MONITORING REPORT FORM (F-CDM-MR)
Version 02.0

MONITORING REPORT

Title of the project activity	Assisted Natural Regeneration of Degraded Lands in Albania
Reference number of the project activity	2714
Version number of the monitoring report	Version number 5
Completion date of the monitoring report	25/02/2013
Registration date of the project activity	02/01/2010
Monitoring period number and duration of this monitoring period	Monitoring period 1: 20/12/2004 - 30/06/2012
Project participant(s)	- Albania - Ministry of Environment, Forests and Water Administration - Italy - Government of Italy - Ministry for the Environment, Land and Sea - Spain - Kingdom of Spain - Ministry of Agriculture, Food and Environment and Ministry of Economy and Competitiveness - Canada. *Party withdrawn from KP effective 15/12/2012 – Government of Canada – Ministry of Foreign Affairs and International Trade - Japan - - Idemitsu Kosan Co., Ltd.; - The Okinawa Electric Power Co., Inc.; - Suntory Holdings Limited; - Tokyo Electric Power Co., Inc.;Sumitomo Joint Electric Power Co., Ltd.; - Japan Iron and Steel Federation (JISF); - Japan Petroleum Exploration Co.,Ltd. (JAPEX); - Sumitomo Chemical - France - Eco-Carbon S.A.S. - Luxembourg - Ministry of Sustainable Development and Infrastructure BioCarbon Fund (BioCF) - International Bank for Reconstruction and Development (IBRD) as Trustee of the BioCarbon Fund (BioCF)
Host Party(ies)	Albania
Sectoral scope(s) and applied methodology(ies)	Approved afforestation and reforestation baseline and monitoring methodology AR-AM0003 "Afforestation and reforestation of degraded land through tree planting, assisted natural regeneration and control of animal grazing – Version 4"
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	178,598.34 (for the period 2005 to 2012)
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	128,757.50

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Land degradation has been identified as a major natural resource management issue in Albania. Degraded land is subject to uncontrolled anthropogenic pressure in terms of fuel wood collection and grazing. Furthermore, the loss of vegetation cover leads to soil erosion and loss of productivity.

The project activity consists of the reforestation of degraded lands, by assisting the natural regeneration of vegetation on degraded lands with the objective of reducing soil degradation, conserve biodiversity and enable GHG emission reduction.

The project supports a participatory approach to the selection of sites, and implementation of the interventions needed to promote the regeneration of degraded forests.

The assisted natural regeneration project was registered with the objective of restoring the vegetation on degraded lands distributed in 24 poorest communes over five regions of the country.

Project interventions include: (a) protection from grazing to promote natural regeneration; (b) supplemental planting to enrich species diversity and to stabilize highly eroded areas, and (c) silvicultural works to promote growth such as coppicing, cleaning and thinning.

The activities implemented under the assisted natural regeneration fall under the reforestation definition of the Marrakesh Accords.

Considering the threats to regeneration, the key to establishing regeneration is through protection and supplemental planting activities implemented with the community involvement. The meetings with communes and preparation of contracts for protection of land parcels were the real actions that initiated the protection activities at the commune level. After initiating consultations, meetings, and contractual arrangements, the project started on 20/12/2004.

Out of the project area of 6,272.36 registered under the project, 1,493.36 ha was excluded from the project area as it was found to be unsuitable for implementing the project. As a consequence, from the area of 4,779 ha found suitable for undertaking the project, the project was implemented on 3,990.45 ha during the five year period. The project was not yet implemented on the remaining 1,154 hectares. The total GHG removals over the monitoring period amount to 128,757.50 tCO2e.

A.2. Location of project activity

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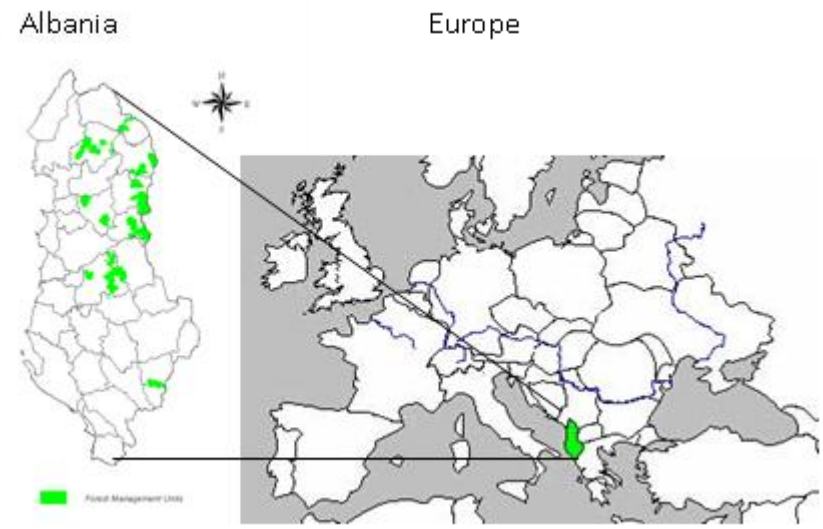
The project sites are spread over five regions of Albania (Diber, Elbasan, Kukes, Korce, Shkoder) (Fig. 1). The project boundaries are geographically delineated and represented on the forestry management/ topographic plans. The four extreme coordinate points of the project are North : 20°17'52.09"E 42°16'6.346"N, West : 19°45'50.282"E 41°58'50.039"N, East : 20°35'22.498"E 41°57'21.961"N, South : 20°36'55.69"E 40°15'41.499"N. The project consists of discrete areas that have unique geographical identification and boundaries. The data on the discrete areas included in the project are presented in a database attached to this monitoring report.

Figure 1. Project location



A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Albania (host)	- Ministry of Environment, Forests and Water Administration	No
Italy	- Government of Italy - Ministry for the Environment, Land and Sea -	Yes
Spain	• Kingdom of Spain-Ministry of the Agriculture, Food and Environment and Ministry of Economy and Competitiveness	Yes
Canada . *Party withdrawn from KP effective 15/12/2012	- Government of Canada – Ministry of Foreign Affairs and International Trade	No

Japan	- Idemitsu Kosan Co. Ltd.; - The Okinawa Electric Power Co., Inc.; - Suntory Holdings Limited; - Tokyo Electric Power Company, Inc.; - Sumitomo Joint Electric Power Co., Ltd.; - Japan Iron and Steel Federation (JISF); - Japan Petroleum Exploration Co.,Ltd. (JAPEX); - Sumitomo Chemical	No
France	• Eco-Carbon S.A.S.	No
Luxembourg	• Ministry of Sustainable Development and Infrastructure	Yes
BioCarbonFund (BioCF)	• International Bank for Reconstruction and Development (IBRD) as Trustee of the BioCarbon Fund (BioCF)	Yes

A.4. Reference of applied methodology

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Approved Afforestation and reforestation baseline and monitoring methodology AR-AM0003 "Afforestation and reforestation of degraded land through tree planting, assisted natural regeneration and control of animal grazing – Version 4"

This project complies with the "Guidelines on application of specified versions of A/R CDM methodologies in verification of registered A/R CDM project activities (version 01.0) (EB 63, Annex 26)"[1]; and "Guidelines on accounting of specified types of changes in A/R CDM project activities from the description in registered project design documents (version 02.0) (EB66, Annex 24)"

Finally, the project is in line with the following A/R Methodological Tools**:**

- Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities, Version 01.1.0 (EB 65, Annex 28).
- Tool for demonstration and assessment of additionality for afforestation and reforestation CDM project activities
- Tool "Procedures to define the eligibility of lands for afforestation and reforestation project activities" EB22, Annex 16.

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

A.5. Crediting period of project activity

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20 years (20yr-00mm) crediting period, renewable twice for a total crediting period of 60 years of the project period. The crediting period start date is 20/12/2004 and its end date is 19/04/2024.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The interventions promote natural regeneration under the project; the project sites from grazing pressure; support silvicultural activities that enhance biomass productivity through:

a. Assisted natural regeneration (3,337.92 ha), including protection from grazing and facilitation of natural regeneration through physical and social fencing measures; silvicultural measures to enhance biomass density; and protection from grazing and facilitation of natural regeneration. To protect the sites from grazing and to facilitate natural regeneration, vegetation fences based on the material from pruning, and thinning has been promoted. In situations that do not require physical fencing, agreements made between the project entity and the village communities under the project serve as social fencing and protective function.

b. Supplemental planting (1,441.08 ha) at 200-500 (in some cases more) seedlings per ha to enrich species diversity.

The forest species proposed for planting are determined as per the site and productive/protective scope of the plantation, and are native and naturalized broadleaf. The supplementary planting is aimed to enrich the species composition, increase the project benefits (and to recover barren areas).

There are twenty private and state nurseries that produce tree seedlings for local needs within the vicinity of the project, which supply seedlings for implementing planting activities (Table 1). The nurseries are sufficient for the production of seedlings and the nursery operators have the relevant skills for seedling production.

Table 1 - Distribution of nurseries in the project area

No	Region	District	Commune or Municipality	Area (m²)		Main production
				Private	State	
1	DIBER	BULQIZË	Zerqan	1,000		Forest seedlings
2			Bulqize	1,000		Forest seedlings
3		DIBËR	Kastriot	3,100		Fruit & Forest seedlings
4			Muhurr	1,200		Fruit & Forest seedlings
5			Tomin	600		Fruit & Forest seedlings
6		MAT	Lis	300		Fruit & Forest seedlings
7	ELBASAN	ELBASAN	Elbasan		20,000	Forest & Ornamental seedlings
8			Shirgjan	1,000		Forest & Ornamental seedlings
9			Gjinar	1,000		Forest seedlings
10		GRAMSH	Kukur	6,000		Forest seedlings
11		LIBRAZHD	L-Qendër	3,027		Forest seedlings
12	FIER	FIER	Qendër	20,000		Forest & Ornamental seedlings
13	KORCE	DEVOLL	Progër		50,000	Black pine, Black locust, etc.
14		KOLONJË	Ersekë	1,000		Ornamental seedlings
15		KORCE	Korçë	1,500		Forest seedlings
16			Mollaj	5,000		Forest & Ornamental seedlings

17	KUKES	KUKES	Novoseje	2,000		Forest seedlings
18		HAS	Krumë		1,200	Ornamental seedlings
19	LEZHE	LEZHË	Lezhe	10,000		Forest & Ornamental seedlings
20	SHKODER	PUKE	Puke	4,000		Forest seedlings
		TOTAL		**61,700**	**71,200**	

c. Silvicultural measures

There are different silvicultural interventions such as cleaning, thinning and coppicing conducted on planted sites. The interventions aim to encourage regeneration of native species - Quercus spp Acer spp, Tilia spp., Carpinus spp., Ulmus spp., etc are:

Cleaning - The selective removal of unwanted trees in a stand that have not passed the sapling stage in order to free the saplings from the unnecessary competition.
Thinning - The removal of selected stems from the stand done to enhance the diameter growth and height of the remaining trees.
Coppicing – It is a silvicultural system in which the low quality stands are regenerated through vegetative means.

The starting date of the project activity is **20/12/2004**. The project starting date was established based on the agreement between the General Directorate of Forest Policy and Pasture Development, Ministry of the Environment, Forests and Water Administration and the communes with regard to the implementation of the carbon sequestration project.

The status of implementation is illustrated in the table below:

Table 2: Status of implementation of the project

FMU	FMU_NO	SUBPARC_NO	CODE	HECTARES	impl	ecozone
BARMASH	01	22a	0122a	37.615395	1	2
BARMASH	01	58a	0158a	59.817125	1	2
BUSHTRICE	02	105b	02105b	21.154989	1	3
BUSHTRICE	02	109b	02109b	16.176670	1	2
BUSHTRICE	02	109c	02109c	21.401116	1	3
BUSHTRICE	02	109c	02109c	1.801900	1	3
BUSHTRICE	02	109c	02109c	0.227767	1	3
BUSHTRICE	02	156b	02156b	9.299454	1	3
BUSHTRICE	02	157a	02157a	28.525147	1	4
BUSHTRICE	02	52b	0252b	33.977510	1	4
BUSHTRICE	02	65a	0265a	34.311699	1	4
BUSHTRICE	02	66a	0266a	49.220571	1	4
BUSHTRICE	02	66a	0266a	7.137309	1	4
BUSHTRICE	02	69a	0269a	26.699221	1	4
BUSHTRICE	02	69a	0269a	17.213081	1	4
BUSHTRICE	02	70a	0270a	23.837776	1	4
BUSHTRICE	02	70a	0270a	6.568769	1	4
BUSHTRICE	02	77a	0277a	8.791605	1	3
BUSHTRICE	02	77a	0277a	2.879868	1	3
BUSHTRICE	02	77a	0277a	10.748924	1	3

BUSHTRICE	02	78c	0278c	9.360092	1	4
BUSHTRICE	02	78c	0278c	0.837004	1	4
BUSHTRICE	02	78c	0278c	5.992452	1	4
BUSHTRICE	02	84a	0284a	12.042519	1	2
BUSHTRICE	02	84a	0284a	0.259864	1	2
BUSHTRICE	02	84a	0284a	9.548986	1	2
BUSHTRICE	02	89a	0289a	14.534426	1	2
BUSHTRICE	02	89a	0289a	2.144779	1	2
BUSHTRICE	02	89a	0289a	8.796503	1	2
BUSHTRICE	02	89a	0289a	0.548297	1	2
BUSHTRICE	02	91b	0291b	11.696665	1	3
DEDAJ-BUHOT	03	104a	03104a	5.442867	1	3
DEDAJ-BUHOT	03	104a	03104a	5.133800	1	3
DEDAJ-BUHOT	03	107a	03107a	15.200615	1	3
DEDAJ-BUHOT	03	111a	03111a	15.936077	1	3
DEDAJ-BUHOT	03	111b	03111b	13.119641	1	3
DEDAJ-BUHOT	03	112d	03112d	2.803871	1	3
DEDAJ-BUHOT	03	112d	03112d	7.728661	1	3
DEDAJ-BUHOT	03	112d	03112d	0.042563	1	3
DEDAJ-BUHOT	03	112d	03112d	0.072692	1	3
DEDAJ-BUHOT	03	112d	03112d	0.250798	1	3
DEDAJ-BUHOT	03	22a	0322a	12.793799	1	3
DEDAJ-BUHOT	03	22a	0322a	0.205593	1	3
DEDAJ-BUHOT	03	27c	0327c	18.735978	1	3
DEDAJ-BUHOT	03	2a	032a	2.974533	1	3
DEDAJ-BUHOT	03	30c/1	0330c/1	10.587299	1	3
DEDAJ-BUHOT	03	31c/1	0331c/1	7.583741	1	3
DEDAJ-BUHOT	03	31c/1	0331c/1	0.413885	1	3
DEDAJ-BUHOT	03	31c/1	0331c/1	0.289569	1	3
DEDAJ-BUHOT	03	31d	0331d	9.281371	1	3
DEDAJ-	03	34a	0334a	10.284263	1	3

BUHOT						
DEDAJ-BUHOT	03	40a	0340a	13.319040	1	3
DEDAJ-BUHOT	03	47b	0347b	14.506605	1	3
DEDAJ-BUHOT	03	4b	034b	8.994653	1	3
DEDAJ-BUHOT	03	4b	034b	4.941495	1	3
DEDAJ-BUHOT	03	4b	034b	0.709001	1	3
DEDAJ-BUHOT	03	4b	034b	0.325420	1	3
DEDAJ-BUHOT	03	4b	034b	0.591009	1	3
DEDAJ-BUHOT	03	4b	034b	1.049401	1	3
DEDAJ-BUHOT	03	4b	034b	0.766560	1	3
DEDAJ-BUHOT	03	4b	034b	1.713035	1	3
DEDAJ-BUHOT	03	57a	0357a	10.670092	1	3
DEDAJ-BUHOT	03	57a	0357a	0.736205	1	3
DEDAJ-BUHOT	03	57a	0357a	3.188482	1	3
DEDAJ-BUHOT	03	57a	0357a	0.478507	1	3
DEDAJ-BUHOT	03	57a	0357a	0.023978	1	3
DEDAJ-BUHOT	03	57a	0357a	0.350563	1	3
DEDAJ-BUHOT	03	58b	0358b	6.142058	1	3
DEDAJ-BUHOT	03	5a	035b	12.700552	1	3
DEDAJ-BUHOT	03	60b	0360b	7.677548	1	3
DEDAJ-BUHOT	03	60b	0360b	0.342423	1	3
DEDAJ-BUHOT	03	60b	0360b	0.029374	1	3
DEDAJ-BUHOT	03	60b	0360b	1.041043	1	3
DEDAJ-BUHOT	03	7a	037a	2.010617	1	3
DEDAJ-BUHOT	03	7a	037a	1.160219	1	3
DEDAJ-BUHOT	03	7a	037a	2.030621	1	3

DEDAJ-BUHOT	03	7a	037a	2.650171	1	3
DEDAJ-BUHOT	03	7a	037a	1.918265	1	3
DEDAJ-BUHOT	03	7a	037a	1.068124	1	3
DEDAJ-BUHOT	03	7a	037a	0.804765	1	3
DEDAJ-BUHOT	03	88a	0388a	23.540803	1	3
DESHAT MAQELLARE	04	106b	04106b	1.100931	1	2
DESHAT MAQELLARE	04	137a	04137a	4.156602	1	2
DESHAT MAQELLARE	04	137a	04137a	2.717871	1	2
DESHAT MAQELLARE	04	14a	0414a	4.689774	1	3
DESHAT MAQELLARE	04	154a	04154a	37.813688	1	2
DESHAT MAQELLARE	04	155a	04155a	6.483407	1	2
DESHAT MAQELLARE	04	155a	04155a	0.027846	1	2
DESHAT MAQELLARE	04	155a	04155a	3.189948	1	2
DESHAT MAQELLARE	04	155a	04155a	1.360739	1	2
DESHAT MAQELLARE	04	155a	04155a	0.038364	1	2
DESHAT MAQELLARE	04	155b	04155b	2.290173	1	2
DESHAT MAQELLARE	04	156a	04156a	25.347653	1	2
DESHAT MAQELLARE	04	156a	04156a	2.754494	1	2
DESHAT MAQELLARE	04	156a	04156a	13.136568	1	2
DESHAT MAQELLARE	04	156a	04156a	0.160987	1	2
DESHAT MAQELLARE	04	159c	04159c	1.018125	1	4
DESHAT MAQELLARE	04	159c	04159c	4.485234	1	4
DESHAT MAQELLARE	04	159c	04159c	4.770643	1	4
DESHAT MAQELLARE	04	159c	04159c	0.639379	1	4
DESHAT MAQELLARE	04	159c	04159c	0.181325	1	4
DESHAT MAQELLARE	04	159c	04159c	0.396168	1	4

DESHAT MAQELLARE	04	168a	04168a	5.912660	1	2
DESHAT MAQELLARE	04	16a	0416a	3.794346	1	3
DESHAT MAQELLARE	04	175a	04175a	17.050496	1	2
DESHAT MAQELLARE	04	179a	04179a	27.690264	1	2
DESHAT MAQELLARE	04	183a	04183a	20.792352	1	2
DESHAT MAQELLARE	04	192c	04192c	8.016201	1	3
DESHAT MAQELLARE	04	201c	04201c	13.770271	1	2
DESHAT MAQELLARE	04	242c	04242c	8.065821	1	2
DESHAT MAQELLARE	04	242c	04242c	0.505305	1	2
DESHAT MAQELLARE	04	265d	04265d	2.391163	1	2
DESHAT MAQELLARE	04	279a	04279a	15.475037	1	2
DESHAT MAQELLARE	04	280b	04280b	11.686417	1	2
DESHAT MAQELLARE	04	33a	0433a	12.431097	1	3
DESHAT MAQELLARE	04	33a	0433a	0.374966	1	3
DESHAT MAQELLARE	04	44a	0444a	6.425472	1	2
DESHAT MAQELLARE	04	46a	0446a	0.086284	1	2
DESHAT MAQELLARE	04	46a	0446a	2.865981	1	2
DESHAT MAQELLARE	04	46a	0446a	0.442814	1	2
DESHAT MAQELLARE	04	46a	0446a	8.162083	1	2
DESHAT MAQELLARE	04	48a	0448a	6.191449	1	4
DESHAT MAQELLARE	04	54a	0454a	10.570861	1	2
DESHAT MAQELLARE	04	57	0457	18.356539	1	3
DESHAT MAQELLARE	04	57	0457	0.929635	1	3
DESHAT MAQELLARE	04	61a	0461a	7.051767	1	3
DESHAT MAQELLARE	04	6b	046b	3.168292	1	3
DESHAT MAQELLARE	04	73b	0473b	1.916381	1	3

GALIGAT-STROR	05	19	0519	50.549801	1	1
GALIGAT-STROR	05	19	0519	0.543297	1	1
GALIGAT-STROR	05	1c	051c	21.896360	1	1
GALIGAT-STROR	05	1c	051c	0.000048	1	1
GALIGAT-STROR	05	1c	051c	2.858119	1	1
GALIGAT-STROR	05	1c	051c	2.772135	1	1
GALIGAT-STROR	05	1c	051c	3.085133	1	1
GALIGAT-STROR	05	20a	0520a	9.997702	1	1
GALIGAT-STROR	05	23d	0523d	9.673267	1	1
GALIGAT-STROR	05	30	0530	14.775553	1	1
GALIGAT-STROR	05	30	0530	0.135216	1	1
GALIGAT-STROR	05	31	0531	0.402100	1	1
GALIGAT-STROR	05	31	0531	0.531359	1	1
GALIGAT-STROR	05	31	0531	37.340032	1	1
GALIGAT-STROR	05	32	0532	11.309092	1	1
GALIGAT-STROR	05	51a	0551a	25.309874	1	1
GALIGAT-STROR	05	52a	0552a	34.582898	1	1
GALIGAT-STROR	05	53	0553	31.481880	1	2
GALIGAT-STROR	05	54	0554	23.802954	1	2
GALIGAT-STROR	05	54	0554	1.758136	1	2
GALIGAT-STROR	05	54	0554	0.255842	1	2
GALIGAT-STROR	05	54	0554	0.673465	1	2
GALIGAT-STROR	05	54	0554	0.294766	1	2
GJINAR-ZAVALINE	06	14a	0614a	1.368739	1	2
GJINAR-ZAVALINE	06	14a	0614a	16.759052	1	2
GJINAR-ZAVALINE	06	14b	0614b	13.199436	1	2

GJINAR-ZAVALINE	06	18b	0618b	0.229139	1	2
GJINAR-ZAVALINE	06	18b	0618b	19.119686	1	2
GJINAR-ZAVALINE	06	47	0647	20.581889	1	2
GJINAR-ZAVALINE	06	47	0647	0.720371	1	2
GJINAR-ZAVALINE	06	47	0647	0.170790	1	2
GJINAR-ZAVALINE	06	49a	0649a	15.076468	1	2
GJINAR-ZAVALINE	06	67a	0667a	4.987656	1	2
GJINAR-ZAVALINE	06	72d	0672d	11.454022	1	2
GOSTIME-KOPRIK	28	76a	2876a	0.104212	1	3
GOSTIME-KOPRIK	28	76a	2876a	0.234205	1	3
GOSTIME-KOPRIK	28	76a	2876a	0.072300	1	3
GOSTIME-KOPRIK	28	76a	2876a	0.161765	1	3
GOSTIME-KOPRIK	28	76a	2876a	42.627224	1	3
GRAMSH-VINJE	07	70a	0770a	25.659266	1	1
GRAMSH-VINJE	07	74a	0774a	35.388234	1	1
GRAMSH-VINJE	07	85a	0785a	31.494634	1	1
GRAMSH-VINJE	07	85a	0785a	0.065573	1	1
GRAMSH-VINJE	07	85a	0785a	1.849777	1	1
HELSHAN	08	67	0867	25.776892	1	3
HELSHAN	08	67	0867	0.055784	1	3
HELSHAN	08	76b	0876b	29.573289	1	3
HELSHAN	08	78	0878	20.228954	1	3
HELSHAN	08	87b	0887b	11.832065	1	3
HELSHAN	08	87b	0887b	5.288716	1	3
HELSHAN	08	88	0888	12.336427	1	3
HELSHAN	08	88	0888	7.292427	1	3
HELSHAN	08	91a	0891a	7.357840	1	3
HELSHAN	08	91b	0891b	15.392963	1	3
HELSHAN	08	96a	0896a	4.595618	1	3
HELSHAN	08	96b	0896b	9.323453	1	3
HELSHAN	08	99a	0899a	18.083688	1	3

HELSHAN	08	99a	0899a	4.088001	1	3
HELSHAN	08	99b	0899b	9.259989	1	3
HELSHAN	08	99b	0899b	6.252253	1	3
KAFTALLE-GOMSIQE	09	124a	09124a	10.083762	1	3
KAFTALLE-GOMSIQE	09	125b	09125b	24.855531	1	3
KAFTALLE-GOMSIQE	09	126a	09126a	29.239386	1	3
KAFTALLE-GOMSIQE	09	20a	0920a	32.311972	1	3
KAFTALLE-GOMSIQE	09	28a	0928a	4.793712	1	3
KAFTALLE-GOMSIQE	09	28a	0928a	13.411980	1	3
KAFTALLE-GOMSIQE	09	28a	0928a	0.429905	1	3
KAFTALLE-GOMSIQE	09	28a	0928a	0.639524	1	3
KAFTALLE-GOMSIQE	09	35a	0935a	19.077115	1	3
KAFTALLE-GOMSIQE	09	79a	0979a	69.748084	1	3
KAFTALLE-GOMSIQE	09	81	0981	31.180625	1	3
KAFTALLE-GOMSIQE	09	85a	0985a	24.645278	1	3
KAFTALLE-GOMSIQE	09	85a	0985a	5.035223	1	3
KAFTALLE-GOMSIQE	09	85a	0985a	1.265467	1	3
KAFTALLE-GOMSIQE	09	85a	0985a	1.095708	1	3
KASTRIOT-SLLOVE	10	137b	10137b	1.087330	1	2
KASTRIOT-SLLOVE	10	137b	10137b	3.306799	1	2
KASTRIOT-SLLOVE	10	163b	10163b	13.115772	1	3
KASTRIOT-SLLOVE	10	205b	10205b	0.301269	1	2
KASTRIOT-SLLOVE	10	205b	10205b	1.683551	1	2
KASTRIOT-SLLOVE	10	208b	10208b	0.538634	1	2
KASTRIOT-SLLOVE	10	208b	10208b	1.097361	1	2
KASTRIOT-SLLOVE	10	208b	10208b	0.897845	1	2
KASTRIOT-SLLOVE	10	211b	10211b	12.063023	1	2

KASTRIOT-SLLOVE	10	214b	10214b	7.457345	1	2
KASTRIOT-SLLOVE	10	214b	10214b	1.034169	1	2
KASTRIOT-SLLOVE	10	216c	10216c	0.757741	1	2
KASTRIOT-SLLOVE	10	216c	10216c	2.773385	1	2
KASTRIOT-SLLOVE	10	216c	10216c	0.318441	1	2
KASTRIOT-SLLOVE	10	220b	10220b	8.726323	1	3
KASTRIOT-SLLOVE	10	220b	10220b	0.198366	1	3
KASTRIOT-SLLOVE	10	226b	10226b	10.235839	1	3
KASTRIOT-SLLOVE	10	226b	10226b	0.212474	1	3
KASTRIOT-SLLOVE	10	231b	10231b	8.864674	1	2
KASTRIOT-SLLOVE	10	233b	10233b	1.553667	1	2
KASTRIOT-SLLOVE	10	233b	10233b	0.933199	1	2
KASTRIOT-SLLOVE	10	233b	10233b	0.982776	1	2
KASTRIOT-SLLOVE	10	233b	10233b	2.189665	1	2
KASTRIOT-SLLOVE	10	239a	10239a	4.481660	1	2
KASTRIOT-SLLOVE	10	239a	10239a	0.363584	1	2
KASTRIOT-SLLOVE	10	239a	10239a	1.390990	1	2
KASTRIOT-SLLOVE	10	240a	10240a	7.134995	1	2
KASTRIOT-SLLOVE	10	241b	10241b	5.759975	1	2
KASTRIOT-SLLOVE	10	241b	10241b	1.035680	1	2
KASTRIOT-SLLOVE	10	243a	10243a	15.019549	1	2
KASTRIOT-SLLOVE	10	244b	10244b	0.141204	1	3
KASTRIOT-SLLOVE	10	244b	10244b	7.438680	1	3
KASTRIOT-SLLOVE	10	244b	10244b	0.055981	1	3
KASTRIOT-SLLOVE	10	244b	10244b	1.305355	1	3
KLENJE	11	41a	1141a	12.638243	1	2

KLENJE	11	49b	1149b	18.930163	1	2
KLENJE	11	7a	117a	27.281822	1	2
KLENJE	11	7a	117a	0.367636	1	2
KLENJE	11	7a	117a	0.294504	1	2
KRYEZI	12	58a	1258a	8.040839	1	3
KRYEZI	12	58a	1258a	0.142649	1	3
KRYEZI	12	58a	1258a	0.193082	1	3
KRYEZI	12	58a	1258a	0.920725	1	3
KRYEZI	12	59c	1259c	4.137611	1	3
KRYEZI	12	59c	1259c	0.077647	1	3
KRYEZI	12	7a	127a	27.436512	1	3
KRYEZI-BICAJ	13	113a	13113a	15.445636	1	3
KRYEZI-BICAJ	13	79a	1379a	31.156761	1	3
KRYEZI-BICAJ	13	91b	1391b	6.041983	1	3
KURDARI-PLANI BARDHE	14	103b	14103b	20.798653	1	3
KURDARI-PLANI BARDHE	14	103b	14103b	11.163355	1	3
KURDARI-PLANI BARDHE	14	103b	14103b	15.771708	1	3
KURDARI-PLANI BARDHE	14	104b	14104b	52.355479	1	3
KURDARI-PLANI BARDHE	14	108b	14108b	30.695341	1	3
KURDARI-PLANI BARDHE	14	60a	1460a	13.968743	1	2
KURDARI-PLANI BARDHE	14	83b	1483b	6.048520	1	3
KURDARI-PLANI BARDHE	14	83b	1483b	2.734938	1	3
KURDARI-PLANI BARDHE	14	83b	1483b	1.935610	1	3
KURDARI-PLANI BARDHE	14	83b	1483b	0.435191	1	3
KURDARI-PLANI BARDHE	14	83b	1483b	1.639290	1	3

KURDARI-PLANI BARDHE	14	84b	1484b	16.723651	1	3
KURDARI-PLANI BARDHE	14	84b	1484b	1.724728	1	3
KURDARI-PLANI BARDHE	14	84b	1484b	13.024692	1	3
KURDARI-PLANI BARDHE	14	84b	1484b	11.435059	1	3
KURDARI-PLANI BARDHE	14	84b	1484b	1.168172	1	3
KURDARI-PLANI BARDHE	14	84b	1484b	5.381172	1	3
KURDARI-PLANI BARDHE	14	84b	1484b	0.243969	1	3
KURDARI-PLANI BARDHE	14	85b	1485b	14.494111	1	3
KURDARI-PLANI BARDHE	14	85b	1485b	2.281726	1	3
KURDARI-PLANI BARDHE	14	85b	1485b	2.540244	1	3
KURDARI-PLANI BARDHE	14	85b	1485b	2.878893	1	3
KURDARI-PLANI BARDHE	14	94b	1494b	14.249889	1	3
KURDARI-PLANI BARDHE	14	94b	1494b	7.265636	1	3
KURDARI-PLANI BARDHE	14	94b	1494b	38.335706	1	3
KURDARI-PLANI BARDHE	14	96b	1496b	0.845875	1	3
KURDARI-PLANI BARDHE	14	96b	1496b	8.676356	1	3
KURDARI-PLANI BARDHE	14	96b	1496b	2.475777	1	3
KURDARI-	14	96b	1496b	1.561609	1	3

PLANI BARDHE						
LABINOT	15	24a	1524a	21.302977	1	2
LABINOT	15	25a	1525a	42.692685	1	2
LABINOT	15	49a	1549a	19.786970	1	2
LUBINJE-TUNJE	25	120a	25120a	29.496428	1	1
LUBINJE-TUNJE	25	120a	25120a	0.582706	1	1
LUBINJE-TUNJE	25	120a	25120a	3.564757	1	1
LUBINJE-TUNJE	25	127a	25127a	23.259578	1	1
PAPER-SHLLAK	17	15a	1715a	10.569070	1	2
PAPER-SHLLAK	17	168a	17168a	47.930041	1	2
PAPER-SHLLAK	17	168a	17168a	1.056149	1	2
PAPER-SHLLAK	17	169a	17169a	44.824672	1	2
PAPER-SHLLAK	17	171a	17171a	46.521452	1	2
PAPER-SHLLAK	17	172a	17172a	19.508348	1	2
PAPER-SHLLAK	17	173a	17173a	15.091762	1	2
PAPER-SHLLAK	17	174a	17174a	33.448153	1	2
PAPER-SHLLAK	17	175a	17175a	20.181976	1	2
POLIS	18	166a	18166a	41.513092	1	1
POLIS	18	166a	18166a	0.117417	1	1
POLIS	18	166a	18166a	0.165718	1	1
POLIS	18	166a	18166a	0.384185	1	1
POLIS	18	169a	18169a	47.303346	1	1
POLIS	18	169a	18169a	0.345031	1	1
POLIS	18	169a	18169a	0.221394	1	1
POLIS	18	1b	181b	12.117048	1	1
POLIS	18	2a	182a	22.422604	1	1
POLIS	18	2b	182b	13.081630	1	1
POLIS-VASJAN	27	29a	2729a	31.790458	1	1
POLIS-VASJAN	27	58	2758	16.008580	1	1
POLIS-VASJAN	27	58	2758	0.471943	1	1
POLIS-VASJAN	27	59a	2759a	34.221242	1	1

POLIS-VASJAN	27	59a	2759a	0.931573	1	1
POLIS-VASJAN	27	59a	2759a	0.187777	1	1
POLIS-VASJAN	27	59a	2759a	0.309542	1	1
POLIS-VASJAN	27	59a	2759a	0.327623	1	1
POLIS-VASJAN	27	59a	2759a	0.089122	1	1
POLIS-VASJAN	27	59b	2759b	6.557391	1	1
POLIS-VASJAN	27	59b	2759b	0.973453	1	1
POLIS-VASJAN	27	59b	2759b	2.022047	1	1
POLIS-VASJAN	27	59b	2759b	4.696337	1	1
POLIS-VASJAN	27	59b	2759b	0.206162	1	1
POLIS-VASJAN	27	61b	2761b	18.542823	1	1
POLIS-VASJAN	27	61b	2761b	11.652084	1	1
POLIS-VASJAN	27	63a	2763a	24.057335	1	1
POLIS-VASJAN	27	64a	2764a	23.381175	1	1
POLIS-VASJAN	27	81a	2781a	42.906704	1	1
QELEZ	26	17b	2617b	9.241355	1	3
QELEZ	26	49	2649	7.833835	1	3
SHISHTAVEC-ZAPOD	19	60b	1960b	11.166033	1	4
SHISHTAVEC-ZAPOD	19	60b	1960b	0.149200	1	4
SHISHTAVEC-ZAPOD	19	74b	1974b	7.134446	1	4
SHISHTAVEC-ZAPOD	19	74c	1974c	3.519029	1	4
SHISHTAVEC-ZAPOD	19	74c	1974c	0.202502	1	4
SHISHTAVEC-ZAPOD	19	89b	1989b	5.098782	1	4
SHISHTAVEC-ZAPOD	19	90b	1990b	4.870954	1	4
SHISHTAVEC-ZAPOD	19	90d	1990d	5.262686	1	4
SHISHTAVEC-ZAPOD	19	90d	1990d	4.576839	1	4
SHISHTAVEC-	19	95e	1995e	3.897126	1	4

ZAPOD						
SHISHTAVEC-ZAPOD	19	95e	1995e	8.383429	1	4
SHISHTAVEC-ZAPOD	19	95e	1995e	1.474603	1	4
SHPAT-SHTERMEN	20	47/2	2047/2	15.385780	1	3
SHPAT-SHTERMEN	20	61a	2061a	24.055033	1	2
SHPAT-SHTERMEN	20	67d	2067d	4.548881	1	2
SHPAT-SHTERMEN	20	67d	2067d	6.325506	1	2
SHPAT-SHTERMEN	20	69a	2069a	15.687981	1	2
TRODHEN	21	48	2148	39.823439	1	3
TRODHEN	21	48	2148	0.107126	1	3
TRODHEN	21	75a	2175a	7.897885	1	3
TRODHEN	21	75a	2175a	2.940207	1	3
TRODHEN	21	75a	2175a	0.009328	1	3
TRODHEN	21	76a	2176a	15.381586	1	3
TUCEP-OKSHTUN	22	173b	22173b	13.379549	1	2
TUCEP-OKSHTUN	22	182b	22182b	9.354067	1	2
TUCEP-OKSHTUN	22	182b	22182b	5.513139	1	2
TUCEP-OKSHTUN	22	9a	229a	16.366107	1	2
TUCEP-OKSHTUN	22	9a	229a	32.093112	1	2
TUCEP-OKSHTUN	22	9a	229a	0.569179	1	2
TUCEP-OKSHTUN	22	9a	229a	6.375121	1	2
ULEZ	23	140a	23140a	28.195108	1	3
ULEZ	23	140a	23140b	1.254333	1	3
ULEZ	23	141	23141	48.533330	1	3
ULEZ	23	141	23141	0.469490	1	3
ULEZ	23	144a	23144a	57.979161	1	3
ULEZ	23	144a	23144a	1.041280	1	3
ULEZ	23	144a	23144a	0.716789	1	3
ULEZ	23	146a	23146a	40.687466	1	3
ULEZ	23	146a	23146a	0.072637	1	3
ULEZ	23	146b	23146b	28.281638	1	3
ULEZ	23	146b	23146b	2.222197	1	3
ULEZ	23	147a	23147a	39.878912	1	3
ULEZ	23	147a	23147a	1.230630	1	3

ULEZ	23	61	2361	0.635569	1	1
ULEZ	23	61	2361	4.464909	1	1
ULEZ	23	61	2361	7.239649	1	1
ULEZ	23	62b	2362b	9.608081	1	1
ULEZ	23	62b	2362b	0.194611	1	1
ULEZ	23	62b	2362b	0.173491	1	1
ULEZ	23	63b	2363b	8.428906	1	3
ULEZ	23	63b	2363b	6.113625	1	3
ZERQAN	24	151b	24151b	0.281119	1	2
ZERQAN	24	151b	24151b	0.532899	1	2
ZERQAN	24	151b	24151b	0.408036	1	2
ZERQAN	24	157b	24157b	6.185369	1	2
ZERQAN	24	157b	24157b	0.189891	1	2
ZERQAN	24	157b	24157b	1.920182	1	2
ZERQAN	24	157b	24157b	5.394253	1	2
ZERQAN	24	157b	24157b	1.411499	1	2
ZERQAN	24	47b	2447b	12.524349	1	2
Total				**3,990.45**		

B.2. Post registration changes

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

Request for deviation to apply 20% precision level and 90% confidence interval was submitted to the UNFCCC Secretariat as part of the request for approval of post registration changes (Ref No. PRC-2714-001**)** on 04/07/2012 and approve on 12/11/2012.

B.2.2. Corrections

>>

N/A

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

>>

N/A

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

>>

N/A

B.2.5. Changes to start date of crediting period

>>

N/A

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

>>

The Monitoring Plan has not been revised. Per the "Guidelines on application of specified versions of A/R CDM methodologies in verification of registered A/R CDM project activities" (Version 01.0) (EB63, Annex 26), for early versions of methodologies that contain requirements which were withdrawn during revisions/improvements of these methodologies after the registration of a A/R CDM project, the guidelines allow for the adoption of the

revisions/improvements that occurred in the methodology for the purposes of project verification. The applicability of these guidelines to the project is presented in Table 3 below.

Table 3 Applicability of guidelines to the implemented project

Requirement	Methodology	Guidelines	Applicability to the project
Monitoring of data and parameters	AR-AM0003 v.04	(i) Only data and parameters obtained from field measurement are required to be monitored; (ii) Monitoring is not required for data, parameters, or variables appearing as intermediate values in calculation steps and those taken from existing sources (e.g. published literature)	Yes, (i) Only data and parameters obtained from field measurement are monitored; (ii) intermediate values are not considered in monitoring
Sampling design, sample plot lay-out, and marking of permanent sample plots	AR-AM0003 v.04	(i) Use of temporary sample plots; (ii) Random lay-out of sample plots; (iii) A maximum allowable relative margin of error of the mean, for estimation of above-ground tree biomass, of ± 10% at 90% confidence level shall be allowed.	Per the post registration change, ref No. PRC-2714-001 approved by the UNFCCC on 12 November 2012, allowable margin of error of 20% of the mean and 90% confidence level was applied.
Accounting for uncertainty	AR-AM0003 v.04	Requirements related to uncertainty assessment, uncertainty analysis, methods of combining uncertainties, and uncertainties in expert judgment are superfluous and compliance with these requirements shall not be enforced.	Yes, uncertainty analysis is not conducted as sampling approach implemented in the addresses these issues.
Field measurement of soil organic carbon		(i) Instead of field measurement of soil organic carbon, the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" shall be used for areas which meet the applicability conditions of the tool; or (ii) The value of change in soil organic carbon shall be set to zero. Consequently, monitoring of data and parameters related to estimation of changes in soil organic carbon shall not be required.	Not applicable
Clearance or burning of herbaceous	AR-AM0003 v.04	(i) Changes in carbon stocks resulting from clearance of herbaceous vegetation shall be set to zero;	Yes, loss of carbon in living herbaceous vegetation has not

vegetation		(ii) Emissions resulting from clearance or burning of herbaceous vegetation shall be set to zero. Consequently, monitoring of data and parameters related to (i) and (ii) above shall not be required.	been monitored.
Estimation of emissions of nitrous oxide from use of fertilizers	AR-AM0003 v.04	Estimation and accounting of emissions of nitrous oxide from use of fertilizers shall not be required. Consequently, monitoring of data and parameters related to the above-mentioned emissions shall not be required.	Not applicable, as fertilizers are not used in the project.
Burning of fossil fuel	AR-AM0003 v.04	Estimation and accounting of emissions from burning of fossil fuel, both within and outside the project boundary, shall not be required. Consequently, monitoring of data and parameters related to the above mentioned emissions shall not be required.	Yes, emissions from burning of fossil fuel, both within and outside the project boundary were not monitored.

The project implementation is line with the provisions of the paragraph 6 of the "Procedures for notifying and requesting approval of changes from the project activity as described in the registered project design document (EB 48, annex 66). As per the "Guidelines on accounting of specified types of changes in A/R CDM project activities from the description in registered project design documents" (Version 02.0) (Annex 24, EB 66), the types of changes from the project description of the A/R CDM project activity in the PDD as listed below are identified as minor in nature. The changes have not impacted the baseline scenario and additionality of the project (Table 4). The changes applicable to the project are to be confirmed by the designated operational entity at the verification stage without the need for submitting a notification of changes to the PDD or a request for revision to the monitoring plan.

Table 4. Types of changes from the description in the registered PDD as outlined in the guidelines (Annex 24, EB66) and their applicability to the implemented project

<table>
<tr><th>No.</th><th>Types of changes from the project description in the PDD of an A/R CDM project activity</th><th>Applicability to the project</th></tr>
<tr><td>a)</td><td>Changes in year-wise areas planted, possibly resulting in a part of the project area not being planted;</td><td>Yes, there have been changes in the schedule of supplemental planting and silvicultural activities intended to assist natural regeneration.
<table>
<tr><th rowspan="2">Years</th><th>Ex-ante</th><th colspan="2">Ex-post</th></tr>
<tr><th>Area, ha</th><th>Area of Suplemental Planting, (ha)</th><th>Area of Assisted Natural Regeneration, (ha)</th></tr>
<tr><td>2005</td><td>1,666.00</td><td></td><td></td></tr>
</table></td></tr>
</table>

				-	476.85
		2006	1,615.00	-	476.85
		2007	2,266.00	158.78	476.85
		2008	725.36	438.22	476.85
		2009	-	375.19	476.85
		2010	-	300.26	476.85
		2011	-	168.63	476.82
		Total	**6,272.36**	**1,441.08**	**3,337.92**

b) Changes in species composition, if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage;

Yes, there have been changes to composition of species in supplemental planting. The changes are consistent with the baseline identification and additionality demonstration made at the validation stage

	Area, ha	
Selected species	**Ex-ante**	**Ex-post**
Acer spp.	86.50	37.10
Castanea sativa	669.30	220.60
Cerasus avium	235.40	-
Fraxinus excelsior	58.00	110.49
Juglans regia	58.00	27.90
Quercus spp..	624.50	48.00
Betula verrucosa	579.00	315.54
Pinus spp.	351.50	105.91
Populus spp.	82.00	68.24
Robinia pseudoacacia	520.00	477.43
Prunus spp.	-	21.87
Fagus spp.	-	7.00
Abies spp.		1.00
Total	**3,264.20**	**1441.08**

c)	Changes in stocking density, if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage;	Yes, considering the project is an assisted natural regeneration project, the changes in stocking density are consistent with the baseline identification and additionality demonstration made at the validation stage. Planting density increased from 200-500 to 1,000 trees per hectare in 328.81 ha.
d)	Change in timing and choice of silvicultural operations;	No
e)	Changes in timing of harvest occurring before the third verification;	No, changes in timing of harvest are not anticipated prior to the third verification.
f)	Changes related to collection of non-timber forest products;	No
g)	Changes in tree/shrubs propagation method;	No
h)	Changes in post-harvest re-planting/regeneration methods;	No, changes in the post harvest replanting/regeneration methods are not anticipated
i)	Changes in technology employed;	No
j)	Changes in inputs (e.g. fertilizers, certified seeds, watering);	No
k)	Changes in stratification for sampling;	Yes, *ex post* stratification has been implemented taking into account the changes to *ex-ante* stratum adopted at the project design. Whereas in ex-ante stratification there was one stratum, there are four strata in the ex-post stratification (see Section C).
l)	Changes in type of sample plots (e.g. temporary, permanent, point-sampling);	No
m)	Changes in number of sample plots and their allocation to strata	Yes, as a follow up to *ex post* stratification, the calculation of number sample plots and their allocation has been revised. Although the number of sample plots in ex-ante and ex-post stratification is the same (95), with re-stratification the ex-ante

		number of sample plots shall be 292. The number of sample plots laid out, however, was 95, which exceeds the number required (66) to meet 20% precision and 90% confidence. The project submitted a request for deviation as part of the post registration change to apply 20 percent precision level and 90 per cent confidence interval and was approved.
n)	Changes in the project boundary (limited to reduction in project area), if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage;	Yes, changes resulting from exclusion of some areas that are not suitable for implementing the project have reduced the project area. These changes are consistent with the baseline identification and additionality demonstration made at the validation stage.
o)	Changes in quality assurance/quality control (QA/QC) procedures, where it can be demonstrated that the changed QA/QC procedures are used by the National Forest Inventory or were applied in another registered A/R CDM project activity;	No
p)	Changes in parameters, equations, or methods used in tree biomass estimation, if the applicability of the changed parameters, equations, or methods is demonstrated at verification using the ”*Tool for demonstration of applicability of allometric equations and volume equations in A/R CDM project*	Yes, changes in parameters, equations, or methods used in tree biomass estimation are consistent with A/R Tool – “Tool for demonstration of applicability of allometric equations in A/R CDM project activities” The changed parameters, equations or methods do not result in a decrease in precision of the estimate of tree biomass.

	activities" when available, or if the changed parameters, equations, or methods do not result in a decrease in precision of the estimate of tree biomass;	
q)	Changes from provisions regarding shifting of pre-project activities, if the related emissions are estimated at verification using the tool "*Estimation of the increase in greenhouse gas (GHG) emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity*". and are accounted for as leakage;	No, changes from provisions regarding the shifting of pre-project activities are not observed. The project monitoring has followed the guidelines of the methodology to assess the leakage.
r)	Changes in use of fire in site preparation, if the related emissions are estimated at verification using the tool "*Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity*" and are accounted for as project emissions	The project monitoring has followed the guidelines of the methodology to assess leakage.
s)	Changes in extent of soil disturbance in site preparation, if the related emissions are estimated at verification using Equation (2) of the "*Tool for estimation of change in soil*	Not applicable

	organic carbon stocks due to the implementation of A/R CDM project activities" and are accounted for as project emissions;	
t)	Changes in methods of estimation of changes in any carbon pool, if the method applied at verification uses the latest version of the relevant approved tool and the applicability conditions of the methodology applied are consistent with the applicability conditions of the tool. emissions;	Yes. Biomass estimation is consistent with A/R Tool – "Tool for demonstration of applicability of allometric equations in A/R CDM project activities" The changed parameters, equations or methods do not result in a decrease in precision of the estimate of tree biomass.

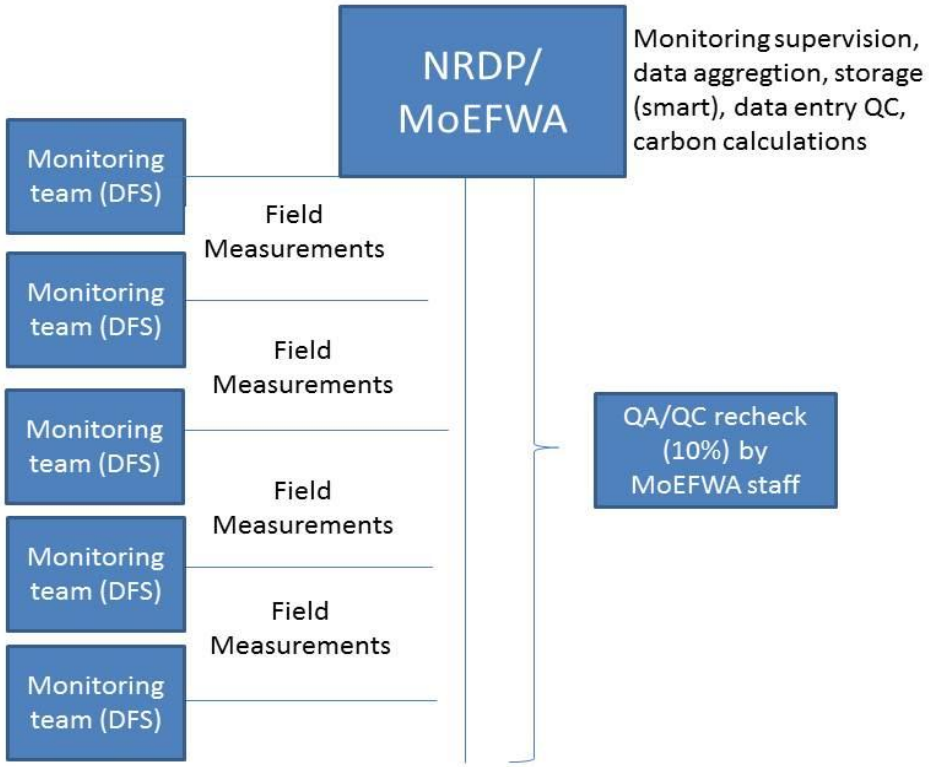
SECTION C. Description of monitoring system

The project activity is implemented as part of the World Bank Natural Resource Development Project (NRDP) by the Ministry of the Environment, Forests and Water Administration (MoEFWA) of the government of Albania. The MoEFWA appointed a carbon specialist to supervise implementation of the project, and to coordinate monitoring to ensure that information and data flow from the field level to the project management unit. The project is implemented by the MoEFWA through Forest and Pasture User Associations (FPUAs) that operate at the village level. These associations are non-government organizations and are formed by village members who use forest and pastoral resources in the territory.

The FPUA signed agreements with the Directorate of Forest and Pasture Policies (DFPP) to use a part of the communal forest under the management of the commune for the purposes of the project. The DFPP and its district forestry offices provide technical assistance on reforestation and forest management, as well as QA/QC.

As part of project monitoring, field measurements for periodic verifications of actual net GHG removals by sinks is coordinated by the carbon specialist and are carried out by DFS staff. The monitoring teams with three members each conduct sample plot measurements. Each team is led by the regional coordinator (DFS staff) of the respective region. FPUA members support the monitoring work and are also part of the teams. As part of monitoring, field data on project activities and sample plot measurements are collected and archived at the DFS level, and aggregated, cross checked and stored at the MoEFWA in paper and electronic forms. As part of the QA/QC procedures, the carbon specialist together with 2 additional MoEFWA Staff verify that plots are installed and measurements are taken correctly. Of the total sample plots, 10% of the plots are randomly selected and re-measured independently (Fig. 2). The re-measurements include the location of the plots, species, DBH and tree height. The carbon specialist is also in-charge of the data transfer from the field sheets to electronic format. This data entry is also rechecked by the BioCarbon Fund.

Figure 2. Flow Chart: Overview of monitoring procedure



The BioCarbon Fund has developed a tool for the monitoring of the A/R CDM portfolio – the Simplified Monitoring Afforestation / Reforestation Tool (SMART). The tool is comprised of several modules, which are tailored to the specific methodology used by the project. Each module indicates the data parameters that the project needs to measure and record in order to successfully monitor the carbon pools as required by its CDM A/R methodology.

The Project Entity uses excel forms for digitalizing field data. The data for 20 sample plots will be shared with the DOE in smart excel forms.

The BioCarbon Fund has developed a web-based platform for data storing and all-time data access. The web-based platform is the core of the monitoring system, where users can input data and obtain calculations at plot and project levels.

The person in charge of maintaining the monitoring system is Erion Istrefi, the project coordinator.

The sampling design

As carbon storage significantly varies in different ecozones, they were used as basis for the ex-post stratification of the project. As a result there are four strata with different carbon content: Ecozone 1, 2, 3, and 4 (see Table 5). The Table 5 shows that the total number of sample plots laid out in the project in four ecozones is 95, which conform to a permissible error of ± 20% of the mean, at 90% confidence level. The section D.3 presents a comparison of sample size requirements and the actual number of sample plots laid out by ecozone in the project.

Table 5 Area and number of sample plots laid out in project strata

Strata	Area, ha	No plots
Ecozone 1	756.44	19
Ecozone 2	1,218.43	28

Ecozone 3	1,698.48	43
Ecozone 4	317.10	5
Total	**3,990.45**	**95**

Location of sample plots

To avoid subjective choice of plot locations, the permanent sample plots were located systematically with random start, in line with LULUCF Good Practice Guidance and according to the following steps.

- Preparing the printed out maps with boundary of the carbon parcels and orthophotos (2007, 0.2 m resolution) as background in order to help the working group in the field for the stratification process
- Re designing of the carbon parcel boundaries excluding the roads, urban areas, agricultures areas, rocky lands, body waters, based on orthophotos, maps of stratification of carbon parcels from field work and consultations with the foresters who know the area very well.
- Generating the data in the attribute table of the carbon parcels shape file in terms of implemented and unimplemented parcels, and by eco-zone
- Creation of the new shape file only for the implemented carbon parcels.
- Creating grid points with distance 100m x100m, which cover all the implemented carbon parcels using Hawth's Analysis Tools / Sampling tools / Generate regular points.
- Selecting the points within the implemented carbon parcels.
- Selecting the first point randomly using the Hawth's Analysis Tools/ Create Random Selection
- Selecting the 95 sample plots in systematic way starting from the first random point counting 42 points from west to east.

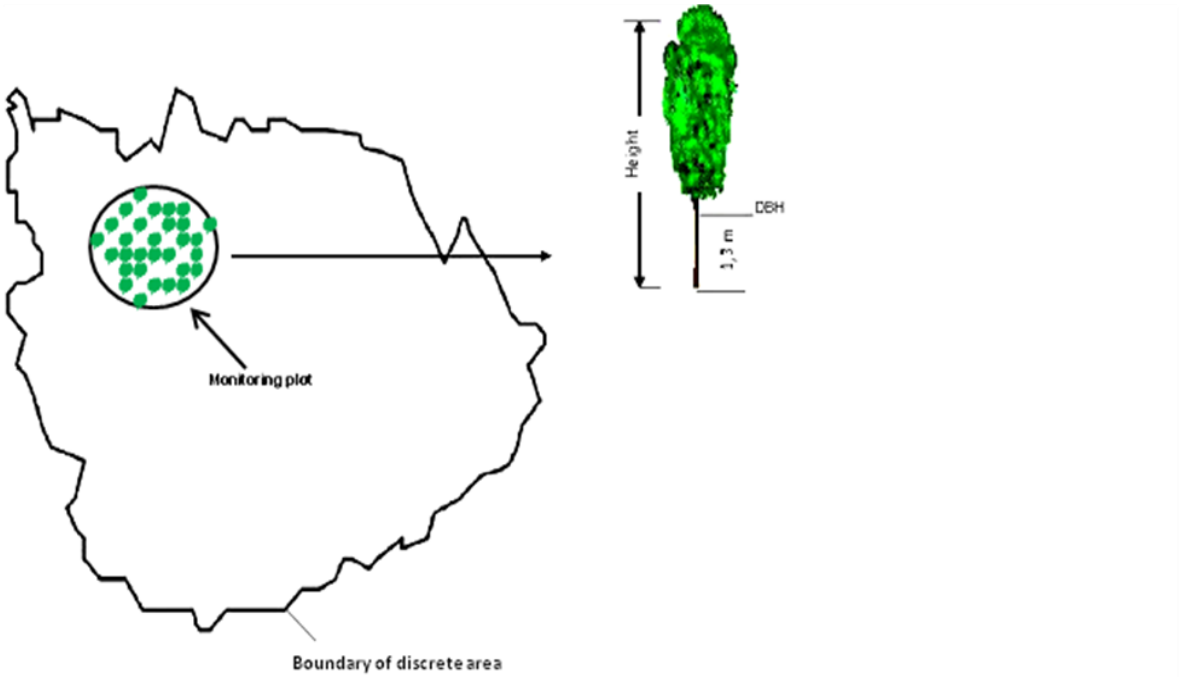
All sample plots, their GPS coordinates, location, names of village, commune, district and region are recorded and archived in the project database. Each plot is given a sample plot ID and included in the project documents.

Circular sample plots of 200 m^2 were located and plot centers were recorded using GPS. The geographical position, administrative location, stratum number of each plot was recorded and archived physically and electronically. The plot radii were adjusted for slope in the direction of the slope. The Vertex instrument compensates automatically. The centers of the sample plots are marked by a metal rod to facilitate the measurement of trees on the plot and for later re-measurement of the permanent sample plot in subsequent inventories.

Procedure for data collection on sample plots

Tree diameter: Measurements for diameter at breast height (1.37 m) were conducted. The trees with DBH greater than 2.0 cm on sample plots were measured. The diameter was measured with a caliper to the nearest lower mm. Tree height - Height of five trees close to the centre of a sample plot were measured with vertex instrument (Fig. 3). Calibration of vertex was conducted prior to the plot and tree height measurements on each sample plot. Calibration of measuring equipment was done and sample plot measurements, data recording and processing were carried out in accordance with QA/QC procedures.

Figure 3 Sample measurement points



Monitoring of project boundaries, forest establishment and management

Project boundary
Project boundary monitoring means to demonstrate that the actual area afforested or reforested conforms to the afforestation are outlined in the project plan. The following activities were carried out for this purpose:

- Field surveys
- Measurement of geographical positions (latitude and longitude of each corner polygon site) using GPS
- Cross-checking of consistency between actual boundary and PDD description of boundaries

In monitoring project boundaries and locating permanent plots the project entity followed Standard Operational Procedures cited in the BioCarbon Fund Manual for Monitoring of CDM Afforestation and Reforestation Projects (Part 1).[2] The procedure followed to measure geographical positions using GPS are explained below:

Standard Operating Procedure for collection and organization of data using GPS.

- GPS use:
  - The GPS gathered location information and identified GPS satellites.
  - Following the GPS manual the field team noted the dilution of precision (DOP) error, which measures the error caused by the geometry between the user and the satellites and indicates map accuracy.
  - Following the GPS user's manual the field team set a waypoint at starting location. A waypoint records the GPS coordinates of a user-defined location.
  - The team followed the perimeter of the area to be plotted, carrying a field notebook to note the names and descriptions of the points of traverse.

[2] World Bank, 2011. Manual for Monitoring of CDM Afforestation and Reforestation Projects: Part 1 – Standard Operational Procedures. 75 p. Available online at https://wbcarbonfinance.org/docs/Manual_for_Monitornig_of_CDM_AR_Projects_Part_I-SOPs.pdf

  - After moving along the track boundaries, the team returned to the beginning waypoint.
  - Finally, the team uploaded the GPS coordinate data to the computer and process it with mapping software. The user manual of the mapping software was followed.
- Permanent plot location:
  - The team set a waypoint at the center of the plot.
  - Upload the data on GPS coordinates to the computer.

Forest establishment

In monitoring forest establishment the team followed Standard Operational Procedure 6 of the BioCF monitoring manual. Forest establishment was monitored during the first three years after planting to ensure that the reforestation and assisted natural regeneration practices conform according to the practice described in the PDD. The following monitoring activities were carried out:

- Confirmation of site and soil preparation practices.
- Two planting survival checking were carried out, using permanent sample plots. The first checking was carried out three months after planting ensuring replanting when the survival rate was lower than 90 per cent of the final planting density. The second check of survival was carried out three years after planting.
- Confirmation that weeding practices were implemented as per the PDD.

Forest management

The following activities were monitored to ensure forest management implementation conformity with the PDD. Data such as date, location, area, biomass removal, tree species, among other was recorded

- Cleaning and site preparation: date, location, area and biomass removals
- Planting: site, location, area and tree species
- Thinning, harvesting, coppicing: date, location, area, tree species, intensity, volumes or biomass removals
- Fuel wood collection: date, location, area, tree species, volume or biomass removals
- Replanting: area, re-sowing or coppicing as required by the forest law
- Existing conditions for natural regeneration
- Disturbances: date, location, area, tree species, type of disturbance, biomass loss, implemented corrective measures.

Monitoring of project emissions by sources

There are no GHG emissions associated with the implementation of the project as there was no soil disturbance related to site preparation as supplemental planting activities were carried out using manual methods. The biomass burning is not practiced in project implementation; therefore, emissions from biomass burning are non-existent. However, the occurrence of natural fires is monitored. It was reported that the project area affected in natural fires during the monitoring period was 0.3 ha. Per the *Tool for testing significance of GHG emissions in A/R CDM project activities" (Version 01)* (EB31, Annex 16), the emissions of the biomass burning from these natural fires is insignificant, and are considered zero. No fossil fuels and fertilizers are used in the project. Therefore, there are no emissions associated with them.

Therefore, no project emissions occurred as a consequence of the project implementation and are reported as zero

Monitoring of leakage due to activity displacement

Per the methodology, leakage due to conversion of land to grazing land is attributable to the A/R CDM project activity if the conversion of land to grazing land occurs 5 years within the last measure taken to reduce animal populations in the project area. Monitoring of leakage due to the conversion of land to grazing land is therefore necessary only up to the fifth year after the measures to control grazing control measures. As the project was implemented at the end of 2004, the protection measures implemented to control grazing in the form of social fencing were initiated from the start of the project. These were supplemented with the physical protection measures in the

form of fencing. Surveys were used to monitor the leakage and data from surveys is analyzed to assess the prevalence of leakage in section E.3.

SECTION D. Data and parameters

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

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

Data / Parameter	C_{BSL}
Unit	*t CO_2-e*
Description	Baseline net greenhouse gas removals by sinks
Source of data	PDD, p. 62, Table 24: Baseline net GHG removals by sinks (t CO_2e)
Value(s) applied	2604.67 t **CO_2 e** (for the period 2005 to 2012)
Purpose of data	Data based on project area and Albania National Forest Inventory are used for calculation of baseline net GHG removals by sinks
Additional comment	

Data / Parameter	**Rj**
Unit	Dimensionless
Description	Root-shoot ratio for species *j*
Source of data	Table 3A.1.8, GPG LULUCF IPCC (2003)
Value(s) applied	0.35
Purpose of data	Root-shoot ratio of temperate broad leaved forests/plantations as specified in GPG LULUCF IPCC (2003) is used to calculate the below ground biomass
Additional comment	

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

Data / Parameter:	p
Unit	percent
Description	Desired level of precision
Source of data	
Value(s) applied	20%
Purpose of data	For the purpose of QA/QC of measurement
Additional comment	Not monitored, request for deviation to use 20% precision approved. Therefore, this parameter is revised to 20%

Data / Parameter:	Confidence level
Unit	Percent
Description	

Source of data	Defined
Value(s) applied	90%
Purpose of data	Sample size calculation
Additional comment	Not monitored

Data / Parameter:	$f_j(DBH,H)$
Unit	kg tree^{-1}
Description	Allometric equation for species *j* linking aboveground tree biomass (kg tree^{-1}) to diameter at breast height (*DBH*) and possibly tree height (*H*) measured in plots for stratum *i*, species *j*, time *t*
Source of data	See notes to Table 9 on sources of published literature on allometric equations
Value(s) applied	See worksheet "Standard Values" in Excel spreadsheet Albania_Calculation of Net GHG Removals
Purpose of data	Calculation of carbon stock change
Additional comment	Not monitored

Data / Parameter:	n_i	
Unit	Dimensionless	
Description	Sample size for stratum *i*	
Source of data	Calculations	
Value(s) applied	Strata	Sample size required to meet 20% precision and 90% CI
	Ecozone 1	10
	Ecozone 2	23
	Ecozone 3	36
	Ecozone 4	2
	Total	71
Purpose of data	For conducting sample plot measurements	
Additional comment	Not monitored	

Data / Parameter:	*XF*
Unit	Dimensionless
Description	Plot expansion factor from per plot values to per hectare values)
Source of data	Calculations
Value(s) applied	50
Purpose of data	Biomass estimation per hectare
Additional comment	Not monitored

Data / Parameter:	$z_{\alpha/2}$
Unit	Dimensionless
Description	Value of the statistic z (normal probability density function), for α = 0.1 (implying a 90% confidence level)
Source of data	Statistics reference
Value(s) applied	1.645
Purpose of data	Calculation of sample size
Additional comment	Not monitored

D.2. Data and parameters monitored

Data / Parameter:	*tID*
Unit	
Description	Age of plantation (1, 2, 3,… years)
Source of data	Project implementation report
Value(s) applied	
Purpose of data	Calculate average annual GHG removals by sinks
Additional comment	Not monitored

Net GHG Removals by sinks	
Data / Parameter	$\mathbf{A_{i=}\ A_{ikt}}$
Unit	Hectares
Description	Area of stratum i
Measured/Calculated/Default	Measured/ Calculated
Source of data	GIS shapefile
Value(s) of monitored parameter	**Strata 1** / **Area, ha** Ecozone 1 / 756.44 Ecozone 2 / 1,218.43 Ecozone 3 / 1,698.48 Ecozone 4 / 317.10 **Total** / **3,990.45**
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	GIS or/and GPS
Measuring/ Reading/ Recording frequency	Measured at the start of the project and thereafter at monitoring intervals, prior to each verification event.
Calculation method (if applicable)	GIS software
QA/QC procedures applied	Checked during monitoring period

Data / Parameter:	**A**
Unit	Hectares
Description	Total size of all strata (A) , e.g the total project area
Measured/Calculated/Default	Measured/ Calculated
Source of data	Project
Value(s) applied	4,779.00
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	GIS or/and GPS
Measuring/ Reading/ Recording frequency	At the start of the project and thereafter at monitoring intervals prior to each verification
Calculation method (if applicable)	N/A
QA/QC procedures applied	Checked during monitoring period
Data / Parameter:	**AP**
Unit	$\mathbf{m^2}$
Description	Sample plot area

Measured /Calculated /Default:	Measured
Source of data	Project
Value(s) applied	200
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Vertex (with slope correction), Tape
Measuring/ Reading/ Recording frequency:	5-year
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Plot location and area checked and verified during monitoring period

Data / Parameter:	Latitude/longitude of sample plot location
Unit	lat/long coordinates
Description	Location of sample plots
Measured /Calculated /Default:	Measured
Source of data	Project and plot maps, GPS, GIS
Value(s) applied	See shape file
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	GPS and GIS
Measuring/ Reading/ Recording frequency:	5 years
Calculation method (if applicable):	
QA/QC procedures applied:	Sample plot locations are checked and verified using GPS coordinates

Data / Parameter:	DBH
Unit	cm
Description	Diameter at breast height of living trees (1.37m)
Measured /Calculated /Default:	Measured
Source of data	Sample plot measurement.
Value(s) applied:	Diameter of trees measured and recorded as part of sample plot measurement. See excel spreadsheet Albania_Calculation of Net GHG Removals. Larger 2cm, smaller 18.4cm.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Diameter tape, caliper
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	
QA/QC procedures applied:	Diameter measurements are randomly checked during monitoring period

Data / Parameter:	Tree species
Unit	dimensionless

Description	N/A
Measured /Calculated /Default:	N/A
Source of data	Project
Value(s) applied:	Scientific names of tree species:

Carpinus betulus	*Acer sp.*	*Juglans regia*
Carpinus orientalis	*Alnus sp.*	*Juniperus oxycedrus*
Carpinus sp.	*Arbutus unedo*	*Juniperus sp.*
Castanea sativa	*Betula pendula*	*Ostria carpinifolia*
Castanea sp.	*Buxus sp.*	*Phyllorea latifolia*
Fraxinus ornus	*Cercis siliquastrum*	*Pistacia terebinthus*
Ostraya sp.	*Corillus colurna*	*Populus sp.*
Pinus nigra	*Cornus mas*	*Prunus sp.*
Pinus sp.	*Cornus sp.*	*Pyris Mali*
Quercus petraea	*Coryllus avellana*	*Pyrus sp.*
Quercus sp.	*Coryllus colurna*	*Rhus coriaria*
Quercus trojana	*Cotinus coggygria*	*Sambucus nigra*
Robinia sp.	*Crataegus monogyna*	*Sorbus aria*
Accer tataricum	*Erica arborea*	*Sorbus aucuparia*
Acer monspelanum	*Fagus sylvatica*	*Ulmus sp.*
Acer optusatum	*Ficus sp.*	*Phyllorea latifolia*
Acer pseudoplatanus	*Frasher*	*Pistacia terebinthus*

Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Implementation of forest plan checked right after planting and three years after planting

Data / Parameter:	Total number of sample plots
Unit	Number
Description	Permanent sample plots
Measured /Calculated /Default:	Calculated
Source of data	Calculated using the tool "Sample plots" (EB31 R15/EB46 R19, for Executive Board 31/46 Repan 15/19)
Value(s) applied:	

Strata	**Area, ha**	**No plots**
Ecozone 1	756.44	19
Ecozone 2	1,218.43	28

		Ecozone 3	1,698.48	43
		Ecozone 4	317.10	5
		Total	**3,990.45**	**95**
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	GPS			
Measuring/ Reading/ Recording frequency:	5 year			
Calculation method (if applicable):	N/A			
QA/QC procedures applied:	N/A			

Data / Parameter:	Number of trees in the sample plot					
Unit	Number					
Description	Trees measured in every sample plot					
Measured /Calculated /Default:	Measured					
Source of data	Monitoring					
Value(s) applied:	**Plot ID**	**No. of trees**	**Plot ID**	**No. of trees**	**Plot ID**	**No. of trees**
	8	1	75	13	23	70
	9	1	15	19	62	71
	11	1	31	21	91	71
	17	1	59	23	6	72
	18	1	12	24	44	77
	20	1	39	24	92	77
	21	1	58	27	87	79
	22	1	78	27	26	80
	27	1	89	30	48	85
	28	1	64	35	83	88
	29	1	36	36	60	89
	30	1	50	37	16	91
	37	1	13	38	46	91
	40	1	35	39	14	92
	42	1	4	40	38	92
	43	1	53	41	32	100
	45	1	90	41	49	108
	47	1	33	43	61	113
	55	1	54	44	79	121
	70	1	10	45	73	125
	76	1	65	46	51	128
	2	3	86	47	63	128
	24	3	80	51	56	131
	34	3	52	56	85	133
	1	5	74	56	81	154
	66	5	93	56	57	155

	19	6	5	58	82	158	
	88	6	95	59	94	159	
	7	10	77	60	71	181	
	41	11	3	65	67	205	
	25	13	72	67	69	207	
	84	251	68	245			

Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	5 year
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Number of trees and other variables are remeasured as part of the 10 per cent of the sample plots which are randomly selected and re-measured independently.

Project emissions

Data / Parameter:	$\mathbf{A_{B,ikt}}$
Unit	Hectare
Description	Area of slash and burn/natural fire in stratum i , species j , at time t. No slash and burn practiced in the project. The area affected by the natural fire is monitored.
Measured /Calculated /Default:	Measured
Source of data	N/A
Value(s) applied	0.3 ha area affected in the natural fire
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	GIS or/and GPS
Measuring/ Reading/ Recording frequency:	At the start of project and annually
Calculation method (if applicable):	

Data / Parameter:	B_{ijt}
Unit	tonnes d.m. ha-1
Description	Average above-ground biomass burnt in natural fire for stratum i , species j , time t
Measured /Calculated /Default:	Measured
Source of data	Project implementation records and IPCC (2003) Good Practice Guidance for LULUCF, Table 3A.1.3 (Eurasia continental broadleaf), page 3.158.
Value(s) applied:	0 t.d.m./ha in areas without vegetation; and 15 t.d.m./ha in areas with vegetation (default IPCC value)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A

Measuring/ Reading/ Recording frequency:	After burning
Calculation method (if applicable):	BEF method

Leakage

Data / Parameter:	dNa_{EGlt}
Unit	Sheep Equivalent Unit (SEU) 1 Goat = 1 SEU 1 Sheep = 1 SEU 1 Cattle/equine = 5 SEU Other animals include pigs, which do not graze on commune lands, therefore are excluded from the calculations.
Description	Number of animals displaced in EGL areas at time t
Measured /Calculated /Default:	Measured/Calculated
Source of data	Survey of communes
Value(s) applied:	45,023 SEU fewer animals are grazing at time t in comparison to prior to starting of the project (t-1)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
QA/QC procedures applied:	10% of the land/animal owners shall be questioned on number of displaced animals.by year. For the early start projects monitoring of leakage once during the first monitoring is sufficient as year of displacement is known through surveys.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Survey
Measuring/ Reading/ Recording frequency:	During the first monitoring period

D.3. Implementation of sampling plan

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Stratification

At the start of the project, the project was proposed for implementation under one ex ante stratum. The changes in project implementation were taken into account in the *ex post* stratification.

***Ex post* stratification**

As part of the *ex post* stratification, area of the *ex-ante* stratum organized into the four ecozones as shown in the table below.

Table 6. Project ex-post stratification

Strata	**Characteristics**
Ecozone 1	Mediterranean scrub (maquis) and garrigues. The vegetation is affected by overgrazing and intensive cutting. It represents the degraded Holly Oak

	(*Quercus ilex)* forests. degradation processes favor dry tolerant dwarf species such as *Spartium junceum, Salvia officinalis, Phlomis fruticosa, Paliurus spina-christi, Erica arborea, Cottynus coggygria etc.*
Ecozone 2	Mixed oak, hornbeam or Macedonian oak, ash and hornbeam. This ecozone represents moderate to severely degraded areas subjected to deforestation, overgrazing and intensive harvest. Major species include Turkey Oak *(Quercus cerris),* Hungarian Oak (*Quercus frainetto*), Oriental Hornbeam (*Carpinus orientalis),* Flowering Ash (*Fraxinus ornus)*. Oak forests are the potential vegetation type of this ecozone.
Ecozone 3	It represents the degraded stage of the former oak forests as a result of long-term intensive harvests and overgrazing. The characteristic vegetation of this ecozone includes Box-Tree (*Buxus sempervirens),* Prickly Juniper *(Juniperus oxycedrus),* Flowering Ash (*Fraxinus ornus),* Oriental Hornbeam *(Carpinus orientalis),* European Forsythia *(Forsythia europaea),* Wig Tree *(Cotynus coggygria), Alison (Alyssum murale),* Bertolon's Alison *(Alyssum bertoloni)* and oaks (*Quercus sp*.). The black pine is the pioneer species and Turkey Oak and Hungarian Oak are the potential species of the vegetation type.
Ecozone 4	Shrub and small tree species or grassland with Juniper *(Juniperus nana*). This ecozone represents the most degraded stage of former beech forests. Major species of this vegetation type are Common Juniper (*Juniperus communis spp. Nana),* Mat-Grass *(Nardus stricta*), Birch *(Betula pendula),* Hezel *(Corylus avellana),* Hornbeam *(Carpinus betulus),* Goat Willow *(Salix caprea),* Mouse-Ear Hawkweed *(Hieracium pilosella),* Blackthorn Tree *(Prunus spinosa),* Rose *(Rosa sp).*

Sample frame

Calculation of number of sample plots for monitoring and measurement

The methodology AR AM0003 version 04 presents equations to assess the number of sample plots required for monitoring to keep a maximum permissible error of ±10% of the mean, at a 95% confidence level. Subsequently "Guidelines on application of specified versions of A/R CDM methodologies in verification of registered A/R CDM project activities" (Version 01.0) required the use of were approved, which require the sample size to meet the permissible error of ±10% of the mean, at a 90% confidence level. Considering the large number of sample plots required to meet 10%, the guidelines of the paragraph 11 of the AR WG 28 (paragraph 37, EB55) were applied to meet the required permissible error of ±20% of the mean and a 90% confidence level for the calculation of the number of sample plots required for monitoring of the project. The following equations of the methodology were used to calculate the number of sample plots required under *ex post* stratification.

Equation 56 of AR AM0003, Version 04

Equation 57 of AR AM0003, Version 04

$$n = \frac{\left[\sum_{h=1}^{L} N_i \cdot st_i\right]}{\left(N \cdot \frac{E_1}{z_{\alpha/2}}\right)^2 + \sum_{i=1}^{L} N_i \cdot (st_i)^2}$$

$$n_i = \frac{\sum_{i=1}^{L} N_i \cdot st_i}{\left(N \cdot \frac{E_1}{z_{\alpha/2}}\right)^2 + \sum_{i=1}^{L} N_i \cdot (st_i)^2} \cdot N_i \cdot st_i$$

Where

L = total number of strata
z = z value for a confidence level (90%)
E = allowable error (±20% of the mean), E = Q * DLP;
st_i = standard deviation of stratum i
n_i= number of samples per stratum allocated
N = number of total sample units (all stratum), $N = \sum N_i$
N_i= number of sample units for stratum i, calculated by dividing the area of stratum i by the area of the sample plot of 200 m^2 .
Q = Average biomass quantity *Q*,; tonnes ha^{-1}
DLP = Desired level of precision (e.g. 20%); dimensionless
zα/2 = Value of statistic z (normal probability density function), for α = 0.1 (implying a 90% confidence level)

The parameters of the strata in terms of their area, mean carbon stock, and standard deviation under the ex post stratification are used for calculation of the number of sample plots.

Area of strata: The area of the strata reflects the area with standing stock at the end of the monitoring period.

Mean carbon stock of strata (Qi): Mean carbon stock of a stratum reflects the quantity of biomass present on the land parcels of the strata.

Standard deviation of the carbon stock of strata (sti): Standard deviation in the carbon stock of strata is expected to vary because of the differences in the growth rates of stands on different lands parcels.

Coefficient of variation (CV): Coefficient of variation as the ratio of standard deviation and mean carbon stock of a stratum expressed in percent reflects the variability of carbon stock of different strata of the project.

The number of sample plots by strata calculated based on mean carbon stock and standard deviation of the carbon stock based on the sample plot measurements to meet the permissible error limit of 10% and 20% of the mean and a confidence interval of 90% is presented in Table 5. The sample plot calculation sheet is attached as Annex 2 (separate file). The number of sample plots required to meet 10% were estimated at 292. Considering the high cost of establishing and measuring 292 plots, the number of sample plots to meet the 20% precision and 90% confidence interval was adopted per the paragraph 11 of the AR WG 28 (paragraph 37, EB55). As the temporary deviation from the MP/MM applicable for the first monitoring period, a request to adopt the sample size required to meet 20% precision was submitted to the UNFCCC as part of the request for post-registration change. The post-registration change (PRC ref No. PRC-2714-001) was approved by the UNFCCC on 12 November 2012. As a follow up to the approval of this post registration change, the sample size of 71 sample plots are adopted to meet the precision and confidence interval requirements for the project. Considering the number of sample plots established in each stratum is greater than those required meet the 20% precision, the number of sample plots laid out in the project is adequate as shown in the table below.

Table 7: Sample plots in project area by strata.

Strata	Sample plots required to meet 10% precision and 90% confidence interval	Sample plots required to meet 20% precision and 90% confidence interval	Sample plots established in the project strata
Ecozone 1	34	10	19
Ecozone 2	132	23	28
Ecozone 3	125	36	43
Ecozone 4	0	2	5
Total	**292**	**71**	**95**

QA/AC procedures

Quality assurance and quality control (QA/QC) procedures are implemented to ensure the net anthropogenic GHG removals by sinks are measured and monitored precisely, credibly, and transparently.

a) Quality checks on field measurements

To ensure the reliable field measurements,

- Standard Operating Procedures (SOPs) followed for each step of the field measurements.
- Trainings on field data collection for persons involving in the field measurement work were held.

b) Quality checks of field data collected

Project boundary:

- To verify quality of GPS data collection the project team followed Standard Operating Procedure 1 of the BioCarbon Fund Monitoring Manual, including:Personnel involved in the monitoring were trained to verify the geographic boundary and to record the data in the project database.
- The monitored data and information on the boundary were checked to ensure consistency with the data recorded in the project database and the registered PDD.
- The team ensured that field crews returning from the field transferred GPS files to the database and backed-up storage; files were transferred to an appropriately-named folder; clear communication with the GPS support person on file storage, data entering, and management was ensured.

Plot establishment

To verify that the plots have been installed and the measurements taken correctly, the following measures have been undertaken:

- Re-measurement of at least one (randomly selected) plot per every 10 plots by another team, and comparison of the measurements to check for errors; any errors found are recorded, resolved and corrected.
- Key re-measurement elements include the location of plots, species, DBH and tree height of all trees present. The procedures implemented as part of the re-measurement are checking of the field record of both original measurement and re-measurement. If any calculation error is found, it is checked and corrected. Following criteria of allowable errors was applied:
  - Any deviation between measurement and re-measurement below 5 percent was considered tolerable.
  - Errors were expressed as a percentage of all plots that have been rechecked to provide an estimate of the measurement error.

Forest establishment and management

As part of the project monitoring, the project team conducted checks and recorded data and information with regard to:

- Data collected with regard to forest establishment and management activities.
- Details of areas recorded in the plot journals and archived in the database with the species growing on the sites
- Areas and locations of supplemental plantings undertaken to fill the gaps and survival in planted areas
- Management, protection and tending activities implemented on the project parcels in different strata
- Occurrence of natural events such as fires in the project area

c) Data maintenance and archival

Data were archived in both electronic and paper forms, and copies of all data shared with each project participant to store in multiple locations. The archives include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheet;
- Estimates of the carbon stock changes in all pools and non-CO_2 GHG emissions covered by the project and corresponding calculation spreadsheets;
- GIS products;
- Copies of the measuring and monitoring reports.

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

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

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Baseline net GHG removals by sinks

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

Table 8. Baseline net GHG removals by sinks

Year	Annual estimation of baseline net anthropogenic GHG removals by sinks in tonnes of CO_2 e
2005	88.60
2006	259.16
2007	531.09
2008	441.60
2009	324.41
2010	322.16
2011	319.93
2012	317.72
2013	315.52
2014	313.33
2015	311.16
2016	309.00
2017	306.86
2018	304.74
2019	302.63
2020	300.53
2021	298.45
2022	296.38
2023	294.33
2024	292.29
Total estimated baseline net	**6249.88**

GHG removals by sinks (tonnes of CO_2 e)	
Total number of crediting years	**20**
Annual average over the crediting period of estimated baseline net GHG removals by sinks (tonnes of CO2 e)	**312.49**

The baseline net GHG removals by sinks for the monitoring period 2005 to 2012 are 2604.67 t CO_2e.

Few solitary trees or trees in groups were recorded as pre-existing vegetation during sample plot measurements. Considering that isolated trees existed prior to the project, biomass of trees greater than 18.4 cm were considered as pre-existing trees based on height and diameter relationship established through height-diameter regression equations and excluded from the calculations of actual net GHG removals by sinks.

Therefore, for the purpose of accounting baseline, subtraction of baseline net GHG removals by sinks of 2604.67 t CO_2e from the calculations of actual net GHG removals by sinks; and exclusion of the GHG removals by sinks associated with pre-existing trees from the calculations of actual net GHG removals by sinks is conservative.

The net anthropogenic GHG removals by sinks is the actual net GHG removals by sinks minus the baseline net GHG removals by sinks minus leakage, therefore, the following general formula can be used to calculate the net anthropogenic GHG removals by sinks of an A/R CDM project activity ($C_{AR\text{-}CDM}$), in tonnes CO_2-e:

$C_{AR\text{-}CDM} = C_{ACTUAL} - C_{BSL} - LK$ (Equation 101 ARAM0003 V4)

Where:

$C_{AR\text{-}CDM}$	Net anthropogenic greenhouse gas removals by sinks; tonnes CO_2-e
C_{ACTUAL}	Actual net greenhouse gas removals by sinks; tonnes CO_2-e
C_{BSL}	Baseline net greenhouse gas removals by sinks (as pre-determined in the PDD); tonnes CO_2-e
LK	Leakage; tonnes CO_2-e

To estimate the amount of CERs that can be issued at time t*= t2 (the date of verification) for the monitoring period T = $t_2 - t_1$, this methodology uses the EB approved equations29, which produce the same estimates as the following:

$tCERs = C_{AR\text{-}CDM,t2}$ (Equation 102 ARAM0003 V4)

Since there is no previous reporting period, the amount of tCERs for the current reporting period is 128,757.50

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

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Calculation of biomass, carbon stock and carbon stock change

Calculation of biomass, carbon stock and carbon stock changes are based on the biomass measurements of sample plots and are calculated following the stock change approach.

Growth data and equations for calculation of biomass and carbon stock change

Allometric equation method is used to calculate the biomass and carbon stock change. The biomass estimated from allometric equation is multiplied by number of trees on the sample plot to obtain above ground biomass per sample

plot and hectare. From the aboveground biomass of trees, carbon stock is calculated using the parameters on root shoot ratio, wood density, and carbon fraction (CF) and converted to CO_{2e}.

Allometric equations published in the edapho-climatic conditions corresponding to Albania were assessed. The "site equivalence" is established using height/diameter relationships of species, which meet the edapho-climatic criteria and applicability criteria of the A/R Methodological Tool: Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities (Version 01.0.0) were analyzed. The allometric equations meeting the applicability with regard to climatic and edaphic conditions, sample size, and R^2 were adopted for the application of sample plot diameter measurements. Below it is shown the application of the AR Methodological Tool on the appropriateness of allometric equations for the project context.

The most widely used allometric equation for biomass, a power function, with DBH as the single independent variable was applied.

W = a*DBH^b *(equation 1)*

where
W= above-ground biomass dry-weight in kg
a= scale parameter
DBH= Diameter at breast-height,1.3 m above-ground
b= shape parameter, usually between 2 and 3

The height/DBH function of site quality is also expressed as a power function of the form

H = DBH^c *(equation 2)*

where
H=individual tree height
c= a shape parameter that must be < 1 for a concave function

For a given species, a greater value of "c" in equation 2 will usually indicate taller trees, more biomass for a given DBH [1, 2], and a better site. The latter is usually also reflected by a larger value for "b" in equation 1 of the corresponding allometric biomass equation.

Table 9 lists parameters of all allometric equations representing the edapho-climatic region and the DBH range to which the equation was originally applied, the number of sample trees used in its establishment, the R^2, and the source. In some cases, additional equations for the same species were graphed and compared and conservative allometric equations that meet the relevant criteria were then chosen.

Table 9: Parameters of allometric equations used in biomass assessment

Species	Origin	DBH range Cm*	a	b	Sample tree number	R^2	Source
Quercus	NE-Spain	5-24	0.2208	2.217	69	0.908	[1]
Carpinus, Ostrya	see text	n.a.	0.2208	2.217	n.a	n.a	[1]
Fraxinus	Italy -see text	5-30	0.17	2.46	40	0.97	[2]
Castanea	Mediterran	1-35	0.08	2.421	49	0.916	[3]

	ean						
Pinus	Southern France	2-44	0.134	2.214	56	0.99	[4]
Robinia	Romania	2-16	0.1211	2.0594	36	0.9272	[5]
Generic equation for all juvenile trees	n.a.	2-16	0.1944	2.08	63	0.88	[3]

Note: *Allometric equations developed for DBH ≥=5cm are applicable to trees with DBH ≥=2cm because the allometric equation, a power function rising from the origin, is strictly monotonic increasing function whose shape between DBH 2 cm and DBH 5 cm is essentially fixed. The estimate of the power function shape parameter approximates the biomass growth of stems between 0 cm and 5 cm. Considering that the growth pattern of stems in this diameter range, the difference or error in the actual biomass growth and the parameter estimate of the power function estimate for the stem diameters between 2 cm and 5 cm is insignificant. Therefore, allometric equation for diameters above 5 cm DBH can be extrapolated to the range 2-5cm and the origin without introducing error.

It was assessed that the allometric equation of oak meets all the criteria of the AR Methodological Tool on appropriateness of allometric equations. Therefore, the oak allometric equation was adopted for major species – oak, hornbeam and ash. For "minor species" a generic equation applicable to those species was adopted.

Sources of allometric equations are the following:

1. Canadell, J., M. Riba, and P. Andras, *Biomass Equations for Quercus ilex L. in the Montseny Massif, Northeastern Spain*, Forestry, 1988. 61(2): p. 137-147.
2. Alberti, G., P. Candido, A. Peressotti, S. Turco, P. Piussi, and G. Zerbi, *Aboveground biomass relationships for mixed ash (Fraxinus excelsior L. and Ulmus glabra Hudson) stands in Eastern Prealps of Friuli Venezia Giulia (Italy)*, Ann. For. Sci., 2005. 62(8): p. 831-836.
3. Leonardi, S., I. Santa Regina, M. Rapp, H. Gallego, and M. Rico, *Biomass, litterfall and nutrient content in Castanea sativa coppice stands of southern Europe*, Ann. For. Sci., 1996. 53(6): p. 1071-1081.
4. Porté, A., P. Trichet, D. Bert, and D. Loustau, *Allometric relationships for branch and tree woody biomass of Maritime pine*, Forest Ecology and Management, 2002. 158: p. 71-83
5. Blujdea, V.N.B., R. Pilli, I. Dutca, L. Ciuvat, and I.V. Abrudan, *Allometric biomass equations for young broadleaved trees in plantations in Romania*, Forest Ecology and Management, 2012. 264(0): p. 172-184.

Wood densities of major species in the project are given in the table below.

Table 10: Basic wood densities of major species in the project area

Species	Average density (g/cm^3)
Quercus spec.	0.65
Carpinus spec.	0.79
Fraxinus spec.	0.66
Robinia	0.73
Castanea	0.56
Prunus avium	0.57
Alnus	0.49
Acer	0.59

Wild pear	0.70
Poplar	0.41
Betula	0.61
Sorbus	0.73
Pine	0.49
Juniper	0.52
Sorbus	0.73
Ulmus	0.64

Source: Sachsse, H., Einheimische Nutzhoelzer. 1984, Hamburg: Parey. 160pp.

The measurements of diameter at breast height of trees with 2 cm or more are conducted for the purpose of assessing the changes in the aboveground and below-ground carbon stocks. The procedures outlined in the monitoring plan are followed in implementing the measurements.

The verifiable changes in carbon stock represent the carbon stock changes in above-ground biomass and below-ground biomass within the project boundary, estimated using the equations:

$$\Delta C_{P,LB_T} = \sum_{t=1}^{t^*} \sum_{i=1}^{m_{PS}} \sum_{k=1}^{K} \Delta C_{P,ikt}$$ **(Equation 60 of the methodology)**

where:

$\Delta C_{P,LB}$ Sum of the changes in living biomass carbon stocks (above- and below-ground); t CO_2-e

$\Delta C_{P,ikt}$ Annual carbon stock change in living biomass for stratum *i*, stand model *k*, time *t;* t CO_2-e yr^{-1}

i 1, 2, 3, ... S_{ps} strata of the project activity

k 1, 2, 3, … *K* stand models

t 1, 2, 3, ...*t** years elapsed since the start of the A/R project activity

$$\Delta C_{P,ikt} = (\Delta C_{AB,ikt} + \Delta C_{BB,ikt}) \cdot \frac{44}{12}$$ **(Equation 61 of the methodology)**

where:

$\Delta C_{P,ikt}$ Annual carbon stock change in living biomass for stratum *i*, stand model *k*, time *t;* t CO_2-e. yr^{-1}

$\Delta C_{AB,ikt}$ Annual carbon stock change in above-ground biomass for stratum *i*, stand model *k*, time *t;* t C yr^{-1}

$\Delta C_{BB,ikt}$ Annual carbon stock change in below-ground biomass for stratum *i*, stand model *k*, time *t;* t C yr^{-1}

The mean change in carbon stocks in above-ground biomass and below-ground biomass per unit area are based on the measurements of sample plots.

As per the Annex 27, EB63, paragraph 3(p), allometric equation is used for calculate the carbon stock change of the project.

Allometric equation method

The allometric equations adopted to the project confirm to the A/R Methodological Tool: Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities

(Version 01.0.0). The steps of the methodology relevant to the allometric equation method are applied to calculate the carbon stock change in the project.

$$TB_{ABj} = f_j(DBH, H)$$ **(Equation 68 of the methodology)**

where:

TB_{ABj}	Above-ground biomass of a tree; kg tree^{-1}
$f_j(DBH,H)$	An allometric equation for species *j* linking above-ground tree biomass (kg tree^{-1}) to diameter at breast height (*DBH*) and possibly tree height (*H*) measured in plots for stratum *i*, species *j*, time *t*

The carbon stock in above-ground biomass per tree is calculated by applying the allometric equation to the tree measurements.

$$TC_{ABj} = TB_{ABj} \cdot CF_j$$ **(Equation 69 of the methodology)**

where:

TC_{AB}	Carbon stock in above-ground biomass per tree; kg C tree^{-1}
TB_{ABj}	Above-ground biomass of a tree of species *j*; kg tree^{-1}
CF	Carbon fraction (IPCC default value = 0.5); t C (t d.m.)$^{-1}$

The increment of above-ground biomass carbon accumulation is assessed by subtracting the biomass carbon at time 2 from the biomass carbon at time 1.

$$\Delta TC_{ABjT} = TC_{ABj,t2} - TC_{ABj,t1}$$ **(Equation 70 of the methodology)**

where:

ΔTC_{ABjT}	Carbon stock change in above-ground biomass per tree of species *j* between two monitoring events; kg C tree^{-1}
$\Delta TC_{ABj,t2}$	Carbon stock change in above-ground biomass per tree of species *j* at monitoring event t_2; kg C tree^{-1}
$\Delta TC_{ABj,t1}$	Carbon stock change in above-ground biomass per tree of species *j* at monitoring event t_1; kg C tree^{-1}

The change in biomass carbon per tree within each plot is calculated by multiplying with plot expansion factor which is proportional to the area of the measurement plot.

$$\Delta PC_{ABikT} = \frac{XF \cdot \sum_{tr=1}^{TR} \Delta TC_{ABjT,tr}}{1000}$$ **(Equation 71 of the methodology)**

$$XF = \frac{10{,}000}{AP}$$ **(Equation 72 of the methodology)**

where:

$\Delta PC_{AB,ijT}$	Plot level carbon stock change in above ground biomass in stratum *i*, species *j*, between two monitoring events; t C ha^{-1}
ΔTC_{ABjT}	Carbon stock change in above-ground biomass per tree of species *j* between two monitoring events; kg C tree^{-1}
XF	Plot expansion factor from per plot values to per hectare values
AP	Plot area; m^2
tr	Tree (*TR* = total number of trees in the plot)

The mean carbon stock change within each stratum is calculated by averaging across plots in a stratum.

$$\Delta MC_{ABikT} = \frac{\sum_{pl=1}^{PL_{ik}} \sum_{j}^{J} \Delta PC_{ABikT,pl}}{PL_{ik}}$$ **(Equation 73 of the methodology)**

where:

ΔMC_{ABikT} Mean carbon stock change in above-ground biomass in stratum *i*, stand model *k*, between two monitoring events; t C ha^{-1}.

ΔPC_{ABijT} Plot level mean carbon stock change in above-ground biomass in stratum *i*, species *j*, between two monitoring events; t C ha^{-1}.

pl Plot number in stratum *i*, species *j*; dimensionless

PL_{ik} Total number of plots in stratum *i*, stand model *k*; dimensionless

j Species *j* (*J* = total number of species)

The carbon stock in below-ground biomass is estimated by applying the root-shoot ratio to the above-ground carbon stock.

$$TC_{BBj} = TC_{ABj} \cdot R_j$$ **(Equation 74 of the methodology)**

$$\Delta TC_{BBjT} = TC_{BBj,t2} - TC_{BBj,t1}$$ **(Equation 75 of the methodology)**

$$\Delta PC_{BB,ikT} = \frac{XF \cdot \sum_{tr=1}^{TR} \Delta TC_{BBjT}}{1000}$$ **(Equation 76 of the methodology)**

$$\Delta MC_{BB,ikT} = \frac{\sum_{pl=1}^{PL_{ik}} \Delta PC_{BBikT,pl}}{PL_{ik}}$$ **(Equation 77 of the methodology)**

where:

TC_{BBj} Carbon stock in below-ground biomass per tree of species *j*; kg C $tree^{-1}$

TC_{ABj} Carbon stock in above-ground biomass per tree of species *j* as calculated in Step 1; kg C $tree^{-1}$

R_j Root-shoot ratio appropriate to increments for species *j*; dimensionless

ΔTC_{BBjT} Carbon stock change in below-ground biomass per tree of species *j* between two monitoring events; kg C $tree^{-1}$

$\Delta PC_{BB,\,ijT}$ Plot level carbon stock change in below-ground biomass of species *j* between two monitoring events; t C ha^{-1}

XF Plot expansion factor from per plot values to per hectare values (see equation 80); dimensionless

tr Tree (*TR* = total number of trees in the plot)

ΔMC_{BBikT} Mean carbon stock change in below-ground biomass for stratum *i*, stand model *k*, between two monitoring events; t C ha^{-1}

ΔPC_{BBikT} Plot level carbon stock change in below-ground biomass for stratum *i*, stand model *k*, between two monitoring events; t C ha^{-1} *pl* = plot number in stratum *i*, stand model *k*; dimensionless

PL_{ik} Total number of plots in stratum *i*, stand model *k*; dimensionless

The annual carbon stock change is calculated by dividing the carbon changes between two monitoring events by the number of years between monitoring events.

$$\Delta MC_{ABikt} = \frac{\Delta MC_{ABikT}}{T}$$ **(Equation 78 of the methodology)**

$$\Delta MC_{BBikt} = \frac{\Delta MC_{BBikT}}{T}$$ **(Equation 79 of the methodology)**

where:

$\Delta MC_{AB,ikt}$	Annual mean carbon stock change in above-ground biomass for stratum *i*, stand model *k*, at year *t*; t C ha^{-1} yr^{-1}
$\Delta MC_{BB,ikt}$	Annual mean carbon stock change in below-ground biomass for stratum *i*, stand model *k*, at year *t*; t C ha^{-1} yr^{-1}
ΔMC_{ABikT}	Mean carbon stock change in above-ground biomass for stratum *i*, stand model *k*, between two monitoring events; t C ha^{-1} yr^{-1}
ΔMC_{BBikT}	Mean carbon stock change in below-ground biomass for stratum *i*, stand model *k*, between two monitoring events; t C ha^{-1} yr^{-1}
T	Number of years between two monitoring events

The annual carbon stock change in living biomass for each stratum *i*, species *j*, stand model *k*, at time *t* is calculated from the area of each stratum *i*, species *j*, stand model *k*, at time *t* and the annual mean carbon stock change in above-ground biomass and below-ground biomass per unit area.

$$\Delta C_{AB,ikt} = A_{ikt} \cdot \Delta MC_{AB,ikt}$$ **(Equation 80 of the methodology)**

$$\Delta C_{BB,ikt} = A_{ikt} \cdot \Delta MC_{BB,ikt}$$ **(Equation 81 of the methodology)**

where:

A_{ikt}	Area of stratum *i*, stand model *k*, at time *t*; hectare (ha)
$\Delta C_{AB,ikt}$	Changes in carbon stock in above-ground biomass for stratum *i*, stand model *k*, at time *t*; t C yr^{-1}
$\Delta C_{BB,ikt}$	Changes in carbon stock in below-ground biomass for stratum *i*, stand model *k*, at time *t*; t C yr^{-1}
$\Delta MC_{AB,ikt}$	Annual mean carbon stock change in above-ground biomass for stratum *i*, stand model *k*, at year *t*; t C ha^{-1} yr^{-1}
$\Delta MC_{BB,ikt}$	Annual mean carbon stock change in below-ground biomass for stratum *i*, stand model *k*, at year *t*; t C ha^{-1} yr^{-1}

Note that stand models will most often be one of the strata, and therefore will be included as such rather than as a separate consideration.

Project Emissions

As the project implementation focuses on assisted natural regeneration, there is no site preparation. Therefore, the soil disturbance is non-existent. The supplemental planting is small, the soil disturbance associated with site preparation is insignificant as site preparation has been done manually and no machinery or fertilization has been used in the project.

The biomass burning is not practiced in project implementation; therefore, emissions from biomass burning are non-existent. However, the occurrence of natural fires was monitored. As per the Fire Management Plan report natural fire incidents occurred in 0.3 hectare located in parcel 120 in Pishaj commune during the monitoring period.

Equations 84 - 87 of the methodology were applied to estimate GHG emissions from biomass burnt, as follows:

Equation 84 of the methodology:

$E_{BiomassBurn} = E_{BiomassBurn,\ CO2} + E_{BiomassBurn,\ N20} + E_{BiomassBurn,\ CH4}$

Where:

$E_{BiomassBurn}$	Total GHG emission from biomass burning in slash and burn; tonnes CO_2e
$E_{BiomassBurn,\ CO2}$	CO_2 emission from biomass burning in slash and burn; tonnes CO_2e
$E_{BiomassBurn,\ N20}$	NO_2 emission from biomass burning in slash and burn; tonnes CO_2e
$E_{BiomassBurn,\ CH4}$	CH_4 emission from biomass burning in slash and burn; tonnes CO_2e

Equation 85 of the methodology:

$$E_{BiomassBurn,CO_2} = \sum_{t=1}^{t^*} \sum_{i=1}^{s_{PS}} \sum_{k=1}^{k} (A_{B,ikt} \cdot B_{ikt} \cdot PBB_{ikt} \cdot CE \cdot CF) \cdot \frac{44}{12}$$

$E_{BiomassBurn,\ CO2}$	CO_2 emission from biomass burning in slash and burn; tonnes CO_2e
$A_{B,ikt}$	Area of slash and burn for stratum i, stand model k, time t; ha
B_{ikt}	Average above-ground biomass stock before burning of stratum I, stand model k, time t, tonnes d.m. ha^{-1}.
PBB_{ikt}	Average proportion of biomass burnt in stratum i, stand model k, time t; dimensionless
CE	Average biomass combustion efficiency (0.5)
CF	Carbon fraction; tonnes C (tonnes d.m.)$^{-1}$
i	1,2,3…m_{ps} strata in the project scenario
k	1,2,3…K stand model in the project scenario
t	1,2,3…t* years elapsed since the start of the A/R project activity

Equations 86 and 87 of the methodology:

$$E_{BiomassBurn,N_2O} = E_{BiomassBurn,CO_2} \cdot \frac{12}{44} \cdot (N/C\ ratio) \cdot ER_{N_2O} \cdot \frac{44}{28} \cdot GWP_{N_2O}$$

$$E_{BiomassBurn,CH_4} = E_{BiomassBurn,CO_2} \cdot \frac{12}{44} \cdot ER_{CH_4} \cdot \frac{16}{12} \cdot GWP_{CH_4}$$

Where:

$E_{BiomassBurn,\ NO2}$	NO_2 emission from biomass burning in slash and burn; tonnes CO_2e
$E_{BiomassBurn,\ CH4}$	CH_4 emission from biomass burning in slash and burn; tonnes CO_2e
$E_{BiomassBurn,\ CO2}$	CO_2 emission from biomass burning in slash and burn; tonnes CO_2e
N/C ratio	Nitrogen-carbon ratio; dimensionless (IPCC default value = 0.01)
ER_{N2O}	Emission ratio for N_2O (IPCC default value = 0.007)
ER_{CH4}	Emission ratio for CH_4 (IPCC default value = 0.012)
GWP_{N20}	Global warming potential for N_2O (310 for the first commitment period)
GWP_{CH4}	Global warming potential for CH_4 (21 for the first commitment period)

Applying equation 85, the CO_2 emissions from biomass burning are estimated as follows:
$E_{BiomassBurn,\ CO2}$ = 0.3 ha* 15 t.d.m. ha^{-1}*1*0.5*0.5*(44/12)

$E_{BiomassBurn,\ CO2}$ = 4.125 tonnes CO_2e

Note: the average proportion of biomass burnt in stratum i, stand model k, time t was conservatively assumed as 1. Combustion efficiency used is the IPCC default value 0.5 as no values are presented for non-tropical areas in Table 3.A.14 of IPCC GPG-LULUCF.

Applying equation 86, the NO_2 emissions from biomass burning are estimated as follows:

$E_{BiomassBurn,\ NO2}$= 4.125 tonnes CO_2e * 12/44 * 0.01 * 0.007 * 44/28 * 310
$E_{BiomassBurn,\ NO2}$= 0.038 tonnes CO_2e

And applying equation 87, the CH_4 emissions from biomass burning are estimated as follows:

$E_{BiomassBurn,\ CH4}$= 4.125 tonnes CO_2e * 12/44 *0.012 * 16/12 *21
$E_{BiomassBurn,\ CH4}$= 0.378 tonnes CO_2e

Summarizing, the total GHG emission from biomass burning is calculated by applying equation 24, as follows:

$E_{BiomassBurn} = E_{BiomassBurn,\ CO2} + E_{BiomassBurn,\ N20} + E_{BiomassBurn,\ CH4}$
$E_{BiomassBurn}$ = 4.125 tonnes CO_2e + 0.038 tonnes CO_2e + 0.378 tonnes CO_2e
$E_{BiomassBurn}$ = 4.541 tonnes CO_2e

Per AR-AM0003 version 04 methodology, accounting for increases in emissions by sources is only required if significant (>2 per cent of the actual net GHG removals by sinks). In addition, per the *Tool for testing significance of GHG emissions in A/R CDM project activities" (Version 01)* (EB31, Annex 16), the emissions of the biomass burning from these natural fires are insignificant (less than 5% of net anthropogenic removals by sinks), and are considered zero.

There is no fossil fuel use and fertilizer application in the project. Therefore, there are no emissions associated with them. Moreover, as per annex 26, EB63, emissions from use of fertilizer use and fossil fuel emissions are not needed to be considered.

Therefore, no project emissions occurred as a consequence of the project implementation and are reported as zero

E.3. Calculation of leakage

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The surveys to assess the leakage from potential shift of grazing were conducted.

The two sources of activity displacement leakage relevant for the project – conversion of land to grazing land and fuel wood collection are assessed as per the guidance of the monitoring methodology

This 'activity shifting' or 'activity displacement' of grazing result in leakage in the immediate years after the start of the project activity when activities are displaced to areas outside the project boundary. $LK_{conversion}$:

$$LK_{conversion} = LK_{conv-graz}$$ **(Equation 89 of the methodology)**

where:

$LK_{conv-graz}$ Leakage resulting from the conversion for grazing

Leakage from conversion of land to grazing land

The ex-ante assessment of the leakage associated with grazing presented in pages 71 to 85 of the PDD was used to assess the prevalence of leakage as part of project monitoring

Assessment of grazing leakage

Steps 1 to 3 of Section 7.1.1 of the AR-AM0003 V4 methodology were applied to assess the leakage, as follows:

Step 1: Monitoring of the grazing control measures specified in the PDD was conducted.
Setp 2: Survey of sample land parcels of the project was done and interviews of households involved in livestock grazing were conducted to assess the number of animals displaced outside the project boundary. As part of survey, questionnaires for assessing leakage were designed and data were collected on animal population, grazing patterns, and potential leakage as per the guidance of the methodology.

The trained field teams conducted the survey of animal owners, sampled land parcels from 25/05/2012 to 05/06/2012, and interviewed 164 animal owners regarding their grazing activities to assess the displacement of livestock units outside the project boundary.

The sample land parcels to be included in the leakage assessment were selected systematically. For this purpose the total 199 land parcels of the project covering 3,990.45 ha were numbered. A random number 63 generated using Excel was used to select the first land parcel and selection of subsequent land parcels was done by systematic selection of every sixth (6) land parcels on the list. As a result, 33 land parcels totaling 603.40 ha were selected to conduct the assessment (Table 11). The sample size meets the methodology requirement to survey at least 10% of the randomly selected parcels or a minimum of 30 parcels). The sample size used for the survey represented 15.12 percent of the project total area and 16.58 percent of the total project land parcels[3].

Table 11. Sample sites selected for leakage assessment

No.	Forest economy	Site code	Area	Ecozone	District	Region	
						Name	*Code*
2	DEDAJ-BUHOT	03107a	15,20	3	Puke	Shkoder	1
8	DEDAJ-BUHOT	032a	2,97	3	Puke	Shkoder	1
14	DEDAJ-BUHOT	0347b	14,51	3	Puke	Shkoder	1
20	DEDAJ-BUHOT	037a	11,64	3	Puke	Shkoder	1
26	KAFTALLE-GOMSIQE	0928a	19,28	3	Puke	Shkoder	1
32	KRYEZI	1259c	4,22	3	Puke	Shkoder	1
38	QELEZ	2649	7,83	3	Puke	Shkoder	1
44	BUSHTRICE	0252b	33,98	4	Kukes	Kukes	2
50	BUSHTRICE	0278c	16,19	4	Kukes	Kukes	2
56	HELSHAN	0878	20,23	3	Kukes	Kukes	2
63	HELSHAN	0899a	22,17	3	Kukes	Kukes	2
69	SHISHTAVEC-ZAPOD	1990b	4,87	4	Kukes	Kukes	2
75	DESHAT MAQELLARE	04154a	37,81	2	Peshkopi	Diber	3
81	DESHAT MAQELLARE	0416a	3,79	3	Peshkopi	Diber	3
87	DESHAT MAQELLARE	04242c	8,57	2	Peshkopi	Diber	3
93	DESHAT MAQELLARE	0446a	11,56	2	Peshkopi	Diber	3
99	DESHAT MAQELLARE	0473b	1,92	3	Peshkopi	Diber	3
105	KASTRIOT-SLLOVE	10214b	8,49	2	Diber	Diber	3
111	KASTRIOT-SLLOVE	10239a	6,24	2	Diber	Diber	3
117	KLENJE	1149b	18,93	2	Bulqize	Diber	3
123	KURDARI-PLANBARDHE	1483b	12,79	3	Diber	Diber	3
129	TRODHEN	2175a	10,85	3	Mat	Diber	3
135	ULEZ	23141	49,00	3	Mat	Diber	3
141	ULEZ	2362b	9,98	1	Mat	Diber	3

[3] This sample size exceeded the methodology requirement of 10 per cent of the land/animal owners.

147	GALIGAT-STROR	051c	30,61	1	Elbasan	Elbasan	4
153	GALIGAT-STROR	0551a	25,31	1	Elbasan	Elbasan	4
159	GJINAR-ZAVALINE	0618b	19,35	2	Elbasan	Elbasan	4
165	GRAMSH-VINJE	0774a	35,39	1	Gramsh	Elbasan	4
171	PAPER-SHLLAK	17168a	48,99	2	Peqin	Elbasan	4
177	PAPER-SHLLAK	17175a	20,18	2	Peqin	Elbasan	4
183	SHPAT-SHTERMEN	2047/2	15,39	3	Elbasan	Elbasan	4
189	POLIS-VASJAN	2729a	31,79	1	Elbasan	Elbasan	4
195	POLIS-VASJAN	2764a	23,38	1	Elbasan	Elbasan	4
	Total		**603,40**				

Based on the general information on the pattern of use of project land parcels, on average 5 animal owners per each project land parcel were interviewed, representing about 40 percent of users of each site. For 33 land parcels, the total number of users/ animal owners (164) interviewed represented 40 per cent of the total users. The details on the number of animal owners/users interviewed and livestock assessed by commune in sample survey are presented in Table 12.

Table 12. Sample survey of animal owners and their livestock by commune

Commune	**No. of animal owners**	**No. of existing animals**				
		Goats	**Sheep**	**cattle**	**Equine**	**Other**
Bushkash	5		12	9		
Bushtrice	5		13	5	4	
Gjinar	5		30	7	5	
Golaj	10		15	20	2	
Gryke Caje	5		90	26	9	
Kabash	9	191	61	19	9	
Kryezi	5	35	30	8	5	
Madhesh	10		26	34		
Maqellare	5		5	13	4	
Mardhnaq	5	64	43	10	5	
Mece	5	105	43	11	6	
Melan	5			4	1	
Paper	5		140	5	4	136
Pishaj	15	191	168	26	11	
Plet	5	86	34	10	5	
Plezh	5		38	12		
Probat	5	78	25	7	5	
Qelez Breg	5	114	37	8	4	
Shishtavee	5		34	11	6	
Shushice	10	54	24	17	7	
Sllove	10	30	4	13	6	
Tomin	15			10	1	
Verrnice	5		70	5		
Vidhas	5		25	10	5	85
Total livestock	**164**	**948**	**967**	**300**	**104**	**221**

For converting the livestock of the sample into the sheep equivalent units (SEU), the following conversion factors noted on the page 72 of the PDD are used.

1 Goat = 1 SEU
1 Sheep = 1 SEU
1 Cattle/equine = 5 SEU
Other animals include pigs, which do not graze on commune lands, therefore are excluded from the calculations.

Per the equation 90 of AR-AM0003 methodology, the results of the survey of livestock on project land parcels were used to assess the displacement of animal population in Existing Grazing Lands (EGL) outside the project boundary.

$Na_{outside,t} = Na_{BL} - Na_{AR,t}$ (Equation 90 of ARAM0003 Version 4)

Where:

$Na_{outside,t}$ Number of animals displaced outside the project area at year t, dimensionless

Na_{BL} Ex-ante estimated pre-project number of animals from the different livestock groups that would be grazing in the project area under de baseline scenario

$Na_{AR,t}$ Monitored number of animals present in the project area

Survey data was used to assess the following conditions:

If:

$Na_{BL} < Na_{AR,t}$ it can be assumed that the ARCDM project activity has not displaced grazing animal population. Leakage due to conversion of land to grazing land can, then, be set as zero and no further monitoring step is needed.

$Na_{BL} > Na_{AR,t}$ it is necessary to monitor the animal population in the Existing Grazing Lands (EGL) areas specified in the PDD.

To identify the animal owners that rely on project sites for grazing their animals, the animal owners in the sample were requested to identify the sites that are used for grazing, on average 5 animal owners per each project land parcel were interviewed. As previously stated, for 33 land parcels, the total number of users/animal owners interviewed was 164. The livestock of these 164 animal owners was counted and was converted into SEU. The livestock units of the sample were assessed at 3935 SEU.

The survey showed that 154 users (i.e., 94 % of the 164 interviewees) do not graze their animals on the projects sites, while 10 users (i.e., 6% of the 164 interviewees) graze their animals on the project sites. The number of animals of these 10 sub-sample users was counted and converted into SEU. The total livestock of the 10 animal owners that graze on project sites was assessed at 317 (see table 13 below).

Table 13: Number of sample animals in SEU grazing on carbon sites

Nr.	Name of Animal owner/User.	Goats SEU	Sheep SEU	Cattle SEU	Equine SEU	Total SEU
1	Naim Rrapi	0	50	20	10	80
2	Beslim Alia	15	7	10	5	37
3	Zhevdet Lici	0	30	15	5	50
4	Marie Cullhaj	0	25	5	5	35
5	Miter Cullhaj	0	0	10	5	15
6	Bashkim Cekrezi	0	0	10	0	10

7	Adriatik Bitna	20	0	0	0	20
8	Hajdar Goxha	0	0	10	0	10
9	Haki Beqiri	0	0	15	0	15
10	Ali Tanushi	20	5	15	5	45
	Total	*55*	*117*	*110*	*35*	317

Since the interviewed users represent on average 40% of all users grazing their animals in project sites, the monitored number of animals present in the project area is 792.5 SEU ($Na_{AR,t\ (sub\text{-}sample)}$ = 317 *1/0.4 = 792.5 SEU). This means that the number of SEU livestock of the sample supported by the project land parcels was calculated as 792.5 . Considering that the project area represented in the sample was 603.40 ha, i.e., 15.12 percent of the project total area, the total number of animals grazing on the project area was assessed as 5,241 SEU, as follows:

$sNa_{AR,t\ (sub\text{-}sample)}$ = 317 SEU * (1/0.40) = 792.5 SEU
$Na_{AR,,t}$ = 792.5SEU*(1/0.1512) = 5,241 SEU

Where,

317	Number of SEU belonging to six percent of the interviewed land users, per the sampling results.
(1/0.40) = 2.5	Factor to expand the number of SEU to 100 percent (100/40), as the sampled interviewed owners represent 40 percent of the total project users who grazed their animals on the project sites
(1/0.1512)= 6.61	Fraction of the project total area sampled ((603.40 ha sampled*100)/3990.45 ha of project total area implemented).

According to the PDD 16,297 SEU[4] are subjected to displacement as a result of the project implementation. Since this figure is greater than the monitored number of animals present in the project area, the livestock population in the Existing Grass Lands (EGL) areas specified in the PDD need to be monitored.

$Na_{BL} > Na_{AR,t}$ = 16,297SEU > 5,241 SEU

Step 3: To assess whether the Existing Grazing lands (EGL) support the animal population displaced into EGL, data on the number of animals Na_{EGLt-1} that can graze on EGL prior to the project implementation assessed on page 84 of the PDD was considered. The survey information on animal owners (users) was used to calculate $Na_{EGL,t}$, and the equation 91 of the ARAM0003 V4 methodology was used to assess the likely displacement of animals in the EGL areas due to project implementation.

$$dNa_{EGL,t} = \frac{Na_{EGL,t} - Na_{EGL(t=1)}}{SFR_{EGL}}$$ (Equation 91 of ARAM0003 V4)

dNa_{EGLt}	Number of animals displaced in *EGL* areas at time *t*; dimensionless
$Na_{EGL,t}$	Number of animals present in the sampled *EGL* areas at time *t*; dimensionless.
$Na_{EGL,t=1}$	Number of animals present in the sampled EGL areas at time t = 1, as specified in the AR-CDM-PDD; dimensionless.
SFR_{EGL}	Fraction of sampled *EGL* areas sampled with respect to total, as specified in the AR-CDM-PDD; dimensionless

The following conditions were assessed:

If:

[4] PDD, Table 29 page 84.

$Na_{BL} < (Na_{AR,t} + dNa_{EGL,t})$	it can be assumed that the animal populations displaced due to the AR-CDM project activity have not occasioned leakage due to conversion of land to grazing land (*LKconversion* = 0) and no further monitoring step is needed.
$Na_{BL} > (Na_{AR,t} + dNa_{EGL,t})$	it is necessary to monitor the animal populations in the *NGL* areas specified in the AR-CDM-PDD.

The values of the variables of the equation 91 of the methodology are presented below.

$Na_{EGL,t}$	From the survey, number of animals present in the sampled *EGL* areas at time *t*; was calculated. The number of animals (SEU) present in sample villages is $sNa_{EGL,t}$ = 39,236 SEU. The number of animals for the entire project area $Na_{EGL,t} = sNa_{EGL,t} * 1/SFR_{EGL}$ = (39,236*1/0.314)
$Na_{EGL,t-1}$	Number of animals present in the sampled EGL areas at time t-1, specified on the page 84 of the PDD = 169,978 SEU
SFR_{EGL}	Fraction of *EGL* areas sampled out of the total project area in the leakage survey = 0.314 for the period t, therefore $SFR_{EGL,t}$ = 0.314; while for t-1 period as the value of $Na_{EGL,t-1}$ *was* estimated for all villages surrounding the project; therefore $SFR_{EGL,t-1}$ = 1 $SFR_{EGL,t}$ = 0.314 $SFR_{EGL,\ t-1}$ = 1

The data on the livestock (goats, sheep, cow, equines) grazing on the EGL areas in sample villages were collected from each commune and converted to SEU according to methodology conversion factors. Table 14 below presents the number of animals ($sNa_{EGL,t}$) in SEU present in the *EGL* areas of the sample villages at time *t.*

Table 14: Data on livestock of the sample villages in SEU

Village	*Goats*	*Sheep*	*Cow*	*Equine*	*Total*
Verrnice	-	60	20		80
Plezh	-	130	1,250	-	1,380
Bushkash	84	70	1,200	-	1,354
Madhesh	-	6	115	-	121
Pocest	30	149	1,750	250	2,179
Melan	20	25	120	-	165
Palaman	30	20	75	30	155
Trojak-	30	100	250	150	530
Pilafe	-	50	390	100	540
Staravec	300	250	525	350	1,425
Ushtelenxe	-	180	420	230	830
Maskarth	70	80	200	60	410
Pobrat	1,300	300	750	500	2,850
Paper	100	156	280	450	986
Vidhas	25	350	1,760	1,550	3,685

Fush Bull	800	270	1,400	-	2,470
Polis i Vogel	180	85	450	-	715
Ceruje	100	120	1	250	1,470
Drize	174	120	800	325	1,419
Kocaj	80	70	120	60	330
Helshan	20	60	1,100	25	1,205
Caje	-	1,457	820	485	2,762
Bushtrice	90	300	800	250	1,440
Shishtavec	-	2,200	2,250	650	5,100
Kryezi	256	292	3,800	50	4,398
Mardhnaq	65	72	225	35	397
Qelez Breg	46	35	80	25	186
Plet	45	76	150	25	296
Kabash	21	33	80	25	159
Mece	66	33	75	25	199
Grand Total	***3,932***	***7,149***	***22,255***	***5,900***	**39,236**

The total number of animals ($sNa_{EGL,t}$) present in the *EGL* areas of the sample villages at time *t = 39,236 SEU*

$$dNa_{EGL,t} = \frac{Na_{EGL,t}}{SFR_{EGL,t}} - \frac{Na_{EGL,t-1}}{SFR_{EGL,t-1}}$$

$$dNa_{EGL,t} = \frac{39,236}{0.314} - \frac{169,978}{1}$$

$dNa_{EGL,t}$ = 124,955 – 169,978 = 45,023

The number of animals estimated to be grazing in EGL areas prior to the project, $Na_{EGL,t-1}$ 169,978 is greater than the number of animals displaced to EGL areas after the implementation of the project , $Na_{EGL,t}$ 124,955. Considering that number of animals displaced to EGL areas after the project implementation is lower than that of the pre-project situation, 45,023 SEU can be additionally accommodated in the EGL areas.

Since the ex-ante estimated pre-project number of animals that would be grazing in the project area under de baseline scenario (Na_{BL}) is less than the summation of the monitored number of animals after the project area ($Na_{AR,t}$) and 45,023SEU (dNa_{EGLt}) that can be increased in the EGL areas, there is no grazing leakage associated with the project.

Na_{BL} = 16,297 SEU
$Na_{AR,t}$ = 5,241 SEU

$dNa_{EGL,t}$ = 45,023 SEU

$Na_{BL} < (Na_{AR,t} + dNa_{EGL,t})$ = 16,297SEU < (5,241 SEU + 45,023 SEU)

= 16,297SEU < 50, 264 SEU

The EGL areas are expected to be sufficient to feed the population of animals displaced as due to the project (Na_{BL}).

The above conclusion of no occurrence of leakage is also demonstrated based on the calculations of biomass production capacity of Existing Grazing Lands belowfollowing the equation 34 of the methodology.

$\Delta CL_{maxEGL} - \Delta CL_{current} \geq \Delta CL_{PA,t}$

$\Delta CL_{current} = Na_{current} * DBI * A_{SEU} * 30 * 1/1000$ (Equation 34 of ARAM0003, V4)

Where:

$Na_{current}$	Total number of SEU present in villages of the project area
ΔCL_{maxEGL}	Maximum annual biomass that EGL grazing areas can produce for animal feeding
$\Delta CL_{current}$	Annual biomass that these grazing areas are currently producing for animal feeding, t.d.m. yr-1
$\Delta CL_{PA,t}$	Animal annual biomass consumption over the project area to be planted at time, t (tonnes d.m. yr-1)
DBI	Daily biomass intake by animal type; kg d.m. head-1 day-1
A_{SEU}	Average months the livestock is expected to be on the parcels

Calculation of ΔCLcurrent

Na,current	=	(39,236SEU sampled / 0.314) = 124,955 SEU in the total project area
ASEU	=	6.7 months (page 77 of the PDD)
DBI	=	1.4 kg.d.m. head-1 day-1 (page 77 of the PDD)
Δ CLmaxEGL	=	139,172 t.d.m. yr^{-1} (page 82 of the PDD)

ΔCLcurrent = 124,955*1.4 kg.d.m. $head^{-1}$ day^{-1}*6.7months*30*1/1000
= 35,162 t.d.m.yr^{-1}

Calculation of $\Delta CL_{PA,t}$

Number of animals (SEU) assessed from the sample project area, $sNa_{PA,t}$ = 3,935 SEU
$Na_{PA,t}$ = (3935 SEU/0.1512) = 26,025 SEU

$\Delta CL_{PA,t}$ = 26,025*1.4 kg.d.m. $head^{-1}$ day^{-1}*6.7 months*30*1/1000
= 7,323 t.d.m.yr^{-1}

Because the difference between the maximum annual biomass that EGL grazing areas can produce for animal feeding (ΔCL_{maxEGL}) and the annual biomass that these grazing areas outside the project are currently producing for animal feeding ($\Delta CL_{current}$) is greater than the animal annual biomass consumption over the project area at time t ($\Delta CL_{PA,t}$), leakage can be deemed as zero.

Δ CLmaxEGL - ΔCLcurrent	$\geq \Delta CL_{PA,t}$
139,172 t.d.m. yr-1 –35,162 t.d.m.yr-1	≥ 7,323 t.d.m. yr-1
104,010 t.d.m. yr-1	≥ 7,323 t.d.m. yr-1,

Therefore, based on the analysis of number of animals displaced to EGL and carrying capacity of EGL, it is concluded that there is no leakage associated with displacement of animals for grazing due to the implementation of the project.

Displacement of fuelwood collection

As the project produces more fuel-wood in comparison to the baseline, there has been no fuel-wood leakage. As stated in the PDD, the project produces more fuel-wood through thinning and cleaning activities. Therefore, no displacement of fuel-wood is anticipated.

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

Table 15 Net Anthropogenic GHG Removals by Sink

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_{2e})	Leakage (tCO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO_2e)
2005	88.6	17,441.68	0	17,353.08
2006	259.16	17,441.68	0	17,182.52
2007	531.09	17,441.68	0	16,910.59
2008	441.6	17,441.68	0	17,000.08
2009	324.41	17,441.68	0	17,117.27
2010	322.16	17,441.68	0	17,119.52
2011	319.93	17,441.68	0	17,121.75
2012	317.72	9,270.38	0	8,952.66
Total				**128,757.50**

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

Table 16. Ex-ante vs ex-post net antropogenic GHG removals by sinks

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO_2e)	178,598.34 (for the period 2005 to 2012)	128,757.50

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

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The difference in the estimated value of net anthropogenic GHG removals by sinks in the registered PDD and calculated at the end of the monitoring period is due to several factors. First, the area implemented under the project is lower than the project area in the registered PDD. Second, the ex-ante emission reduction values presented in the PDD (178,598.34 t CO_2e) are based on the estimates of forest growth while the actual values are based on the measurements conducted on the sample plots. The *ex post* actual net GHG removals by sinks (128,757.50) are in the range corresponding to the ex-ante projections adjusted for the reduced area under project implementation. The differences between the ex post and ex ante estimates seem reasonable considering the diverse species composition and distribution of the project covering different ecozones.

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History of the document

Version	Date	Nature of revision
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Form **Business Function**: Issuance		