presence was confirmed by sampling (see table 13).

D.2. Monitoring method

Sampling, field and laboratory processing, as well as data processing follow the project's Monitoring Plan (MP). For the 3rd monitoring period, the reported pools are: Living Biomass pool composed from belowground biomass (roots until 2 mm), aboveground biomass (stem, branches, leaves); soil organic matter pool (until 30 cm depth) and dead organic matter (DOM) pool. DOM is composed from litter and dead wood laying on the floor, standing dead trees under and above 5.6 cm (at thick end) inside the PMP area.

Additionally, the C stock in biomass of *Amorpha fruticosa* understory (shrub) in poplar and willow plantations is accounted (toward full symmetry with pre-project emissions associated with removal of existing Amorpha for land and soil preparation).

Project monitoring and estimation of changes in C stock correspond to the project boundary and cover the major soil types (alluvial soils mostly in Braila county, sandy soils mostly in Dolj county and high-clay (i.e. czernozem) mostly in Tulcea, Galati and Vaslui counties). Accordingly, the composition of the plantations was determined by the soil type and not based on geographical reasons.

Initially, the monitoring plan established a number of 185 PMPs, yet in 2017 167 were monitored for reasons explained in Annex 1 and Annex 2. Permanent monitoring plot (PMP) area is consistently 200 m^2 for biomass measurement and 250 cm^2 for litter, across all PMPs measured. The plot centres identified by GPS coordinates are marked by wood and concrete landmarks and also with iron bars buried at the base of the landmarks. An overview of the sampling method is shown in Table 15. PMP on which there was no measured biomass was entered into the database as zero C stock in Living biomass.

D.2. Overview of the monitoring of the PMPs and pools sampling

Table 15. Number of PMPs and C pools sampling

C pools	No. of PMPs	No. of samples
Living biomass standing trees	165	9,870 measured trees
Sampled trees for allometric biomass equations		45 individual trees sampled and processed
Litter	73	292 samples (4 x PMPs, some of PMPs did not have any litter so no samples or only 1-3 samples were collected. An average C stock was estimates based on sampled PMPs (always divided by 4, even when less, at least one, samples were collected)
Dead wood	56	All dead trees within PMP area
Biomass of *Amorpha fruticosa*	15	Found in PMPs located in poplar and willow plantations
TOTAL per project	**176**	Across planted area of 5,789.08 ha (includes entire area of private owners)

D.2.1. Estimation of C stock in Living Biomass and Litter pools

Estimation of C stock change follows Methodological tool AR-TOOL 14 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (version 2.1.0)' on the project strata.

The total carbon stock estimate is the product of afforested area and average C stock (tC/ha). C stock in living biomass, dead wood and litter were averaged among all PMPs in each stratum, and estimated at project level based on share of each stratum in the project total area (following AR TOOL14). C stock in *Amorpha* shrubs was only applied to willow and poplar total area, while estimates of dead wood and litter were estimated only for the areas where they occur. Estimation of the uncertainty followed same computation path.

D.2.1.1. Measurement and recording of the stands/plantations characteristics in the PMPs

Procedure follows the guidelines described in the project Monitoring Plan;

PMP and forest parcel codes were recorded on field sheets (the format is provided according to the MP). The full list of the PMP coordinates is presented in Annex 1 (the visualization of PMPs is also available in the Project GIS database);

- collar diameter (DCH), breast height diameter (DBH) of all trees in the PMPs were measured exact (in mm) and recorded (if above 5 mm) in the field sheet or counted if DCH < 5 mm;
- height of 50% of trees is also measured in each PMPs (always the Eastern half of PMP);
- all tree species, seedlings and shrubs present in the PMP area were recorded as they have equal chance to participate in the stand composition in the future and represent the actual C stock.

D.2.1.2. Sampling of trees for biomass allometric equations

Higher diameter trees were sampled from the main species groups (ST, PLA, SA, SC, MIX) based on the values needed in the existing pool data for allometric equations, in order to update the existing biomass equations (developed for the same species up to the age of 11 years).
Between 1-5 trees near vicinity of the PMPs were harvested. Harvested trees were taken from the largest diameter classes and whole trees/seedlings by species were separated into different fresh biomass components (i.e. foliage, stem, and branches) and weighted as fresh matter (grams). For harvested trees, the length (i.e. stem aboveground) was also measured and recorded (cm). The fresh weight of total biomass component was recorded in a field sheet, while subsamples were weighed and put into plastic bags which were coded according to the provisions of the MP;

D.2.1.3. Laboratory processing for biomass humidity correction

Biomass sub-samples were collected in order to establish the water content in fresh biomass (some 200 samples). Sub - samples were stored in closed plastic bags until weighted in the lab (for fresh weight), then dried in open space at air temperature for 2 weeks, then oven-dried for ~ 48 hours at 70 ^{o}C until constant mass (two repeated weighing until constant sample weight). Results were recorded in laboratory registry and in Excel spreadsheets;
Humidity correction was then applied to field measured fresh weight of biomass components on species in order to get dry matter of biomass (Table 16);
Gap filling and outlier removal consisted use of average humidity correction on each species, whenever data was not sampled or missing.

Table 16. Biomass humidity correction calculation

Item	Type of relation	Format of equations
Biomass humidity correction	Mathematical	*H(%)=100*(FM-DM)/FM, where H (%) sub-sample humidity in per cent; FM – sub-sample fresh matter (g); DM – sub-sample dry matter (g)*

D.2.1.4. Whole tree/seedling biomass (dry matter, C content)

Individual tree/seedling biomass (dry matter, C content) is computed with site-specific and species-specific allometric equations, established for 11 species/groups (see Table 17 below).

Table 17. Site-specific and species-specific allometric equations

Item	Type of relation	Format of equations
Individual tree dry biomass (gC/tree)	Allometric equations (site-specific, specie-specific) equations are valid for trees in 15 years old plantations in climatic conditions similar to the project areas	$B_T=f(species, DCH/DBH, \Sigma B_{mc})$, where B_T= Total dry biomass of individual tree (g DM/individual tree x1000 to Kg; x 0.5 to obtain C content), D_{CH} - Collar diameter (mm), D_{BH} – Breast Height diameter (cm), ΣB_{mc} – sum of dry mass of tree components (ABGTB –aboveground total biomass, i.e. foliage, stem and branches & BGB – belowground total biomass, i.e. roots). DBH and DCH alternative apply, i.e. DBH is used when their ratio is >0.69.

Biomass equations validation and drawing of improved biomass equations. It is worth mentioning that the biomass equations obtained in early stages of growth are sensitive to new data added, i.e. with higher diameters. Thus 45 more trees from different species were processed in summer 2012 in order to ensure full suitability of biomass equations to tree growth conditions, wider diameters range are included (Table 18), compared to the pool used for the published paper in *Forest Ecology and Management* (*Blujdea et.al, 2012*).

Table 18. Current maximum diameter range for pooled trees for the NEW individual tree biomass equations

Species	Scientific name	Species code	DCH (mm)	DBH (mm)
Salcioara	*E. angustifolia*	SL	170	145
Frasin	*Fraxinus communis, F. ornus*	FR	158	123
Gladita	*Gleditschia triachantos*	GL	180	137
Stejar	*Quercus sp (xerophilous)*	STB	200	160
Salcam	*Robinia pseudoaccia*	SC	254	172
Plop alb	*Populus alba, P. nigra*	PLA	300	231
Salcie	*Salix sp.*	SA	255	200
Mixt	*General (mixed group of Pyrus, Prunus, Ulmus, Crataegus)*	MIXT	226	165
Amorfa	*Amorfa fruticosa*	AMORFA	33	22
Maces	*Rosa canina*	Rosa	18	na

The latest equations in comparison to the earlier published equations result in negligible differences for middle range of the tree's diameters and slight under/overestimation of maximum ±10% for upper and lower ranges of diameters. The latest equations are used for estimation in this report.

Biomass allometric equation implemented in excel spreadsheet

Tree biomass = CF * $e^{(\ln(a)+b*\ln(D))}$,

CF is a factor to correct for back log-transformation,

D – independent variable as predictor (DBH, DCH),

ln(a) and *b* are equation coefficients provided in Table 19 below. To estimate them, statistical processing was performed in ***R*** software (http://cran.r-project.org/bin/windows/base/) and included estimation of linear regression parameters and their significance, as well as fulfilment of statistical conditions for linear models (linear relationship between concerned logarithmic variables and residual's normality, independence and homoscedasticity). Model and predictors used are statistically significant and can be used for pools of data with same characteristics (age and site).

Detailed information is available in:

File: *Biomass accumulation calculations_2017.xlsx*

New equations were drawn for all species, except for dead trees, Amorpha and Rosa where the old equations were still suitable (for Robinia, larger trees from outside project but from same geographical areas were included in the initial pool, and former Robinia East and Robinia West strata were pooled together). Parameters of new equations are shown in Table 19.

Table 19. Parameters of individual tree biomass allometric equation

Tree species		Biomass eq. parameters for DCH (mm)						Biomass eq. parameters for DBH (cm)					
		ABGTB (aboveground total biomass)			Roots biomass			ABGTB (aboveground total biomass)			Roots biomass		
		ln(a)	*b*	*CF*	*ln(a)*	*b*	*CF*	*ln(a)*	*b*	*CF*	*ln(a)*	*b*	*CF*
E. angustifolia	**SL**	-2.3988	2.6395	1.1691	-2.666	2.3561	1.2806	0.3060	2.1742	1.214	-0.11907	1.819585	1.3333
Fraxinus communis, F. ornus	**FR**	-2.3323	2.6166	1.1691	-0.793	1.82342	1.2806	-0.5160	2.3160	1.214	-0.27901	1.8294	1.3333
Gleditschia triachantos	**GL**	-2.3319	2.5437	1.1691	-2.058	2.22323	1.2806	-0.69589	2.3470	1.214	0.95044	1.47099	1.3333
Quercus sp (xerofili)	**STB**	-2.0495	2.3946	1.1691	0.1981	1.50635	1.2806	-0.41333	2.29828	1.214	1.502632	1.30261	1.3333
Robinia pseudoaccia	**SC**	-2.2317	2.5627	1.1691	-2.254	2.19446	1.2806	-1.22928	2.43908	1.214	-1.27532	2.025729	1.3333
Populus alba, P. nigra	**PLA**	-2.1819	2.4537	1.1691	-0.672	1.67416	1.2806	-1.4465	2.4766	1.214	-0.20708	1.694768	1.3333
Salix sp.	**SA**	-2.264	2.4832	1.1691	-3.032	2.42735	1.2806	-1.78002	2.53411	1.214	-1.14817	2.059555	1.3333
Mixed group	**Mixt**	-2.199	2.5027	1.1691	0.5819	1.42294	1.2806	-0.05616	2.23664	1.214	2.375176	1.043037	1.3333
Amorpha sp.	**Amorfa**	-2.222	2.4785	1.1691				-0.31446	2.28121	1.214			
Rosa canina	**Rosa**	-1.9911	2.2555	1.1691	-2.434	2.21609	1.2806						

Tree species		Biomass eq. parameters for DCH (mm)						Biomass eq. parameters for DBH (cm)					
		ABGTB (aboveground total biomass)			Roots biomass			ABGTB (aboveground total biomass)			Roots biomass		
		ln(a)	*b*	*CF*	*ln(a)*	*b*	*CF*	*ln(a)*	*b*	*CF*	*ln(a)*	*b*	*CF*
Dead tree/Mort	**Dead**	-0.9617	1.8617	1.2819	-3.681	2.75511	1.887	3.7492	1.8203	1.384	3.7989	2.5192	1.3641

D.2.1.5. Data processing at PMP level

D.2.1.5.1. *Individual tree Living Biomass estimation*

Biomass of each individual tree was computed with above species-specific biomass equations, then summed up to PMP plot area (200 m^2).

In each PMP, biomass data was summed up tree by tree (Table 20). Both DCH (mm) and DBH (cm) for each tree in the PMP are input in the spreadsheet, as either variable can be used with priority of DBH (if available). Equations for small trees are expected to perform better for DCH because of larger pools. An excel spreadsheet implements a formula that uses DCH as predictor (when both DBH is not available), or use DBH (when available).

Table 20. Dry matter estimation at PMP level

Item	Type of relation	Format of equations
Dry matter in LB pool on PMP (gC/PMP)	Mathematic (sum)	$LB_{PMP} = \Sigma B_T$, where: LB_{PMP} = Total Living Biomass dry matter on each PMP, B_T= Total dry biomass of individual tree (g DM/individual tree) Conversion from g to kg: x 1/1000
Unitary C stock per strata (tC/ha)	Averaging on strata	Average of PMP biomass for each composition and age grouping at ha Conversion from PMP to 1 ha: x 50 Conversion from kg to tons: x 1/1000

There is a deviation from the monitoring plan regarding the LB aggregation within PMP as follows:
- Monitoring Plan method consisted of averaging the tree's DCH/DBH on each species and applying the tree average biomass to the total number of trees within PMP.
- Current used method assumes biomass estimation of each individual tree followed by summing up to PMP total dry biomass. Latest method estimates better the biomass accumulation by considering the tree biomass distribution within the plot.

D.2.1.5.2. Estimation of C stock in Litter pool

Litter pools were aggregated following same procedure as Living biomass.

Litter consists of tree organic matter lying on the soil, including leaves from previous years and dead wood pieces in any stage of decomposition, excluding current year leaves, herbs and other non-tree organic material. Litter pool is collected according to the procedures described in the monitoring plan. Laboratory processing is nevertheless more elaborated than described there (in order to ensure accuracy, the current year leaves/litterfall and mineral residues were removed). The working protocol was prepared with laboratory technicians and preparatory processing were carried out. Litter sampling was made between 15 July 2012 to 31 of August 2017, in order to capture the right (minimal and permanent) litter stock on the soil under maximum decomposition while current year leaves were still pending on trees (in any case current year leaves were removed both in the field sampling and in the laboratory based on their colour and shape).

Sampling of litter was achieved in all PMP where it was encountered, in total numbering 73 PMPs. In each PMP 1-4 samples were taken, according to MP (1 on each cardinal direction) and if only one was sampled then it was because no litter was in the other directions. Inside the solid 50X50 cm square frame, the litter was collected in plastic bags, labelled according to the PMP code and transported to laboratory. Collected samples were air dried in the laboratory for 2 weeks then processed according to the laboratory

procedures noted in Annex 3. For each PMP/strata an average at the level of sampling plot (250 cm^2) was computed. Scaling up of C amount in Litter to per area unit (1 ha) per composition and per age (Table 21).

Table 21. Litter amount estimation at PMP level

Item	*Type of relation*	*Format of equations*
Litter amount (g DM/0.25 m^2)	Multiplication	Litter amount x $C_{content\ Lab}$ Conversion from g to kg: x 1/1000
Unitary C stock per strata (tC/ha)	Averaging on strata	Average of samples on species and stand age groupings at ha Conversion from PMP area to 1 ha: x 4000 Conversion from kg to tons: x 1/1000

D.2.1.6 Biomass and Litter pools C stock scaling up to relevant strata and to whole project level

For each PMP, tree composition and plantation age were recorded by forest districts and provided as 'Plantations monitoring sheet' at the end of 2017. Starting from this database, the project area was stratified into 7 strata, as shown in Table 13. Allocation under groupings was made starting from composition (main species) and age category. *Amorpha* (100%) is a stratum in itself, but as a shrub understory it is associated to poplar and willow stands.

C stocks on each such stratum, and its uncertainty, were further aggregated up depending on their share in total project area, to an average C stock across all project strata.

D.2.2. ESTIMATION OF C STOCK IN DEAD ORGANIC MATTER (DOM)

Estimation of C stock in Dead Wood pool

For standing dead wood specific biomass equations were used. In the project, average standing dead wood amount is 1.9 tC/ha and represents 0.05% of total standing biomass in poplar, and respectively, 1.9 tC/ha and 0.9% for *Robinia pseudoacacia* plantations.

DW was aggregated at PMP and strata levels following same procedure as living biomass and litter. Finally, C stocks on each such stratum, and its uncertainty, were aggregated depending on their share in total project area to an average C stock across all project strata.

Estimation of Soil Organic Carbon (SOC)

Changes in the organic C stock of the mineral soil was calculated considering the baseline estimates (soil samples from 2004). Similar sampling and processing were implemented for the two estimates, according to the MP. Data on land use was provided by the afforestation studies at the beginning of the project. Estimation of SOC follows the stratification in the baseline on soil type and land use. The C stock change in mineral soils is estimated for 30 cm depth for an area of 5789,08 ha.

The correspondence of soil type and land management with default classification is shown in Table 22, as well as the selected values for three C stock change factors. 'Arable' includes long-term disturbed soils managed through annual cultivation. '*Pasune*' include not cultivated, i.e. annually ploughed, lands on slopes or not cultivated because of very low productivity for several years before plantations and at least occasionally used for grazing. '*Pasune*' includes a small area of abandoned and degraded wine and orchard lands which were used for at least some years before the project for occasional grazing.

Table 22. Parameters for estimation of C stock change in soils organic carbon pool

Soil type & land use strata	**Baseline measured C stock (tC/ha)**	**C stock measured in 2017 (tC/ha)**	**OBSERVATIONS**
Psamosol & arabil (Sandy & arable)	43	50	Short-term or set aside cropland (since 1990 erratically ploughed). Full tillage assumed whenever ploughing was done. Low input of fertilizers and irrigation
Psamosol & vie/livada/pasune (Sandy & orchard/pasture)	31	54	Abandoned grasslands, naturally invaded at least since 1990, Moderately degraded (often sand dunes or swamps). Low or,

			rather, not at all inputs of fertilizers
Aluvial & arabil (LAC & arable)	87	95	Short-term or set aside cropland (since 1990 erratically ploughed). Full tillage assumed whenever was done. Low input of fertilizers
Aluvial & pasune (LAC & pasture)	71	90	Grassland, Moderately degraded, Low or, rather, not at all inputs of fertilizers
Cernoziom & arabil (HAC & arable	106	97	Short-term or set aside cropland (since 1990 erratically ploughed). Full tillage assumed whenever was done. Low input of fertilizers
Cernoziom & pasune (HAC & pasture)	87	85	Grassland, Moderately degraded, Low or, rather, not at all inputs of fertilizers

D.2.3 TOTAL AMOUNT OF CARBON ACCUMULATED IN CARBON POOLS

The total C stock in the four pools (LB, LT, DW, SOC) was summed up and final *'CO_2 removal/emissions'* was obtained by multiplying with 44/12 (Table 23).

Table 23. Total C stock and CO_2 removals by pools

Carbon pool	Total C stock change (tC)	Total CO_2 removals (tCO_2)
CO_2 removal by living biomass, litter and dead wood (tC/tCO_2)	123,237.5	451,870.7
CO_2 removals by mineral soils (tC/tCO_2)	83,361.9	305,660.3
TOTAL	**206599,4**	**757531,0**

D.3. Description and consideration of measurement uncertainties and error propagation

In the monitoring plan the targeted precision was 10 % (according draft IPCC 2003 guideline at the time of project's monitoring plan preparation), which was taken into consideration when computing the sampling plot number under initial low number of strata. Although, under operational circumstances the C stock estimates are influenced by the survival rate and annual gap filling rate.

Changes in Living biomass and especially SOC pools are dominant in total C stock change at project level project, while their uncertainties are below 10% (Table 24 and Table 25).

Table 24. Stratification for Living biomass C stock estimation (NA – not applicable since estimated as zero C stock)

Strata	C stock (tC)	Share in total project C stock (%)	No. of plots	Project weighted average (tC/ha)
LPS (AGI)	22,719.2	6	10	91
LPS (AGII)	55,415.9	14	24	
STB(AGII)	42,612.7	11	29	
PLA(AGII)	128,488.5	32	36	
SA(AGII)	27,755.3	7	16	
SC (AGII)	118,451.1	30	50	
Unproductive	0	NA	11	
Total project	**395,442.8**		**176**	

Total uncertainty was estimated based on methodology prosed by AR-TOOL14 (Table 25).

Table 25. Uncertainty estimation on pools and total project

Pool	Project average C stock (tC/ha)	Relative uncertainty (%)
Living biomass (tree stand)	21.12	9.9%

Understory Living biomass (Amorpha shrubs)	1.16	51.1%
Standing dead trees	0.18	28.7%
C stock in Litter	0.85	18.2%
Soil organic carbon	35.1	16.1%
TOTAL	**58.41**	**-**

The errors in Activity data are considered negligible as standard procedures were followed in collecting the field data (e.g. biomass measurements) and therefore have negligible impact on uncertainty.

More details on uncertainty estimation are available in file:

File: *Biomass accumulation calculations_2017*
Sheets: *SUMMARY FINAL*

D.4. GHG emission reductions (referring to B.2. of this document)

D.4.1. Project emissions

D.4.1.1. Emissions from Land preparation and removal of pre-existing vegetation

Land preparation and removal emissions were included and deducted from the estimate of the 1st verification (2002-2007).

D.4.1.2. Emissions from fuels consumption and use of fertilizers

Fuels used for soil preparation have been annually reported in the Project Monitoring Sheet by local forest districts to INCDS. The reports contained data on: effective area, type and amount of fuel. Use of fertilizers was no longer reported in the period between 2013 – 2017.
Wood harvesting through tending operations (especially thinning of Robinia plantations according to the management plans) was reported in the Project Monitoring Sheet (Table 26).

Table 26. Activity data for estimation of emission from GHG sources

Emission source	Monitoring year					TOTAL 2013-2017 (tCO_{2eq})
	2013	2014	2015	2016	2017	
Fuels (1000 litters/lt)	34.85	93.48	11.29	2.80	1.93	**394.08**
Commercial fertilizer (tons)	2.00	0.00	0.00	0.00	0.00	**2.71**
Harvested wood (m3)	188.87	266.50	501.92	338.00	649.69	**2,513.88**

Total amount of CO_2 emissions equivalent to be deducted for the period 2013 – 2017 is 2,910.7 tonnes CO_{2eq}. Detailed calculation for 2013-2017, including multiplication factors used, is shown in file: *ROU_PCF_GHG_sources_2017.xls*

D.4.2. Baseline emissions

Baseline emissions and removals were deducted from the estimate of 1st verification.

D.4.3. Leakage

The project has been assessed as not having any displacement of activity and consequently no leakage on other lands.

D.4.4. Summary of the emissions reductions during the monitoring period:

For accounting purpose, the estimates provided here refer to C stocks attributed to the project activity since the 1st verification (biomass and dead organic matter pools) and baseline (soil organic carbon) in Table 27.
Notably, the emission reductions claimed for the second monitoring period (2008-2012) has to be understood as a constant amount (with no uncertainty attached since it was associated with the lower bound of the CI 95% of the total estimate). Thus, the emission reduction between 2nd and 3rd monitoring period results as the difference between “total C stock estimated for 3rd verification period (C accumulated between 2002-2017)” and “the constant amount estimated for 2nd period”.

Table 27. Projects breakdown of CO_2 removals and emissions for 3rd monitoring period

Summary table	Amount (tCO2eq)
Total removals in C stocks at end of 2017 (LB+LT+DW+SOC) (tCO2)	**-757531,0**
GHG emissions from sources (2013-2017), total (tCO2eq)	**2910,7**
CO2 emission from fuels	394,1
N2O emissions from fertilizers application	2,7
Emission from wood harvesting	2513,9
Amount claimed 2nd MP (2008-2012)	**229641,0**
Net CO2 removals for 2013-2017	**-524979,4**
Deduction rate (according to Table 8 in AR-TOOL 14)	**-31498,8**
Amount to be claimed for 3rd MP	**556478,0**
Relative uncertainty of the estimate (%)	**10,3%**

Legend Emissions from sources
Removals by sinks
Claims/deduction

Background calculation is included in excel spreadsheet *Biomass accumulation calculations_2017 (sheet SUMMARY FINAL).*

In order to have a clear separation between the rights of the project entity and that o the private owners who signed subcontracts with the latter, total amount of ERs accumulated in the project plantations for 2013-2017 is 556,478 tCO2eq, was split down between NFA Romsilva and private owners as of Table 28.

Table 28. ERs amounts for 2013-2017 period split between NFA Romsilva and private owners (rounded to nearest integer)

SUMARY	ERs (tCO_2)	*Comments*
Total amount to be claimed for the project, out of which to:	**556,478**	*See file: Biomass accumulation calculations_2017.xls*
NFA Romsilva	**539,828**	
25 private land owners who signed ERPA sub-agreements for 2013-2017	**16,650**	*See file: Private owners accumulation calculation_2017.xls*

ANNEX 1. LIST OF VALID PMPS in 2017 AND THEIR GPS COORDINATES

(updated parcel codes according forest management plan in force are highlighted, management unit coding will be permanent as part of the forest management planning and mapping)

Table 29. PMP geographical coordinates

No.	Forest branch	Forest district	Working unit	Parcel	PMP code	Lat(N)		Long(E)	
						degrees	decimals	degrees	decimals
1	**Braila**	**Lacu Sarat**	X	26C	LS Sa 1	44	55.181	27	53.318
2			X	27A	LS Pla 1	44	55.749	27	53.794
3			X	33A	LS Pla 3	44	56.358	27	53.873
4			X	34C	LS Pla 4	44	56.472	27	53.907
5			X	37A	LS Pla 5	44	56.568	27	53.719
6			X	40B	LS Pla 6	44	56.898	27	53.547
7			VIII	37A	LS Sa 4	44	56.881	27	54.194
8			VIII	38A	LS Pla 7	44	57.357	27	54.062
9			VIII	40B	LS Pla 8	44	52.468	27	51.084
10			VIII	42A	LS Pla 9	44	52.212	27	50.955
11			VIII	43	LS Pla 10	44	52.793	27	52.397
12			VIII	44AB	LS Pla 11	44	52.276	27	52.984
13			VIII	49	LS Pla 12	44	52.180	27	52.710
14			VIII	49A	LS Pla 13	44	52.103	27	52.450
15			VIII	49 A	LS Pla 14	44	51.964	27	51.838
16			VIII	51A	LS Pla 15	44	51.920	27	51.706
17			VIII	51B	LS Sa 6	44	52.095	27	51 930
18			VIII	53A	LS Pla 16	44	51 345	27	51.190
19			VIII	54B2	LS Pla 17	44	51.205	27	51.027
20			VIII	55A	LS Pla 18	44	50.992	27	50.833
21			VIII	56A	LS Pla 19	44	50.737	27	50. 677
22			VIII	58A	LS Pla 20	44	50.993	27	51.486
23			VIII	61A	LS Pla 21	44	50.562	27	51.521
24			VIII	63C	LS Sa 7	44	50.168	27	51.424
25			VIII	64A	LS Sa 8	44	49.973	27	51.793
26			VIII	66A	LS Pla 22	44	49.923	27	51.741
27			VIII	67A	LS Pla 23	44	50.071	27	50.875
28			VIII	68A	LS Pla 24	44	49.790	27	50.465
29			VIII	69A	LS Pla 25	44	49.708	27	50.519
30			VIII	71B	LS Sa 9	44	49.512	27	51.432
31			VIII	71D	LS Pla 26	44	49.466	27	50.171
32			VIII	72	LS Pla 27	44	49.335	27	50.122
33			VIII	73B	LS Pla 28	44	49.218	27	50.284
34			VIII	74B	LS Pla 29	44	48.911	27	50.445
35			VIII	76A	LS Sa 10	44	49.124	27	51.246
36			VIII	79B	LS Pla 30	44	49.758	27	51.911

MONITORING REPORT FORM

No.	Forest branch	Forest district	Working unit	Parcel	PMP code	Lat(N)		Long(E)	
						degrees	decimals	degrees	decimals
37			VIII	80B	LS Pla 31	44	49.824	27	51.910
38			VIII	83A	LS Sa 11	44	48.783	27	51.001
39			VIII	90A	LS Pla 33	44	48.602	27	51.992
40	**Braila**	**Braila**	VI	113	Br Sc 1	44	52.759	27	41.798
41			VI	124 C	Br Gl 1	44	55.639	27	40.833
42			VI	116	Br Stb 1	44	52.425	27	42.063
43			VI	123A	Br Stb 2	44	56.038	27	40.298
44			VI	125F	Br Stb 3	44	55.588	27	41.264
45			X	27	Br Pla 1	44	47.342	27	53.562
46			X	28	Br Pla 2	44	47.501	27	53.233
47			X	30	Br Pla 3	44	47.299	27	52.635
48			X	30	Br Pla 4	44	47. 443	27	52.646
49			X	32	Br Pla 5	44	47.638	27	53.719
50			X	37	Br Pla 6	44	47.937	27	54.044
51			X	39	Br Pla 7	44	48.053	27	53.625
52			X	53	Br Pla 8	44	48.295	27	53.658
53			X	53	Br Pla 10	44	48.393	27	53.771
54			X	41	Br Pla 11	44	47.871	27	52.866
55			X	19	Br Pla 12	44	48 773	27	53.668
56			X	49	Br Pla 13	44	48.779	27	53.545
57			X	53	Br Pla 14	44	48.773	27	53.380
58			VIII	76	Br Pla 15	44	49.291	27	55 .896
59			VIII	49	Br Pla 16	44	51.705	27	55.121
60	**Galati**	**Galati**	IV	146	Gl Sc 1	45	58.612	27	57.453
61			IV	149	Gl Sc 2	45	58.814	27	57.516
62			III	91A	Gl Sc 3	44	55.225	27	52.265
63	**Galati**	**Hanu Conachi**	III	90A	Gl Pin 1	45	27.427	27	58.947
64	**Galati**	**Grivita**	VI	49	Gl Gl 1	46	6.438	27	31.094
65	**Tulcea**	**Babadag**	IV	92A	Tl Stbr 1	45	7.611	28	50.617
66			IV	93A	Tl Stbr 2	45	7.122	28	50.983
67			IV	94A	Tl Stbr 3	45	7.366	28	51.486
68			IV	94B	Tl Stbr 4	45	7.036	28	51.464
69			IV	93C	Tl Stbr 5	45	7.604	28	51.449
70			IV	92G	Tl Stbr 6	45	7.308	28	51.277
71			IV	92H	Tl Stbr 7	45	7.348	28	51.266
72			IV	93B	Tl Fr 1	45	7.119	28	50.834
73	**Tulcea**	**Ciucurova**	III	121A	Tl Sc 1	44	50.172	28	14.067
74			III	125	Tl Sl 1	44	51.934	28	12.888
75			III	121C	Tl Stb 8	44	50.271	28	13.523
76			III	123A	Tl Stb 9	44	50.608	28	12.300
77			III	124A	Tl Stb 10	44	51.478	28	12.718

MONITORING REPORT FORM

No.	Forest branch	Forest district	Working unit	Parcel	PMP code	Lat(N)		Long(E)	
						degrees	decimals	degrees	decimals
78			III	122D	Tl Gl 1	44	50.188	28	13.169
79	**Tulcea**	**Niculitel**	VI	36E	Tl Sc 2	45	08 827	28	43.906
80			VI	37D	Tl Stbr 11	45	8.088	28	44.367
81			VI	40A	Tl Stbr 12	45	8.266	28	44.928
82			VI	41A	Tl Stbr 13	45	8.764	28	44.973
83			VI	34C	Tl Fr 2	45	8.934	28	43.368
84			VI	37J	Tl Fr 3	45	8.406	28	44.391
85	**Vaslui**	**Barlad**	VI	77B	Vs Sc1	46	20.849	27	44.518
86	**Vaslui**	**Epureni**	II	153G	Vs Sc2	46	17.047	27	46.524
87			II	153G	Vs Sc3	46	16.973	27	46.678
88			II	200B	Vs Sc4	46	19.800	28	2.566
89	**Vaslui**	**Barlad**	III	127A	Vs St 1	46	29.319	27	29.471
90	**Vaslui**	**Epureni**	II	201B	Vs St 2	46	19.833	28	2.570
91	**Vaslui**	**Husi**	V	72D	Vs Gl 1	46	25.902	28	9.272
92			V	72B	Vs Pin 1	46	25.926	28	9.239
93	**Vaslui**	**Barlad**	VI	77B	Vs Arb 1	46	20.823	27	44.535
94	**Dolj**	**Segarcea**	60	513/92	Dj Sc 1	43	49.977	23	40.936
95			62	515/2	Dj Sc 2	43	49.825	23	39.505
96			65	572/1	Dj Sc 3	43	49.691	23	40.121
97			146	3145/a	Dj Sc 4	43	49.663	23	41.845
98			147	3156/4	Dj Sc 5	43	49.058	23	42.357
99	**Dolj**	**Sadova**	IV	547A	Dj Sc 6	43	49.293	24	3.989
100			IV	520	Dj Sc 7	43	49.530	24	1.577
101			IV	527B	Dj Sc 8	43	49.308	24	2.760
102			IV	531B	Dj Sc 9	43	48.920	24	3.549
103			IV	517	Dj Sc 10	43	48.034	24	3.260
104			IV	512	Dj Sc 11	43	48.150	24	2.379
105			IV	512	Dj Sc 12	43	48.156	24	2.156
106			IV	552C	Dj Sc 13	43	50.693	24	1.257
107			IV	550	Dj Sc 14	43	51.176	23	89.575
108			IV	537	Dj Sc 15	43	50.308	23	59.827
109			IV	501A	Dj Sc 16	43	52.419	24	6.484
110			IV	520F	Dj Sc 17	43	51.696	24	8.654
111			IV	528A	Dj Sc 18	43	51.499	24	10.393
112			IV	467B	Dj Sc 19	43	52.680	24	3.858
113			IV	565	Dj Sc 20	43	51.288	24	3.096
114			IV	569	Dj Sc 21	43	50.381	24	7.032
115			IV	570	Dj Sc 22	43	50.542	24	6.988
116			IV	575	Dj Sc 23	43	50.215	24	8.121
117			IV	578	Dj Sc 24	43	49.767	24	8.424
118			IV	525A	Dj Sc 25	43	49.462	24	2.527

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No.	Forest branch	Forest district	Working unit	Parcel	PMP code	Lat(N)		Long(E)	
						degrees	decimals	degrees	decimals
119			IV	551D	Dj Sc 26	43	50.491	24	1.059
120			IV	568	Dj Sc 27	43	51.444	24	3.846
121	**Dolj**	**Segarcea**	I	99	Dj Sl 1	43	49.020	23	39.127
122			I	131	Dj Sl 2	43	49.617	23	42.093
123	**Dolj**	**Sadova**	IV	523	Dj Sl 3	43	49.553	24	2.146
124			IV	576	Dj Sl 4	43	50.197	24	8.259
125			IV	555E	Dj Stb 1	43	51.051	24	1.352
126			VIII	505A	Dj Stb 2	43	49.616	23	42.093
127			VIII	470A	Dj Stb 3	43	52.060	24	7.121
128			IV	568F	Dj Stb 4	43	50.943	24	3.550
129	**Dolj**	**Segarcea**	I	109	Dj Stb 5	43	50.343	23	39.915
130			I	112A	Dj Stb 6	43	49.818	23	40.196
131			I	120A	Dj Pla 1	43	48.858	23	40.869
132			I	127A	Dj Pla 2	43	48.940	23	41.418
133			I	120	Dj Pla 3	43	48.821	23	40.981
134			I	136	Dj Pla 4	43	48.813	23	42.697
135			I	137	Dj Pla 5	43	48.907	23	42.722
136			I	138	Dj Pla 6	43	48.956	23	43.233
137	**Dolj**	**Sadova**	IV	566	Dj Pla 7	43	51.050	24	3.092
138	**Dolj**	**Segarcea**	I	107	Dj Gl 1	43	49.983	23	40.002
139			I	112C	Dj Gl 2	43	49.794	23	40.688
140			I	130B	Dj Gl 3	43	49.511	23	41.776
141	**Dolj**	**Sadova**	IV	566	Dj Fr 1	43	51.443	24	3.238
142	**Olt**	**Corabia**	III	86A	Ot Gl 1	43	42.905	24	7.310
143			III	45	Ot Gl 2	43	42.482	24	18.749
144			III	78E	Ot Ce 1	43	43.710	24	8.620
145			III	79A	Ot Ce 2	43	43.814	24	8.186
146			III	86B	Ot Ce 3	43	42.795	24	7.488
147			III	88C	Ot Ce 4	43	43.850	24	7.204
148			III	89A	Ot Ce 5	43	43.993	24	8.112
149			III	81B	Ot Pla 1	43	42.702	24	9.430
150			III	83A	Ot Pla 2	43	41.740	24	9.470
151			II	42F	Ot Pla 3	43	45.413	24	27.781
152			II	42C	Ot Pla 4	43	44.807	24	25.752
153			II	42A	Ot Pla 5	43	44.368	24	24.343
154			II	44	Ot Pla 6	43	42.435	24	20.663
155			II	44	Ot Pla 7	43	42.411	24	20.165
156			II	46	Ot Pla 8	43	42.378	24	17.621
157			III	82A	Ot St 1	43	42.420	24	09.49
158			III	101A	Ot St 2	43	41.622	24	12.449
159			III	101C	Ot St 3	43	41.562	24	10.356

MONITORING REPORT FORM

No.	Forest branch	Forest district	Working unit	Parcel	PMP code	Lat(N)		Long(E)	
						degrees	decimals	degrees	decimals
160			III	103A	Ot St 4	43	41.763	24	12.200
161			III	102A	Ot St 5	43	42.047	24	10.902
162			III	102B	Ot St 6	43	41.743	24	10.878
163			III	66D	Ot Sl 1	43	43.200	24	12.180
164			III	67C	Ot Sl 2	43	43.050	24	11.470
165			III	69A	Ot Sl 3	43	43.400	24	11.300
166			III	70	Ot Sl 4	43	42.440	24	11.480
167			III	71A	Ot Sl 5	43	43.200	24	10.800
168			III	73A	Ot Sl 6	43	43.020	24	11.130
169			III	78A	Ot Sl 7	43	43.456	24	8.667
170			III	80E	Ot Sl 8	43	43.660	24	8.570
171			III	80E	Ot Sl 9	43	43.707	24	8.146
172			III	103A	Ot Sl 10	43	41.930	24	12.040
173			III	103A	Ot Sl 11	43	42.125	24	10.960
174	**Mehedinti**	**Corcova**	I	89	Mh Go 1	44	38.220	23	1.614
175			I	89	Mh Go 2	44	38.392	23	1.070
176			I	90	Mh Go 3	44	38.472	23	1.104

ANNEX 2. OVERVIEW OF THE PMPS MEASURED IN THE 2ND AND 3RD PROJECT MONITORING

Table 30. PMP's measured in the year 2012 and remeasured in the year 2017

No.	*PMP code*	**Monitoring 2012**	**Monitoring 2017**
		Afforestation mix (%)	***Afforestation mix (%)***
1	BRPLA1	PLA(100)	PLA(100) (invaded by Amorpha)
2	BRPLA 2	No woody vegetation /trees in 2012 (SPM invaded by herbaceous vegetation)	SA(100)
3	BRPLA10	PLA(100)	PLA(100)
4	BRPLA11	SA(80)PLA(20)	SA(100)
5	BRPLA12	PLA(100)	PLA(100)
6	BRPLA13	SA(100)	SA(100)
7	BRPLA14	PLA(100)	PLA(100)
8	BRPLA15	SA(100)	SA(100)
9	BRPLA16	SA(100)	SA(100)
10	Br PLA17	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas) Removed completely from the list of PMPs.	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas). It is removed completely from the list of PMPs.
11	BRPLA3	PLA(100)	PLA(100)
12	BRPLA4	PLA(100)	PLA(100)
13	BRPLA5	PLA(100)	PLA(100)
14	BRPLA6	PLA(100)	PLA(100)
15	BRPLA7	SA(100)	SA(100)
16	BRPLA8	No woody vegetation /trees in 2012 (SPM invaded by herbaceous vegetation)	PLA(100)
17	BRPLA9	PMP never established	PMP never established
18	BRSC1	SC(100)	SC(100)
19	BRSTB1	SC(100)	SC(100)
20	BRSTB2	Mixt(73)STB(0)FR(0)Rosa(25)	STB(89)Rosa(11)
21	BRSTB3	STB(55)Rosa(5)Mixt(39)FR(0)	STB(52)SL(18)Rosa(8)MIXT(21)FR(1)
22	BRGL1	Mixt(26)GL(31)FR(41)	FR(64)GL(12)MIXT(24)
23	DJFR1	SC(100)	SC(100)
24	DJGL1	GL(100)	GL(100)
25	DJGL2	GL(100)	GL(100)
26	DJGL3	Mixt(5)GL(81)SL(13)	MIXT(63)GL(36)SL(1)
27	DJPLA1	PLA(100)	PLA(100)
28	DJPLA2	PLA(100)	PLA(100)
29	DJPLA3	GL(2)PLA(97)	PLA(67)GL(63)
30	DJPLA4	GL(100)	GL(100)
31	DJPLA5	SC(100)	SC(100)
32	DJPLA6	SC(100)	GL(16)SC(84)
33	DJPLA7	SC(100)	SC(100)
34	DJSC1	No woody vegetation /trees in 2012 (SPM invaded by herbaceous vegetation)	No trees in 2017 (SPM invaded by reed)
35	DJSC10	SC(100)	SC(100)
36	DJSC11	SC(100)	SC(100)
37	DJSC12	SC(100)	SC(100)
38	DJSC13	SC(100)	SC(100)
39	DJSC14	SC(100)	SC(100)
40	DJSC15	100 SC	100 SC
41	DJSC16	100 SC	100 SC

No.	PMP code	Monitoring 2012	Monitoring 2017
		Afforestation mix (%)	*Afforestation mix (%)*
42	DJSC17	100 SC	100 SC
43	DJSC18	100 SC	100 SC
44	DJSC19	SC(93)Mixt(6)	SC(20)SL(80)
45	DJSC2	SC(100)	SC(100)
46	DJSC20	SC(100)	SC(100)
47	DJSC21	SC(100)	SC(100)
48	DJSC22	SC(100)	SC(100)
49	DJSC23	SC(100)	SC(100)
50	DJSC24	SC(100)	SC(100)
51	DJSC25	SC(41)Mixt(58)	MIXT(58)SC(42)
52	DJSC26	SC(100)	SC(100)
53	DJSC27	SC(100)	SC(100)
54	DJSC3	GL(100)	GL(100)
55	DJSC4	PLA(1)SC(98)	SC(100)
56	DJSC5	GL(29)SC(70)	SC(0)
57	DJSC6	SC(52)Mixt(47)	MIXT(78)SC(22)
58	DJSC7	SC(100)	SC(100)
59	DJSC8	SL(27)SC(72)	SC(78)SL(23)
60	DJSC9	SL(27)SC(72)	SC(100)
61	DJSL1	GL(9)Mixt(42)FR(48)	MIXT(30)FR(6)GL(64)
62	DJSL2	Mixt(20)SL(14)GL(65)	MIXT(49)GL(28)SL(23)
63	DJSL3	SC(100)	SC(82)SL(18)
64	DJSL4	SC(100)	SC(100)
65	DJSTB1	SC(100)	SC(100)
66	DJSTB2	STB(58)SC(3)Mixt(37)	MIXT(40)STB(60)
67	DJSTB3	STB(60)Mixt(40)	MIXT(58)STB(42)
68	DJSTB4	Mixt(100)	MIXT(40)STB(60)
69	DJSTB5	GL(100)	FR(81)GL(19)
70	DJSTB6	STB(2)SC(72)FR(2)Mixt(6)GL(16)	MIXT(4)GL(21)FR(1)Rosa(1)SC(69)STB(3)
71	GLGL1	SL(11)SC(0)Rosa(64)GL(23)	GL(23)Rosa(63)SC(1)SL(14)
72	GLPIN1	SC(23)Mixt(76)	MIXT(100)
73	GLSC1	SC(99)Mixt(0)	SC(100)
74	GLSC2	SC(100)	SC(100)
75	GLSC3	SC(95)Mixt(2)Rosa(1)	MIXT(3)SC(97)
76	LSGL1	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas) Removed completely from the list of PMPs.	PMP not re-identified (GPS coordinates error, PMP centre outside the project areas). It is removed completely from the list of PMPs.
77	LSPLA1	PLA(100)	PLA(100)
78	LSPLA2	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas) Removed completely from the list of PMPs.	PMP not re-identified (GPS coordinates error - identical to LSPLA1). It is removed completely from the list of PMPs.
79	LSPLA10	SA(95)PLA(4)	PLA(30)SA(70)
80	LSPLA11	SA(6)PLA(93)	PLA(96)SA(4)
81	LSPLA12	SA(82)PLA(17)	PLA(50)SA(50)
82	LSPLA13	PLA(100)	PLA(6)SA(94)
83	LSPLA14	SA(100)	SA(100)
84	LSPLA15	PLA(100)	PLA(35)SA(65)
85	LSPLA16	PLA(100)	PLA(100)

No.	PMP code	Monitoring 2012	Monitoring 2017
		Afforestation mix (%)	*Afforestation mix (%)*
86	LSPLA17	PLA(100)	PLA(100)
87	LSPLA18	PLA(100)	PLA(100)
88	LSPLA19	PLA(100)	PLA(100)
89	LSPLA20	PLA(100)	PMP not remeasured due to inaccessible location (flooded roads)
90	LSPLA21	SA(44)PLA(55)	PMP not remeasured due to inaccessible location (flooded roads)
91	LSPLA22	SA(100)	PMP not remeasured due to inaccessible location (flooded roads)
92	LSPLA23	PLA(100)	PLA(100)
93	LSPLA24	PLA(0)	PLA(0)
94	LSPLA25	PLA(100)	SA(100)
95	LSPLA26	PLA(100)	PLA(50)SA(50)
96	LSPLA27	SA(8)PLA(91)	PLA(100)
97	LSPLA28	PLA(100)	PLA(100)
98	LSPLA29	PLA(100)	PLA(100)
99	LSPLA3	PLA(100)	PLA(100)
100	LSPLA30	SA(100)	PMP not remeasured due to inaccessible location (flooded roads)
101	LSPLA31	SA(100)	PMP not remeasured due to inaccessible location (flooded roads)
102	LS PLA32	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas) Removed completely from the list of PMPs.	PMP not re-identified (GPS coordinates error - identical to LSPLA1). It is removed completely from the list of PMPs.
103	LSPLA33	PLA(100)	PLA(100)
104	LSPLA4	SA(53)PLA(46)	PLA(56)SA(44)
105	LSPLA5	PLA(100)	PLA(100)
106	LSPLA6	PLA(100)	PLA(100)
107	LSPLA7	PLA(100)	PLA(100)
108	LSPLA8	SA(100)	SA(100)
109	LSPLA9	SA(100)	SA(100)
110	LSSA1	SA(100)	SA(100)
111	LSSA2	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas) Removed completely from the list of PMPs.	PMP not re-identified (GPS coordinates error - identical to LSPLA3). It is removed completely from the list of PMPs.
112	LSSA10	SA(100)	PMP not remeasured due to inaccessible location (flooded roads)
113	LSSA11	No trees in 2012 (SPM invaded by herbaceous vegetation)	No trees in 2017 (SPM invaded by herbaceous vegetation)
114	LS SA 12	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas) Removed completely from the list of PMPs.	PMP not re-identified (GPS coordinates error, PMP centre outside the project areas). It is removed completely from the list of PMPs.
115	LS SA 3	PMP not re-identified in 2012 (GPS coordinates error, PMP centre outside the project areas) Removed completely from the list of PMPs.	PMP not re-identified (GPS coordinates error - identical to LSPLA5). It is removed completely from the list of PMPs.
116	LSSA4	100 SA	PLA(100)
117	LS SA 5	PMP not re-identified in 2012 (GPS coordinates error) Removed completely from the list of PMPs.	PMP not re-identified (GPS coordinates identical to LSPLA10). It is removed completely from the list of PMPs.
118	LSSA6	SA(100)	SA(100)
119	LSSA7	PLA(100)	PMP not remeasured due to inaccessible location (flooded roads)

No.	*PMP code*	**Monitoring 2012**	**Monitoring 2017**
		Afforestation mix (%)	***Afforestation mix (%)***
120	LSSA8	SA(100)	PMP not remeasured due to inaccessible location (flooded roads)
121	LSSA9	PLA(0)	PMP not remeasured due to inaccessible location (flooded roads)
122	MHGO1	SC(100)	Rosa(2)MIXT(4)SC(94)
123	MHGO2	STB(100)	STB(98)MIXT(2)
124	MHGO3	STB(100)	STB(92)MIXT(8)
125	OTCE1	STB(41)FR(4)Mixt(23)Rosa(30)	STB(44)Rosa(21)MIXT(29)FR(6)
126	OTCE2	STB(90)SA(1)Mixt(7)	STB(56)MIXT(11)Rosa(45)
127	OTCE3	Mixt(88)Rosa(8)PLA(3)	STB(10)SA(3)Rosa(38)MIXT(46)
128	OTCE4	STB(38)Rosa(34)Mixt(28)	MIXT(33)STB(10)GL(43)Rosa(16)
129	OTCE5	SL(4)GL(95)	GL(96)SA(2)SL(2)
130	OTGL1	GL(100)	GL(100)
131	OTGL2	PLA(0)GL(98)Mixt(0)	GL(93)MIXT(7)
132	OTPLA1	SC(76)PLA(7)Mixt(15)	SC(65)PLA(4)MIXT(31)
133	OTPLA2	SC(100)	SC(100)
134	OTPLA3	GL(100)	GL(100)
135	OTPLA4	PLA(100)	PLA(100)
136	OTPLA5	PLA(100)	PLA(100)
137	OTPLA6	GL(100)	GL(72)
138	OTPLA7	SA(4)SC(36)GL(57)Mixt(1)	MIXT(2)GL(76)SA(11)SC(11)
139	OTPLA8	PLA(100)	PLA(100)
140	OTSL1	SL(4)SC(90)SL(4)	MIXT(11)SC(81)SL(8)
141	OTSL10	SL(80)Mixt(20)	MIXT(44)SL(56)
142	OTSL11	SL(100)	MIXT(54)SL(46)
143	OTSL2	GL(50)Mixt(50)	MIXT(50)GL(50)
144	OTSL3	SC(1)GL(98)	MIXT(16)GL(76)SL(3)SC(5)
145	OTSL4	GL(100)	GL(100)
146	OTSL5	SL(38)SC(28)Mixt(32)	MIXT(43)SC(33)SL(24)
147	OTSL6	Mixt(100)	MIXT(77)GL(23)
148	OTSL7	Mixt(63)SL(36)	SL(28)MIXT(65)GL(7)
149	OTSL8	Mixt(3)SL(43)GL(53)	MIXT(23)GL(58)SL(19)
150	OTSL9	SL(69)GL(30)	GL(49)SL(51)
151	OTST1	SC(100)	SC(100)
152	OTST2	STB(50)PLA(16)FR(33)	PLA(67)STB(33)
153	OTST3	PLA(85)Mixt(14)	MIXT(43)PLA(57)
154	OTST4	Mixt(100)	MIXT(81)SL(19)
155	OTST5	PLA(100)	PLA(100)
156	OTST6	SC(95)Mixt(4)	MIXT(20)SC(80)
157	TLFR1	Mixt(33)Rosa(5)SL(11)FR(50)	SL(7)Rosa(17)MIXT(23)FR(53)
158	TLFR2	Mixt(79)STB(5)STB(15)	STB(6)MIXT(75)FR(19)
159	TLFR3	Mixt(65)STB(16)SL(18)	STB(12)SL(10)MIXT(78)
160	TLGL1	SL(54)SL(45)	GL(44)SL(56)
161	TLSC1	SC(85)GL(14)	GL(14)SC(86)
162	TLSC2	SC(84)GL(15)	GL(18)SC(82)
163	TLSL1	Mixt(40)SL(50)FR(10)	SL(39)MIXT(43)FR(17)
164	TLSTB10	SL(9)SL(90)	GL(76)SL(24)
165	TLSTB11	Mixt(74)STB(11)FR(13)	STB(12)SL(11)MIXT(67)FR(10)
166	TLSTB12	Mixt(48)STB(34)SL(16)FR(1)	STB(26)SL(16)MIXT(57)FR(1)

MONITORING REPORT FORM

No.	*PMP code*	**Monitoring 2012**	**Monitoring 2017**
		Afforestation mix (%)	***Afforestation mix (%)***
167	TLSTB13	STB(16)SL(20)STB(25)STB(37)	STB(17)SL(26)MIXT(30)FR(27)
168	TLSTB8	Mixt(8)STB(2)SL(35)FR(54)	STB(19)SL(30)MIXT(13)FR(37)
169	TLSTB9	STB(8)Mixt(50)Mixt(41)	STB(10)SL(31)MIXT(10)FR(49)
170	TLSTBR1	Mixt(32)STB(47)SL(20)	STB(38)SL(29)MIXT(32)
171	TLSTBR2	Mixt(41)STB(17)SL(23)FR(17)	STB(14)SL(29)MIXT(41)FR(16)
172	TLSTBR3	Mixt(14)STB(48)SL(37)	STB(49)SL(37)MIXT(14)
173	TLSTBR4	Mixt(27)STB(27)SL(15)FR(30)	STB(5)MIXT(14)FR(61)
174	TLSTBR5	Mixt(34)STB(4)FR(61)	SL(40)MIXT(14)FR(46)
175	TLSTBR6	Mixt(21)SL(9)FR(69)	STB(23)SC(77)
176	TLSTBR7	STB(21)SC(78)	SL(34)SC(52)GL(14)
177	VSARB1	SL(57)SC(8)Rosa(14)GL(20)	SC(36)GL(64)
178	VSGL1	SC(27)Rosa(1)GL(71)	SL(3)SC(15)GL(10)FR(71)
179	VSPIN1	Rosa(10)SL(2)SC(10)FR(64)GL(10)	SC(100)
180	VSSC1	SC(100)	SC(100)
181	VSSC2	SC(95)Rosa(2)Mixt(1)	SC(97)MIX(3)
182	VSSC3	SL(1)SC(84)Rosa(8)Mixt(6)	SC(97)FR(3)
183	VSSC4	SC(96)SC(3)	STB(93)FR(7)
184	VSST1	STB(28)Rosa(66)Mixt(3)FR(2)	STB(79)MIXT(19)FR(2)
185	VSST2	Mixt(25)STB(74)	STB(14)SL(29)MIXT(41)FR(16)
		Invalid PMP in 2017 = 9 (highlighted across the table)	**Invalid PMP in 2017 = 19 (highlighted across the table)**
		Monitored number of PMPs in 2012 = 176	**Monitored number of PMPs in 2017 = 165**

- Total number of PMP mentioned in the MONITORING PLAN (2003) = 184
- Number of PMP's MEASURED in 2017 = 176
- Number of PMP's MEASURED in 2017 = 167 (11 PMP were not accessible at the time of the field measurements due to flooded roads).

ANNEX 3. LABORATORY PROCESSING PROTOCOL FOR LITTER SAMPLES

Field sampling is described in the project monitoring plan.

Table 31. Litter samples processing procedure

Faza de lucru (*Processing steps*)	**Denumire proba (*Sample name*)**	**Codare in fisa de laborator (*Coding in laboratory report*)**
A. Procesarea in laborator a probelor recoltate in teren (*Lab processing of the field sample*)		
Step 1. Samples are air dried for two weeks in the laboratory in constant humidity/air conditioned space. Sample weight and recorded in the lab registry is V1.	NECROMASS collected sample with constant humidity	Value V1
B. Procesarea probelor alese pentru stabilitrea continutului de LITIERA - MASA USCATA (*Litter separation and processing*)		
Step 2. Separation of true tree litter by current year leaves, grass and earth	-	-
Step 3. Additional separation of fine earth by sinking in water and collection of floating biomass, which was added to subsample collected in step 1.	-	-
Step 3. All true litter sample is dried in the air for two weeks and weighted. All such sub-samples weighted and recorded in the lab registry is V2.	LITTER with constant humidity	Value V2
Step 4. Selection of litter samples are dried at 105C (24 % of total number of field samples across all PMPs). Sample weighted and recorded in the lab registry is V3.	LITTER dry mass	Value V3
Step 6. Selected samples are grinded and from powder is extracted the sample for the C-analyzer. Sample weighted and recorded in the lab registry is V4.	Calcination sub-sample	Value V4
Step 7. Mass loss is assumed to be emitted C, the residue is assumed as the mineral component of the sample. Sample weighted and recorded in the lab registry is V5.	Post-calcination residual mass and correction factor	Value V5

ANNEX 4. CALCULATION OF PAYMENTS FOR EMISSION REDUCTION (CO2 REMOVALS) ON RESTITUTED LAND AREAS FROM PROJECT BOUNDARY

See attached file: *Private owners accumulation calculation_2017.xls*

ANNEX 5. BIODIVERSITY INDICATORS

Assessment of project impact on biodiversity

- *Concept of project's impact biodiversity monitoring*

Biodiversity associated project impact is assessed based on dynamics of bird populations in and adjoining the project lands area. Birds are species "at the top of nutrition chain" in the ecosystems, and consequently their presence reflects the ecosystem diversity.

- *Monitoring indicators*

- temporary or/and permanent birds that live, shelter or are occasionally related or identified in the lands under afforestation
- traces of birds presence (nests, etc)
- bird raptors
- canopy closed plantations

- *Monitoring methodology*

Bird monitoring s conducted in the year of project carbon monitoring, namely in 2007, 2012 and 2017. Bird species are surveyed by forestry staff. Monitoring is based on a questionnaire by PMU, with the assistance of the personnel of NFA Romsilva (see Sub-Annex 5.1.). For monitoring purpose, a field survey was conducted in summer 2012, with follow-up in 2017 consisting in field observations undertaken by mixed NFA Romsilva and INCDS teams.

- *Sampling area*

Large afforested land parcels have been considered for bird survey in three separate counties: Dolj, Olt and Braila, corresponding to the Danube flood plain area.

- *Monitoring results (see Sub-annex 5 summary table)*

Assessment has shown the presence of numerous bird forms (majority are *Passeriformes* and *Piciformes*) from different groups (i.e. granivorous and predators).

Compared to 2nd monitoring, in the late summer and autumn of 2017 a large number of the species identified previously were reported by the INCDS and NFA Romsilva field personnel.

The numbers of nests of *Passeriformes* have been reported in the understory and in tree holes between 3 to 8 m, and rarely above.

Based on the questionnaires filled by the interviewed persons (i.e. game wardens, local people) there is no report or evidence of negative impact of growing populations of specific birds, like crow populations (*Corvus corax*), that usually damage the agricultural crops. The details of bird survey monitoring results are presented in sub-annex table.

No negative effects on species included in the IUCN Red List of threatened species were observed (or species on a nationally recognized list (Birds directive 79/409/CCE transposed in Romanian legislation by Law 462/ 2001).

Worth mentioning is the reported expansion of the jackal (*Canis aureus*), an invasive species that has colonised the entire south of the country, affecting native species, especially in the Danube floodplain area.

The "with project" biodiversity scenario provides benefits for bird associations compared to baseline "without project" scenario, as the habitat of certain typical forest species has expanded.

Sub-annex 5. Bird species monitoring results

Table 32. Bird species presence within project boundaries

Nr. crt.	Date of observation	Location of observation	Phasianus sp.	Perdix sp.	Dendrocopos sp.	Streptopelia turtur	Corvus sp.	Pica sp.	Coturnix sp.	Streptopelia decaocto	Accipiter sp.	Sturnus sp.	Others
1	24.07.2012	Dabuleni	X	X	X	X	X	X	X	X		X	
2	25.07.2012	Dabuleni	X	X	X	X	X	X	X	X		X	*1
3	25.07.2012	Segarcea	X	X			X		X	X		X	
4	27.07.2012	Segarcea	X	X		X	X	X		X	X	X	
5	31.07.2012	Lacu Sarat	X		X	X	X	X		X	X	X	
6	08.08.2012	Dabuleni	X	X	X	X	X	X	X	X	X	X	
7	28.08.2012	Corabia	X	X	X	X	X	X	X	X	X	X	*2
8	28.08.2012	Olt	X	X	X		X	X		X	X	X	*3
9	28.08.2012	Dabuleni	X	X	X	X	X	X		X	X	X	
10	28.08.2012	Corabia	X	X			X	X		X		X	
11	30.08.2012	Corcova	X	X		X	X	X	X	X	X	X	*4
12	30.08.2012	Corabia	X	X	X		X	X		X	X	X	*5
13	30.08.2012	Corabia	X	X	X	X	X	X	X	X	X	X	
14	31.08.2012	Corabia	X	X	X		X	X		X	X	X	*6
15	31.08.2012	Corabia	X	X	X	X	X	X		X		X	*7
16	20.09.2012	Sadova, U.a.66B3					X	X					*8
17	20.09.2012	Sadova, U.a.58A4					X	X			X		*9
18	20.09.2012	Sadova, U.a. 144D			X		X	X					*10
19	20.09.2012	Sadova, U.a.133A			X		X						*11
20	20.09.2012	Sadova,U.a.139B					X						*12
21	20.09.2012	Sadova, U.a.142D2											
22	20.09.2012	Sadova, U.a.13B											
23	20.09.2012	Sadova, U.a.15C4					X				X		*13
24	21.09.2012	Sadova, U.a.115B		X			X	X					*14
25	21.09.2012	Sadova, U.a.115G											
26	21.09.2012	Sadova, U.a.68A					X	X			X		
27	21.09.2012	Dabuleni, U.a.DJSL3					X	X			X		*15
28	21.09.2012	Dabuleni,U.a.58					X	X		X	X		
29	21.09.2012	Dabuleni, U.a.DJSc9					X	X		X	X		
30	25.10.2012	Braila, U.a.LSPLA28			X		X	X					*16
31	25.10.2012	Braila,U.a.LSSA11	X		X		X				X		*17

1 Columba palumbus, Falco tinunculus, Falco vespertinus, Milvus migrans, Asio otus, Athene noctua
2 Upupa epops, Columba palumbus, Merops apiaster
3 Upupa epops, Merops apiaster, Columba palumbus
4 Upupa epops, Columba palumbus, Merops apiaster
5 Merops apiaster, Columba palumbus
6 Merops apiaster, Columba palumbus
7 Fringila coelebs, Phylloscopus sp., Coracias garrulus
8 Columba palumbus, Accipiter nisus, Ac. Gentilis, Falco vespertinus
9 Parus major, Turdus merula, Fringilla coelebs, Phylloscopus sp.
10 Picus canus, Columba palumbus, Fringilla coelebs, Parus major
11 Columba palumbus, Phylloscopus sp., Delichon urbica
12 Columba palumbus, Falco vespertinus
13 Columba palumbus, Falco vespertinus
14 Columba palumbus, Accipiter gentilis, Parus major
15 Fringilla coelebs, Falco vespertinus
16 Fringilla coelebs, Phylloscopus sp.
17 Parus major, Turdus merula, Fringilla coelebs, Anser albifrons, Accipiter gentilis, Dendrocopos major, Dendrocopos medius, Columba palumbus, Parus major, Erithacus rubecula, Parus major, Picus canus, Buteo rufinus, Dendrocopos major, Accipiter nisus, Parus major, Buteo rufinus, Parus major, Parus coeruleus

SUB-ANNEX 5.1. Questionnaire regarding the biodiversity impact of PCF - NFA Romsilva degraded land afforestation project

The maturity of a forest ecosystem could be assessed against its own functional stable nutritional chains. In this way, more stable species interactions, increase the capacity to measure the system integrity by specific bio-indicators. Based on this statement, the most efficient bio-indicators are the 2nd degree consumers (birds and animals) and 3rd degree (raptors).

In order to understand the how plantations have been evaluated in your area, please answer the questions:

1. Is there any canopy closed plantations in your activity area?
2. What bird species have you noticed in these areas? Please indicates the birds species you met in the your activity area, whatever they are related or not to forest
3. Do the bird species have any negative impact over the neighbouring lands crops?
4. What other wild species (mammals) have you noticed in plantations areas?

ANNEX 6. SOCIAL INDICATORS

Assessment of social impact of the project

- *Concept*

Land use change by afforestation brings about a change in land use pattern at local and regional level, as well as in the behaviour of the local people. The positive effects come from stopping land degradation and reducing soil erosion, improving of landscape, building shelter belts for humans and herds, supply of construction wood and fuel-wood, fruits. Adverse impacts of establishing the forest plantations may include reduced area for crops or grazing, and delay in revenue to owners.

- *Indicators*

Simple indicators were used to assess the project social impact:

- on household income and income trend for local population
- other direct community benefits out of the project
- other direct individual benefits out of the project
- community level negative impact
- individual level negative impact
- investment of gain from working for plantation
- any presumptive gain of crops due to plantations
- personal availability and interest for continuing the afforestation
- availability for afforestation of own degraded land (if any)

- *Monitoring approach*

The same questionnaire as in the 2nd monitoring was (prepared by the INCDS social research department), relying on the questionnaire used for social economic assessment conducted as part of the baseline study. The questionnaire is attached in the Sub-Annex 6.2. The questionnaires were filled up based on interviews with 32 people from localities bordering the project are, as follows: Dabuleni (Dolj), Agighiol (Tulcea), Ianca (Braila), Marasu (Braila) and Stancuta (Braila), Epureni (Vaslui), Grojdibodu (Olt) etc. The interviews were held in July-September 2017. The interviewers were either the chiefs of INCDS field teams or the responsible with forest regeneration at branch (county) level or National Park personnel in NFA Romsilva.

- *Monitoring results*

The answers (see Sub-Annex 6.1) to social questionnaire (Sub-Annex 6.2.) can be summarized as follows:

Local people are well informed on past and existing afforestation activities, and have benefited individually and collectively from participating in the afforestation works (Q1, Q2, Q4). Social and economic impact is little known or not acknowledged (Q3) by local people. Negative effects in the form of less grazing area is still reported because of replacing natural vegetation (Q6), and still very few communities are benefitting from great potential of beekeeping (related to Robinia stands).
Long term positive effects of afforestation on lands were also acknowledged, but participation was subject to payments and not as voluntary. Wood supply benefits were mentioned by local people, as harvesting started occurring due to the tending operations (thinning) that were made in the older stands (especially in Robinia).
Also, fewer product benefits such as fruits were realized, while although more apiculture was observed, it is not yet widespread.
Comparing to the results of social assessment in the first two monitoring periods, it was noted that the enthusiasm diminished as employment benefits associated with planting have declined, yet the majority of interviewed people acknowledge the need for more afforestation of degraded lands (Q8, Q9).

Sub-Annex 6.1 Answers to the questionnaire regarding the social impact of the project

Table 33. Social questionnaire answers

County	Variants	Question No.														
		I			II			III			IV			V		
		TYPE OF ANSWER														
		YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW
Mehedinți	a)	2			2					2	2				2	
	b)										2				2	
	c)											2			2	
	d)											2			2	
	e)											2			2	
	f)											2			2	
	g)											2			2	
	Total	**2**			**2**					**2**	**4**	**10**			**14**	
Dolj	a)	8			5		3			8	4	4			8	
	b)										2	6		1	7	
	c)											7			8	
	d)										6	2			7	
	e)											8			8	
	f)										3	5			8	
	g)										3	2	3		8	
	Total	**8**			**5**		**3**			**8**	**18**	**34**	**3**	**1**	**54**	
Olt	a)	5					5			5	2	3			5	
	b)											5			5	
	c)											5			5	
	d)										4	1			5	
	e)											5			5	
	f)											5			5	
	g)											5			5	
	Total	**5**					**5**			**5**	**6**	**29**			**35**	
Tulcea	a)	6			6			1	2	3	4	2			6	
	b)											6			6	
	c)											6			6	
	d)										2	4			6	
	e)											6		1	5	
	f)											6			6	
	g)										1	5			6	
	Total	**6**			**6**			**1**	**2**	**3**	**7**	**35**		**1**	**41**	
Braila	a)	6		1	7			4		3	3	4			7	
	b)											7			7	
	c)										3	4			7	
	d)										1	6			7	
	e)										1	6		3	4	
	f)										1	6			7	
	g)											7			7	
	Total	**6**		**1**	**7**			**4**		**3**	**9**	**40**		**3**	**46**	
Vaslui	a)	3		1	4			4			2	2		1	3	
	b)											3	1		4	

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County	Variants	Question No.														
		I			II			III			IV			V		
		TYPE OF ANSWER														
		YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW
	c)										4			2	2	
	d)										4			2	2	
	e)											4			4	
	f)										2	2			4	
	g)										3		1		4	
	Total	**3**		**1**	**4**			**4**			**15**	**11**	**2**	**5**	**23**	
PUNCTAJ		**30**		**2**	**24**		**8**	**9**	**2**	**21**	**59**	**159**	**5**	**10**	**213**	

County	Variants	Question No.											
		VI			VII			VIII			IX		
		TYPE OF ANSWER											
		YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW
Mehedinți	a)		2		2			1+1*			2		
	b)		2										
	c)		2										
	d)		2										
	e)												
	f)												
	g)												
	Total		**8**		**2**			**1+1***			**2**		
Dolj	a)	3	5		8			8			8		
	b)		8										
	c)		8										
	d)	3	5										
	e)												
	f)												
	g)												
	Total	**6**	**26**		**8**			**8**			**8**		
Olt	a)		5		5			4+1*			5		
	b)		5										
	c)		5										
	d)		5										
	e)												
	f)												
	g)												
	Total		**20**		**5**			**4+1***			**5**		
Tulcea	a)		6		6			5+1*			3	3	
	b)		6										
	c)		6										
	d)	3	3										
	e)												
	f)												
	g)												
	Total	**3**	**21**		**6**			**5+1***			**3**	**3**	

MONITORING REPORT FORM

County	Variants	Question No.											
		VI			VII			VIII			IX		
		TYPE OF ANSWER											
		YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW	YES	NO	DON'T KNOW
Braila	a)		7		6	1		5+2*			7		
	b)		7										
	c)		7										
	d)		7										
	e)												
	f)												
	g)												
	Total		**28**		**6**	**1**		**5+2***			**7**		
Vaslui	a)	2	2		4			4			4		
	b)		4										
	c)		4										
	d)	2	2										
	e)												
	f)												
	g)												
	Total	**4**	**12**		**4**			**4**			**4**		
PUNCTAJ		**13**	**115**		**31**	**1**		**19+5***			**29**	**3**	

* YES BUT NOT AS VOLUNTEER

SUB - ANNEX 6.2. ***Questionnaire regarding the social impact of the PCF - NFA Romsilva degraded land afforestation project***

In the past years, certain areas of degraded lands have been afforested in your area. Main scope of these plantations is to create environmental improvement in your area: halting water and wind erosion; enrich the landscape; increase of forest cover at local and global scale, conservation of biodiversity and enhancement of carbon stock in the terrestrial ecosystem. To fully understand the effect of these plantations the local community that you belong to, please answer to the following questions:

1. Please inform if any forest plantations have been done in your area?
2. Please explain how you personally benefited from the afforestation work (income, duration of work, work difficulty, supplementary/additional sources, any investment, payment problems),
3. Please explain how you personally benefited from afforestation work, from social point of view (permanent job, seasonal income to family members, house comfort, increased daily allocation)
4. Please explain how your community benefited from the afforestation work?
5. Explain how you personally were negatively affected by the plantations, from economic point of view
6. Explain how you personally were negatively affected by the plantations, from social point of view
7. Recent times, have you noticed any change regarding the crop harvests? The afforestation activity did help you for investment, protection of cultures, etc?
8. If there is more afforestation work in your area, will you continue to participate? (Even as a volunteer ?)
9. If new projects or funding would be available, would you be interested in the afforestation of your own degraded land, if the case?